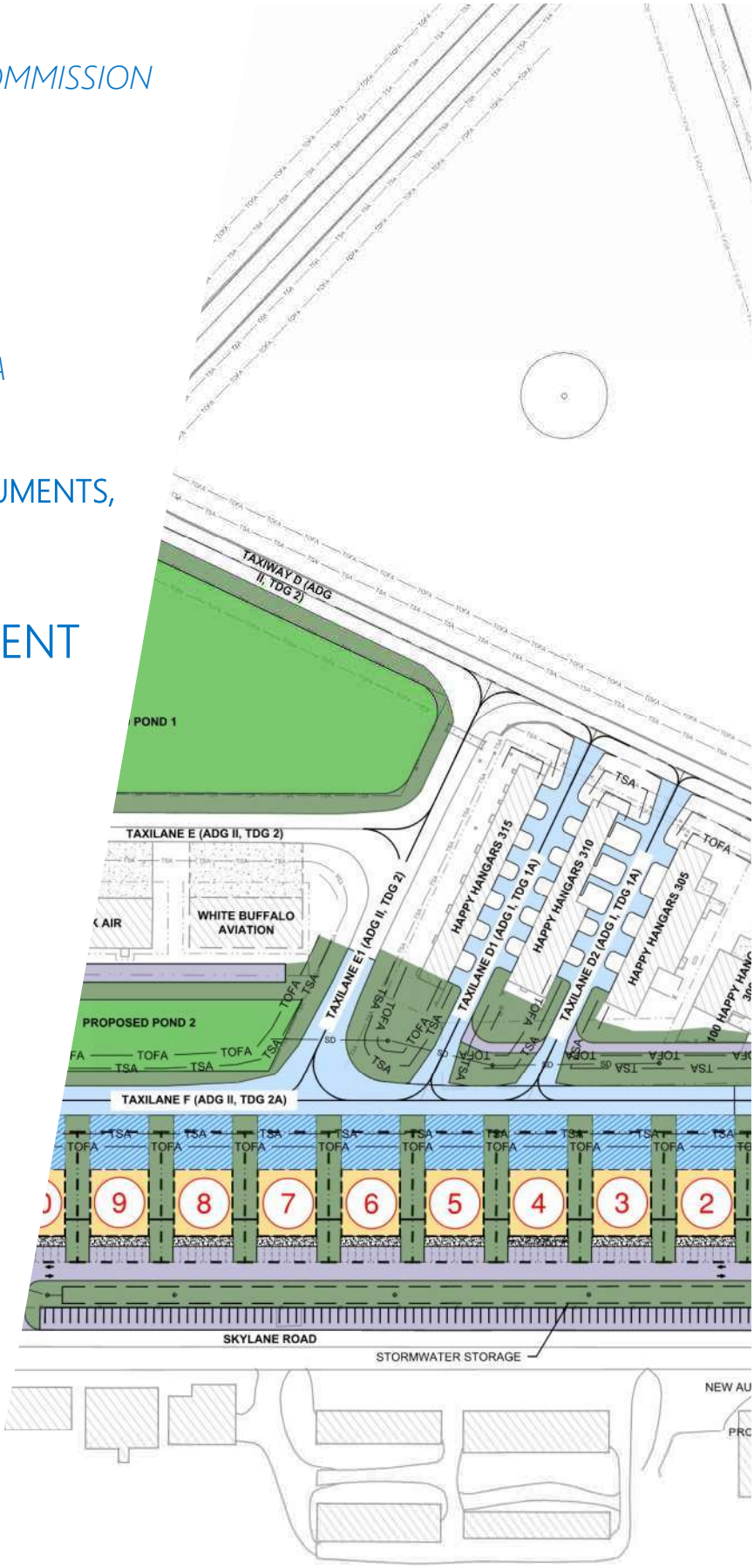
GLYNN COUNTY AIRPORT COMMISSION
BRUNSWICK, GEORGIA

St. Simons Island Airport At McKinnon Field

ST. SIMONS ISLAND, GEORGIA

PROPOSAL, CONTRACT DOCUMENTS, AND SPECIFICATIONS FOR

SKYLANE DEVELOPMENT INFRASTRUCTURE – PHASE 2



FAA Project No.: (TBD)
GDOT Aviation Project No.: (TBD)
PID: (TBD)
GCAC Project No.: 215D
RS&H Project No: 1021-0199-007

RS&H

FEBRUARY 2026
BID ISSUE

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Appendix 2 Geotechnical Engineering Report, Skylane Infrastructure Development Phase II, McKinnon Airport, ECS Florida, LLC. Project: 35-33867. Revised September 24, 2024

REFERENCES

Reference 1 FAA AC 150/5200-18D
Airport Safety Self-Inspection

Reference 2 FAA AC 150/5210-5D
Painting, Marking, and Lighting of Vehicles Used on an Airport

Reference 3 FAA AC 150/5370-2G
Operational Safety on Airports During Construction

Reference 4 FAA AC 150/5370-13A
Off-Peak Construction of Airport Pavements Using Hot-Mix Asphalt

References and other information is available at:
https://www.faa.gov/regulations_policies/advisory_circulars/

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GLYNN COUNTY AIRPORT COMMISSION
ST. SIMONS ISLAND AIRPORT AT McKINNON FIELD

SKYLANE DEVELOPMENT INFRASTRUCTURE – PHASE 2

CONTRACT DOCUMENTS

CIVIL ENGINEERING: Paving, Grading, Airfield Facilities
Brian C. Thompson, PE

By: _____

Date: _____

CIVIL ENGINEERING: Drainage and Utility Infrastructure
Jessica Vick, PE

By: _____

Date: _____

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BID INFORMATION

BID INFORMATION

GLYNN COUNTY AIRPORT COMMISSION
ST. SIMONS ISLAND AIRPORT AT McKINNON FIELD

INVITATION TO BID – Long Form

PROJECT NAME: **Skylane Development Infrastructure – Phase 2**

BID DATE: **Tuesday, 24 March 2026**

BID TIME: **3:00 P.M.**

Sealed bids will be received by the **Glynn County Airport Commission, 295 Aviation Parkway, Suite 205, Brunswick, Georgia 31525-6804,** until **3:00 P.M.** (local time), on the bid date, at which time and place all bids will be publicly opened and read aloud. **Bids must be in the possession of the Glynn County Airport Commission prior to bid call at 3:00 P.M. (local time) on the bid date. Bids shall be sealed and plainly marked on the outside of the envelope with the project name, location of airport, bidder's name, bidder's address, bidder's telephone number. ANY BID RECEIVED AFTER THE SPECIFIED TIME WILL NOT BE CONSIDERED AND WILL BE RETURNED UNOPENED.** Bids must be fully completed and signed in ink in space(s) provided on the enclosed blank bid form(s) or bid will be subject to rejection. Each Bidder must submit with his bid security in the amount of five percent (5%) of his bid price, subject to the conditions provided in Section 20 of the General Provisions. No Bidder may withdraw his bid within ninety (**90**) calendar days after the actual date of the bid opening.

The bid, with original signatures, and two (2) additional copies are to be submitted in a sealed envelope and the sealed envelope shall be marked as follows:

> Glynn County Airport Commission: Do not open in mail room. Bid for Skylane Development Infrastructure – Phase 2, St. Simons Island Airport at McKinnon Field, to be opened at 3:00 P.M., 24 March 2026.

SCOPE OF WORK: The Glynn County Airport Commission seeks to facilitate continued private aircraft hangar development at St. Simons Island Airport by preparing development-ready parcels. This program includes the construction of infrastructure to support the development of the proposed Skylane Hangar Infrastructure Development – Phase 2. Proposed infrastructure improvements include grading, paving, stormwater management and conveyance, utility infrastructure (water, sewer, fire protection, communications, electricity, site lighting), pavement milling/demolition, pavement marking, fencing/gates, grassing, landscaping, and airfield lights and signage. The project included both FAA and GDOT asphalt mix materials. The program includes a Base Bid, plus three (3) Additive Bid Schedules which may be awarded at the discretion of the Commission.

PRE-BID CONFERENCE: A Pre-Bid Conference for this project will be held on **Tuesday, 10 March 2026**,at **3:00 P.M.** (local time) at the 2nd Floor Conference Room, Glynn County Airport Commission, Brunswick Golden Isles Airport, 295 Aviation Parkway, Suite 205, Brunswick, Georgia 31525-6804. **This conference will include information that is essential for all bidders to understand. Therefore, ALL BIDDERS ARE STRONGLY ENCOURAGED TO ATTEND the pre-bid conference.** The Pre-Bid Conference will also provide the **only opportunity** for bidders to examine the project site at St. Simons Island Airport.

OBTAINING BID DOCUMENTS: Bidding documents are available to bidders at no-cost and may be obtained by contacting:

RS&H, Inc.
10748 Deerwood Park Blvd. South
Jacksonville, FL 32256
Attn: Pamela Zenon
Telephone: (904) 256-2121
Email: Pam.Zenon@RSandH.com

The plans, specifications, and other contract documents will be made available on Wednesday, **24 February 2026**. Partial sets of documents will not be issued.

All documents will be available by electronic file transfer only, in Adobe Acrobat file format. Hard copies will not be distributed. Direct access to the electronic file transfer protocols will be available only to registered email addresses. Computer-aided design files will not be available during the bidding period.

It is the sole responsibility of each prospective bidder to assure that RS&H, Inc. is kept informed of his or her current mailing address, email address, telephone number and fax number. Written questions pertaining to the bid documents may be submitted until **5:00 P.M. local time, on Tuesday, 17 March 2026,** and will be addressed by Addendum. Written inquiries after this period will not be addressed. **No telephone inquiries will be accepted.**

Each Bidder is individually responsible for the careful examination of the site of the proposed Work, the Proposal, Plans, General Provisions, Technical and Supplemental Specifications, Contract Forms and all requirements of the project. The failure or omission by any Bidder to do so shall in no way relieve any Bidder from any obligation with respect to its bid.

The successful Bidder will be required to submit a Certification of Non-segregated Facilities prior to award of the Contract, and to notify prospective Subcontractors of the requirement for such Certification where the Subcontract exceeds $10,000. Samples of the Certification and Notice to Subcontractors appear in the Specifications.

A cashier's check, a certified check or a surety bond in the amount of **five percent (5%) of the bid** shall accompany the proposal of each bidder. The said check or bond shall be submitted as security that should the bidder be awarded the work, he will enter into a contract and furnish the necessary bonds and insurance certificates within fifteen (15) days from the date of notice of award and failing to do so, said bid security shall be forfeited to the Owner (Glynn County Airport Commission, Brunswick, Georgia) as liquidated damages. The check or bond shall be made payable to the Owner. The Owner reserves the right to hold the check or bond of the three lowest bidders until the successful bidder has entered into a contract and furnished the necessary bonds. All other checks or bonds will be returned as soon as the award has been made to the successful bidder. The Owner reserves the right to reject proposals and to waive technicalities as provided in Section 20-08 of the General Provisions.

Performance and Payment Bonds will be required as set forth in the INSTRUCTIONS TO BIDDERS. In addition, the successful bidder shall also furnish to the Owner a Warranty covering defects of material and workmanship for the calendar year following the Owner's approval and written acceptance of the construction.

The proposed contract is contingent upon actual receipt by the Glynn County Airport Commission, Brunswick, Georgia of adequate funds from the FAA and/or the Georgia Department of Transportation for the performance of the construction and installation of the airport improvements contemplated by the proposed contract.

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

The **Glynn County Airport Commission** continually strives to develop quality sources for goods and services and encourages all prospective Bidders to respond to the Invitation to Bid. The Owner reserves the following rights: to accept or reject any or all bids, any or all bid alternates, and any portion of the work

that would be reduced due to funding short-falls; and to award the Contract to the most responsive and responsible Bidder whose bid is determined by the Owner to be in its best interest.

The Owner reserves the right to defer award of the Contract for a period of **90** days after the date of opening bids or to reject any or all bids. In case of ambiguity or lack of clearness in stating proposal prices, the Owner reserves the right to adopt the most advantageous interpretation thereof and to accept or reject any informalities or irregularities.

Buy American Provision. The proposed Contract is subject to the Buy American provision under Section 9129 of the Aviation Safety and Capacity Expansion Act of 1990. Details of such requirements are contained in the specifications.

The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of the Glynn County Airport Commission, Brunswick, Georgia, 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 requirement of this bid specification. These requirements apply to all bidders/offerors, including those who qualify as a DBE. A DBE contract goal of **0.0 percent** has been established for this contract. The bidder/offeror shall make good faith efforts, as defined in Appendix A, 49 CFR Part 26 (Attachment 1), to meet the contract goal for DBE participation in the performance of this contract.

The bidder/offeror will be required to submit the following information: (1) the names and addresses of DBE firms that will participate in the contract; (2) a description of the work that each DBE firm will perform; (3) the dollar amount of the participation of each DBE firm participating; (4) written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet the contract goal; (5) written confirmation from the DBE that it is participating in the contract as provided in the commitment made under (4); and (6) if the contract goal is not met, evidence of good faith efforts.

DBE participation in this contract may be in the form of a prime contract, subcontract, joint venture, or another arrangement that qualifies under 49 CFR Sections 26.55, "How is DBE participation counted toward goals?" or 26.53 (g).

After bid opening and before award of the Contract, those bidders that have submitted a Contract price that has been determined to be reasonable will be asked by the Owner, as a condition of remaining in competition for the award, to submit within 10 days the names of the DBEs they propose to use, the type of subcontract work each DBE will perform and the dollar value of each proposed DBE subcontract. The Contractor shall utilize State of Georgia DOT approved DBE Contractors for all DBE subcontract work.

The proposed Contract is under and subject to Executive Order 11246 of September 24, 1965, and the Equal Opportunity Clause. The bidder's (proposer's) attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth in the specifications.

The bidder must supply all the information required by the bid or proposal form.

Women will be afforded equal opportunity in all areas of employment. However, the employment of women shall not diminish the standards or requirements for the employment of minorities.

For contracts of $50,000 or more, a contractor having 50 or more employees and his subcontractors having 50 or more employees and who may be awarded a subcontract of $50,000 or more, will be required to maintain an affirmative action program within 120 days of the Contract.

Pre-award Equal Opportunity Compliance Reviews. Where the bid of the apparent low responsible bidder is in the amount of $1 million or more, the bidder and his known all-tier subcontractors which will be awarded subcontracts of $1 million or more will be subject to full on-site, pre-award equal opportunity

compliance reviews before the award of the Contract for the purpose of determining whether the bidder and his subcontractors are able to comply with the provisions of the equal opportunity clause.

Compliance Reports. Within 30 days after award of this Contract, the Contractor shall file a compliance report (Standard Form 100) if:

a. The Contractor has not submitted a compliance report within 12 months preceding the date of the award; and

b. The Contractor is within the definition of "employer" in Paragraphs 2e(3) of the instructions included in Standard Form 100.

The Contractor shall require the Subcontractor on all-tier subcontracts, irrespective of dollar amount, to file Standard Form 100 within 30 days after award of the subcontract if the above two conditions apply. Standard Form 100 will be furnished upon request.

INVITATION FOR BIDS – Short Form

GLYNN COUNTY AIRPORT COMMISSION
ST. SIMONS ISLAND AIRPORT AT McKINNON FIELD
SKYLANE DEVELOPMENT INFRASTRUCTURE – PHASE 2

Sealed bids will be received by the Glynn County Airport Commission, until **3:00 P.M. local time, Tuesday, 24 March 2026**, at which time they shall be opened in the **2nd Floor Conference Room**, **Glynn County Airport Commission, Brunswick Golden Isles Airport, 295 Aviation Parkway, Suite 205, Brunswick, Georgia 31525-6804**, for:

ST. SIMONS ISLAND AIRPORT AT McKINNON FIELD
SKYLANE DEVELOPMENT INFRASTRUCTURE – PHASE 2

SCOPE OF WORK: The Glynn County Airport Commission seeks to facilitate continued private aircraft hangar development at St. Simons Island Airport by preparing development-ready parcels. This program includes the construction of infrastructure to support the development of the proposed Skylane Hangar Development – Phase 2. Proposed infrastructure improvements include grading, paving, stormwater management and conveyance, utility infrastructure (water, sewer, fire protection, communications, electricity, site lighting), pavement milling/demolition, pavement marking, fencing/gates, grassing, landscaping, and airfield lights and signage. The project included both FAA and GDOT asphalt mix materials. The program includes a Base Bid, plus three (3) Additive Bid Schedules which may be awarded at the discretion of the Commission.

PRE-BID CONFERENCE: A Pre-Bid Conference for this project will be held on **Tuesday, 10 March 2026**,at **3:00 P.M.** (local time) at the 2nd Floor Conference Room, Glynn County Airport Commission, Brunswick Golden Isles Airport, 295 Aviation Parkway, Suite 205, Brunswick, Georgia 31525-6804. **This conference will include information that is essential for all bidders to understand. Therefore, ALL BIDDERS ARE STRONGLY ENCOURAGED TO ATTEND the pre-bid conference.** The Pre-Bid Conference will also provide the **only opportunity** for bidders to examine the project site at St. Simons Island Airport.

Bid security in the amount of five percent (5%) of the base bid will be required to accompany bids. Contract Bonding shall also be required. The Owner reserves the right to reject any or all bids and to waive irregularities in bidding. Participation in the Owner's Disadvantaged Business Enterprise Program is required. The goal for this contract is **zero point zero percent (0.0%)** to be performed by firms certified as DBE by the Georgia Department of Transportation.

This project will be bid as a single contract. Bid prices must be held for up to **90** days. All bids must be submitted in accordance with the Project Manual which may be examined in the Glynn County Airport Commission Office located at the Brunswick Golden Isles Airport or obtained at no-cost by contacting:

RS&H, Inc.
10748 Deerwood Park Blvd. South
Jacksonville, FL 32256
Attn: Pamela Zenon
Telephone: (904) 256-2121
Email: Pam.Zenon@RSandH.com

It is the sole responsibility of each prospective bidder to assure that RS&H, Inc. is kept informed of his or her current mailing address, email address, telephone number and fax number. Written questions pertaining to the bid documents may be submitted until **5:00 P.M. local time on Tuesday, 17 March 2026,** and will be addressed by Addendum. Written inquiries after this period will not be addressed. No telephone inquiries will be accepted.

Complete sets of drawings and specifications are available from RS&H, Inc. beginning on **24 February 2026**. Partial sets of drawings and specifications will not be issued. **All documents will be available by electronic file transfer only**, in Adobe Acrobat file format. **Hard copies will not be distributed. Direct**

access to the electronic file transfer protocols will be available only to registered email addresses. Computer-aided design files will not be available during the bidding period.

GLYNN COUNTY AIRPORT COMMISSION
ST. SIMONS ISLAND AIRPORT AT McKINNON FIELD

INSTRUCTIONS TO BIDDERS

I. GENERAL

A. This project is to be financed in part by a grant from the United States under the Airport Improvement Program. Award of contract is subject to the approval of the Federal Aviation Administration (FAA), the Georgia Department of Transportation (GDOT) and the Glynn County Airport Commission, Brunswick, Georgia (hereinafter called "Owner").

B. Compliance with Law

1. The Bidder covenants and agrees that he and his agents and employees will comply with all municipal, state and federal laws, applicable national and local codes, Owner rules and regulations applicable to the work to be conducted under this Agreement and that he shall obtain all necessary permits, pay all required fees and taxes, and otherwise perform these services in a legal manner. Owner rules and regulations are available on request. The Bidder is assumed to be familiar with all federal, state and local laws, ordinances, Owner rules and regulations that in any manner affect the work. Ignorance on the part of the Bidder will in no way relieve him from responsibility.

2. Bidder certifies that all material, equipment, etc., contained in his proposal meets all OSHA, FAA, GDOT and Owner requirements.

C. General Bond Requirements:

1. The Proposal Guaranty shall be as specified; only the Proposal Bond and Surety's Bond Affidavit as bound within these documents or a Cashier's Check is acceptable. Each separate proposal shall be accompanied by a Cashier's Check or Proposal Bond on the form provided herein in the amount of **5 percent (5%) of the total amount bid**, made payable to the **Glynn County Airport Commission**. If a Proposal Bond is provided in lieu of a Cashier's Check, it must be accompanied by a valid Power of Attorney indicating that the person signing the bond on behalf of the Surety has full legal authority to do so.

2. The amount of such bond or the check of the Bidder whose proposal is accepted shall be forfeited and paid to the Owner as liquidated damages if said Bidder fails to enter into a Contract with the Owner and to furnish the required executed Contracts, Certificates of Insurance and Performance and Payment Bonds within fifteen (15) calendar days after the date of the Notice of Award and Acceptance of the Proposal.

3. Contract Payment and Performance Bonds shall be as specified; only the Payment and Performance Bonds and Surety's Bond Affidavit as bound within these Contract Documents are acceptable.

D. Insurance Requirements:

1. Insurance requirements shall be as specified in the Special Conditions, Section 2.

II. NONDISCRIMINATION AND SEGREGATED FACILITIES

A. Each Bidder shall complete, sign and include in his/her Proposal the Equal Employment Opportunity Report Statement and Certification of Nonsegregated Facilities. A Proposal may be considered nonresponsive and may be rejected if it fails to furnish required data. When a determination has been made to award a Contract to a specific Contractor, such Contractor shall, prior to award, furnish such other

pertinent information regarding his/her own employment policies and practices as the Federal Aviation Administration (FAA), the GDOT, the Owner, or the Secretary of Labor may require. The Contractor shall require similar compliance with its subcontractors. Where the Contract Price is $10,000.00 or greater, the Contractor shall comply with Part 152 of the Federal Aviation Regulations (FAR) as amended and specifically FAR 152.411(c) and (d), incorporated herein by this reference. All such information required of a subcontractor shall be furnished by the Bidder.

B. The Equal Employment Opportunity Report Statement, Certification of Nonsegregated Facilities, Equal Opportunity Clause, and all other EEO requirement shall be included in all nonexempt subcontracts entered into by the Bidder. Subcontracts entered into by the Bidder shall also include all other applicable labor provisions. No subcontract shall be awarded to a noncomplying subcontractor.

C. **Affirmative Action**: If the Contract is an aviation-related activity as defined in 14 CFR Part 152, and is a Construction Contract of $10,000.00 or more, Bidder assures that it will undertake an Affirmative Action Program as required by 14 CFR Part 152, Subpart E, to ensure that no person shall, on the grounds of race, creed, color, national origin, or sex, be excluded from participating in or receiving the services or benefits of any program or activity covered by this subpart. Bidder assures that it will require that it's covered sub organizations provide assurances to the Bidder that they similarly will undertake Affirmative Action Programs and that they will require assurances from their sub organizations, as required by 14 CFR Part 152, Subpart E to the same effect.

D. Bidders must comply with the President's Executive Order No. 11246, which prohibits discrimination in employment regarding race, creed, color, sex or national origin.

E. In addition, the Bidder will also insert in each of his subcontracts a clause requiring the subcontractor to include these provisions in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

III. DISADVANTAGED BUSINESS ENTERPRISE (DBE)

A. General: Bidders are advised that this project required the Owner to submit and FAA to approve a DBE Program.

B. DBE Obligation: The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of the Glynn County Airport Commission, Brunswick, Georgia, 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 contact will be conditioned upon satisfying the requirements of this bid specification. These requirements apply to all bidders/offerors, including those who qualify as a DBE. A DBE contract goal of **0.0 percent** has been established for this contract. The bidder/offeror shall make good faith efforts, as defined in Appendix A, 49 CFR Part 26 (Attachment 1), to meet the contract goal for DBE participation in the performance of this contract.

C. DBE Expectancies: Contract expectancies are expectancies established for each specific prime Contract with subcontracting possibilities. The Bidder shall make good faith efforts to subcontract **0.0 percent** of the dollar value of the prime Contract to small business concerns owned and controlled by socially and economically disadvantaged individuals (DBE). In the event that the Bidder for this solicitation qualifies as a DBE, the Contract goal shall be deemed to have been met. Individuals who are rebuttably presumed to be socially and economically disadvantaged include: (i) "Black Americans," which includes persons having origins in any of the Black racial groups of Africa; (ii) "Hispanic Americans," which includes persons Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race; (iii) Native Americans, " which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians; (iv) "Asian-Pacific Americans," which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos,

Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tongam, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong; (v)"Subcontinent Asian Americans," which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka; (vi) Women; (vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective. The apparent successful competitor will be required to submit information concerning the DBEs that will participate in this Contract. The information will include the name and address of each DBE, a description of the work to be performed by each named firm, and the dollar value of the Contract. If the Bidder fails to achieve the Contract expectancy stated herein, it will be required to provide documentation demonstrating that it made good faith efforts in attempting to do so. A Proposal that fails to meet these requirements will be considered nonresponsive.

The bidder will be required to submit the following information: (1) the names and addresses of DBE firms that will participate in the contract; (2) a description of the work that each DBE firm will perform; (3) the dollar amount of the participation of each DBE firm participating; (4) written documentation of the bidder's commitment to use a DBE subcontractor whose participation it submits to meet the contract goal; (5) written confirmation from the DBE that it is participating in the contract as provided in the commitment made under (4); and (6) if the contract goal is not met, evidence of good faith efforts.

D. Definition of DBE: A DBE is a small business that is both owned and controlled by minorities or both owned and controlled by women. This means that 51 percent of the business must be owned by minorities and/or women and that they must control the management and daily operation of the business.

E. Contractor Efforts to Meet DBE Subcontract Expectancies:

1. Bidders that have not met the expectancy stated in the DBE Expectancies section but wish to remain in competition must provide the Owner with written statements as to the reasons that the expectancy was not met. Those efforts may include, but are not necessarily limited to, the following:

a. Whether the Contractor attended any pre-solicitation or pre-bid meetings that were scheduled by the Owner to inform DBEs of contracting and subcontracting opportunities;

b. Whether the Contractor advertised in general circulation, trade association, and minority-focus media concerning the subcontracting opportunities;

c. Whether the Contractor provided written notice to a reasonable number of specific DBEs certified by the Owner that their interest in the Contract was being solicited in sufficient time to allow the DBEs to participate effectively;

d. Whether the Contractor followed up initial solicitations of interest by contacting DBEs certified by the Owner to determine with certainty whether the DBEs were interested;

e. Whether the Contractor selected portions of the Work to be performed by DBEs certified by the Owner in order to increase the likelihood of meeting the good faith efforts and, in the case of federally funded projects, the DBE expectancy (including, where appropriate, breaking down contracts into economically feasible units to facilitate DBE participation);

f. Whether the Contractor provided interested DBEs certified by the Owner with adequate information about the Plans, Specifications, or requirements of the Contract;

g. Efforts made by the Bidder to negotiate with DBEs certified by the Owner for specific subcontract work, including but not limited to:

(1) Names, addresses and phone numbers of DBEs that were contacted in this regard.

(2) A description of the information provided to DBEs regarding the Contract Documents pertaining to the subcontract work proposed to be performed.

(3) A statement as to why additional agreements were not reached with DBE firms.

h. Whether the Contractor negotiated in good faith with interested DBEs certified by the Owner; not rejecting DBEs as unqualified without sound reasons based on a thorough investigation of their capabilities.

i. Whether the Contractor made efforts to assist interested DBEs certified by the Owner in obtaining bonding, lines of credit, or insurance required by the recipient or Contractor; and

j. Whether the Contractor effectively used the services of available minority community organizations; minority contractors' groups; local, state and federal minority business assistance offices; and other organizations that provide assistance in the recruitment and placement of DBEs.

F. Certification of Eligibility of DBEs: To ensure that DBEs are eligible, any DBE that wishes to participate must provide an eligibility certification to the Owner.

1. The Owner will accept any firm certified as a DBE under an authorized ~~federal~~, state ~~or local~~ DBE certification program.

2. Any firm having questions regarding its eligibility as a DBE should contact the Owner regarding the certification requirements if it wishes to compete as a bona fide DBE under this Contract.

G. Bidder's DBE Assurance: Each Bidder shall submit a written assurance of its ability to meet the prescribed expectancy in its proposal. Proposals received that do not contain this assurance or have not given acceptable reasons for not meeting the expectancy will be considered nonresponsive and may be ineligible for award of the Contract.

IV. EXAMINATION OF CONDITIONS AFFECTING WORK

A. Prior to submitting a proposal, each Bidder shall examine and thoroughly familiarize himself with all existing conditions, including all applicable laws, codes, ordinances, rules and regulations that will affect his work. Bidders shall visit the project site, examine the grounds and all existing buildings, utilities, pavements and systems and shall ascertain all conditions that will in any manner affect work. Bidders shall ask the Engineer, in writing, for any additional information deemed necessary for them to be fully informed as to exactly what is to be expected prior to submitting a proposal.

V. INTERPRETATIONS

A. Each Bidder shall carefully examine the plans and the Contract Documents and all Addenda or other revisions and thoroughly familiarize himself with the detailed requirements prior to submitting a proposal. Should a Bidder find discrepancies or ambiguities in, or omission from, the Contract Documents, or should he be in doubt as to their meaning, he shall at once, and in any event, not later than seven days prior to receipt of bid, notify the Engineer in writing who will send written Addenda to all Bidders where necessary. Bidders shall not be entitled to rely upon any oral instructions or interpretations by the Engineer. All Addenda sent to Bidders will become a part of the Contract Documents. All technical inquiries shall be directed, in writing to:

RS&H, Inc.,
10748 Deerwood Park Boulevard South,
Jacksonville, Florida, 32256,
Attention: Pamela Zenon
Office: (904) 256-2121
Email: Pam.Zenon@RSandH.com

No allowance will be made after proposals are received due to oversight by Bidder.

VI. SUBSTITUTIONS

A. The materials, products and equipment described in the Contract Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. The Bidder is responsible for assuring that all supplies, subcontractors, and vendors conform to the Contract requirements.

B. No substitution will be considered prior to receipt of bids unless written request for approval has been submitted in the proper format not less than seven (7) days prior to the receipt of bids. The burden of proof of the merit of the proposed substitution is upon the Bidder. The Engineer's decision of approval or disapproval of a proposed substitution is final.

In making requests for substitutions, the Bidder shall list the particular system, product, or material he wishes to substitute, and the justification for such a request. Requests submitted shall include any and all adjustments of that any other work affected thereby.

C. If the Engineer approves any proposed substitution prior to receipt of bids, such approval will be set forth in an Addenda. Bidders shall not rely on approvals made in any other manner.

D. No substitutions will be considered after the receipt of bids except as specifically provided for in the Contract Documents.

VII. PREPARATION AND SUBMISSION OF PROPOSAL

A. Sealed Proposals for the construction of the Project generally described will be received until the time and date stated in the "Invitation to Bid."

B. The Proposal shall be on the "Proposal Forms" provided; no other forms are acceptable.

C. Due to the allocation of funds, successful Bidders will be required to provide verified breakdown of costs of Work in a manner acceptable to the Engineer and Owner.

D. Each proposal submitted shall be placed in a sealed opaque envelope plainly marked with the Project name, location of airport, and name and business address of the Bidder on the outside. When sent by mail, preferably registered, the sealed Proposal, marked as indicated above, shall be enclosed in an additional envelope and sent by registered mail with return receipt requested. The Owner will in no way be responsible for delays caused by the U. S. Postal service or any other deliverer of the Proposal, or for delay received on or before the time and at the place designated in the "Invitation to Bid". Proposals received after the specified opening time shall be returned to the Bidder unopened. The envelope shall contain the signed original and two complete copies of:

Page(s)	Title
P-1 thru P-2	Proposal Form
P-3	Proposal Affidavit
P-4	Proposal Bond (or Cashier's Check)
P-5	Surety's Bond Affidavit (on Forms Provided)
P-6 thru P-8	Certification of Compliance with FAA Buy American Preferences – Construction Projects
P-9	Disadvantaged Business Enterprises Plan
P-10 thru P-12	Statement of Bidder's Qualifications
P-13	DBE Subcontractor Solicitation
P-14	DBE Intent to Perform as a Subcontractor
P-15	Disadvantaged Business Enterprise (DBE) Utilization
P-16	Letter of Intent
P-17	Non-Collusion Affidavit
P-18 thru P-20	Georgia Security & Immigration Compliance (GISC) Affidavits
P-21 thru P-22	Certification of Offerer/Bidder Regarding Tax Delinquency and Felony Convictions
P-23 thru P-38	Bid Schedule
P-39 thru P-40	Insurance Requirements

E. The Bidder must submit his Proposal on the forms furnished by the Owner. All blank spaces in the Proposal forms must be correctly filled in where indicated and the Bidder must state the price(s) (written in ink) both in words and numerals. **The words, unless obviously incorrect in the opinion of the Owner, will govern.**

F. Proposals shall be submitted as indicated in the "Proposal Form" and shall be signed in blue ink by an official of the firm submitting the Proposal. A separate bid proposal package for use by the contractor in submitting his bid forms is included so that the specification book doesn't need to be broken apart.

G. Erasures or other changes in a Proposal shall be explained or noted over the initials or signature of the Bidder.

H. Proposals containing reservations, conditions, omissions, unexplained erasures or alternations, items not required in the bid or irregularities of any kind may be rejected by the Owner.

I. Each proposal shall indicate the full business name and address of the Bidder and shall be signed by him/her with his/her usual signature.

J. A proposal submitted by a partnership shall list the names of all partners and shall be signed in the partnership name by one of the members of the partnership.

K. A proposal submitted by a corporation shall be executed in the legal name of the corporation and signed by the President or Vice President. The name of each person signing the Proposal shall be typed or printed below the signature.

L. When requested by the Owner, a Power of Attorney or other satisfactory evidence of the authority of the officer signing on behalf of the corporation shall be furnished for the Owner's records.

M. The Bidder must supply all information required.

N. The Proposal must be accompanied by a Proposal Bond and Surety's Bond Affidavit executed on the forms provided or a Cashier's Check payable to the Owner in an amount equal to but not less than

five percent (5%) of the bid. If a Bidder withdraws its Proposal within **90** days from the date on which bids are opened, or if a Bidder is awarded the Contract but fails, refuses or neglects to execute the Contract or to furnish acceptable and required Certificates of Insurance, and Payment and Performance Bonds within 20 days after receipt of written Notice of Award and Acceptance, then the amount of this Bond or check shall be paid to, or retained by the Owner as liquidated damages.

O. Proposals which are electronically transmitted will not be accepted.

VIII. TAX EXEMPT CERTIFICATE

A. If the Bidder desires a tax-exempt certificate, it shall be obtained from the State of Georgia and not through the Owner.

IX. DISQUALIFICATION OF BIDDERS

A. Bidders will be disqualified and their proposals not considered for any of the following reasons:

1. Where more than one proposal for an individual, firm, partnership or corporation is filed under the same or different names and where such proposals are not identical in every respect;

2. Reasonable grounds for believing that any bidder is interested in more than one proposal for work contemplated or materials to be furnished;

3. Reason for believing that collusion exists among the bidders;

4. Where the Bidder has an interest in any litigation or arbitration claim against the Owner or Engineer or has defaulted on a previous Contract;

5. Lack of competency, as revealed by the Statement of Bidder's Qualifications, etc.;

6. Uncompleted work which, in the judgement of the Owner, will hinder or prevent the prompt completion of additional work, if awarded.

X. SURETY BONDS

A. With the execution and delivery of the Contract, the Bidder shall furnish and file with the Owner in the amounts herein required the following surety bonds:

Performance Bond and Labor and Materials Payment Bond, if the total awarded Contract price exceeds $25,000.00, in a penal sum not less than the amount of the Contract as awarded, as security for the faithful performance of the Contract and for the payment of all persons, firms or corporations to whom the Bidder may become legally indebted for labor, materials, tools, equipment or services of any nature including utility and transportation services, employed or used by him in performing the work.

The warranty shall begin on the date of official acceptance of the completed installation by resolution of the Owner.

No surety will be accepted who is now in default or delinquent on any bond or who is interested in any litigation or arbitration claim against the Owner. All bonds shall be made on forms furnished herein and shall be executed by surety companies licensed to do business in the State of Georgia and acceptable to the Owner. Each bond shall be executed by the Bidder and the surety and the bonds shall bear the same date as, or a date subsequent to that of the Contract.

Should any surety on the Contract be determined unsatisfactory at any time by the Owner, notice will be given to the Bidder to that affect and the Bidder shall forthwith substitute a new surety or sureties satisfactory to the Owner. No payment will be made under the Contract until the new surety or sureties, as required, have qualified and been accepted by the Owner. The Contract shall not be operative nor shall any payments be due until approval of the bond has been made by the Owner.

Contractor's Liability Insurance Requirements. The Bidder shall provide with the proposal a listing of general liability, automobile liability, excess liability, worker's compensation, property hazard, and miscellaneous insurance coverage the Bidder currently has and normally has in force, under the column "Bidder's Present Insurance Coverage" along with a copy of a Certificate of Insurance as verification of that coverage. In addition, the bidder shall provide any additional premium cost for each of those items listed under the column "Insurance Requirements for this Project" on the Insurance Form issued by the agent or insurance carrier for that coverage.

In the event the Owner determines that the low bidder's coverage in force is inadequate, the Owner may require the low bidder to procure the additional coverage in the amounts specified by the Owner in the Insurance Forms. The cost of premiums for such additional coverage shall be paid by the Owner in the form of a reimbursement under the Contract. The additional premium cost shall be that defined on Bid Schedule, ADDITIONAL INSURANCE PREMIUM COSTS and that amount shall be inserted in Bid Item I-1,

XI. THIRD-PARTY COVERAGE

A. **The bidding documents require the Bidder to name the Engineer and the Owner as additional insureds.** The bidder shall show the premium cost for the additional insureds in the items defined in the Bid Schedules as **"Additional Insurance Premium Cost."**

The Bidder shall submit actual premium costs which do not reflect any overhead, profit or other hidden costs.

XII. AWARD OF LOWEST RESPONSIBLE AND RESPONSIVE BIDDER

A. The Owner reserves the following rights: to accept or reject any or all bids, any or all bid schedules, and any portion of the work that would be reduced due to funding short-falls; and to award the Contract to the most responsive and responsible Bidder whose bid is determined by the Owner to be in its best interest.

B. The Owner reserves the right to accept any combination of the Bid Schedules based upon available funds provided by the FAA and GDOT, and the sum of the Owner established Bid Schedules shall be the award mechanism used to establish the low responsible and responsive bidder. The Owner reserves the sole right to establish which combination bid schedules will form the basis of award.

MANDATORY CONTRACT PROVISIONS

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1. ACCESS TO RECORDS AND REPORTS

(Reference:: 2 CFR § 200.334, 2 CFR § 200.337 and FAA Order 5100.38)

ACCESS TO RECORDS AND REPORTS

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

2. BREACH OF CONTRACT TERMS

(Reference: 2 CFR § 200 Appendix II(A))

BREACH OF CONTRACT TERMS

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

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

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

3. BUY AMERICAN PREFERENCE

(Reference: 49 USC § 50101, Executive Order 14005, and BABA)

BUY AMERICAN CERTIFICATION

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

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

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

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

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

Certification of Compliance with FAA Buy American Preference – Construction Projects

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

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

a) Only installing iron, steel and manufactured products produced in the United States;

b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.

c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or

d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

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

a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product

b) To faithfully comply with providing U.S. domestic products

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

d) Certify that all construction materials used in the project are manufactured in the U.S.

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

a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.

b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.

c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.

d) To furnish U.S. domestic product for any waiver request that the FAA rejects.

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

Required Documentation

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

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire

b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;

c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

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

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;

b) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).

c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.

d) Percentage of non-domestic component and subcomponent cost as compared to total "facility" component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

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

a) A completed Content Percentage Worksheet and Final Assembly Questionnaire form

b) At minimum two comparable equal bids and/or offers;

c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;

d) Completed waiver applications for each comparable bid and/or offer.

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

Date	Signature
Company Name	Title

Certification of Compliance with FAA Buy American Preference – Equipment/Building Projects

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 U.S.C. § 50101, and other Made in America Laws, U.S. statutes, guidance, and FAA policies by selecting one on the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark (ü) or the letter "X".

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

a) Only installing steel and manufactured products produced in the United States;

b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.

c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or

d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

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

a) To provide to the Airport Sponsor or FAA evidence that documents the source and origin of the steel and manufactured product.

b) To faithfully comply with providing U.S. domestic product.

c) To furnish U.S. domestic product for any waiver request that the FAA rejects.

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

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

a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.

b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.

c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.

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

Required Documentation

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

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire

b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;

c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

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

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;

b) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108 (products of unknown origin must be considered as non-domestic products in their entirety).

c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.

d) Percentage of non-domestic component and subcomponent cost as compared to total "item" component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

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

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire from

b) At minimum two comparable equal bidders and/or offerors;

c) c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;

d) d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 U.S.C. § 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

4. CIVIL RIGHTS - GENERAL
(Reference: 49 USC § 47123)

GENERAL CIVIL RIGHTS PROVISIONS

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

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

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

5. CIVIL RIGHTS – TITLE VI ASSURANCE

(Reference: 49 USC § 47123 and FAA Order 1400.11)

CIVIL RIGHTS – TITLE VI ASSURANCE

Title VI Solicitation Notice

As a condition of a grant award, the Sponsor shall demonstrate that it complies with the provisions of Title VI of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d et seq) and implementing regulations (49 CFR part 21) including amendments thereto, the Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47123), the Age Discrimination Act of 1975 (42 U.S.C. 6101 et seq.), Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794 et seq.), the Americans with Disabilities Act of 1990 (42 U.S.C. § 12101, et seq.), U.S. Department of Transportation and Federal Aviation Administration (FAA) Assurances, and other relevant civil rights statutes, regulations, or authorities, including any amendments or updates thereto. This may include, as applicable, providing a current Title VI Program Plan to the FAA for approval, in the format and according to the timeline required by the FAA, and other information about the communities that will be benefited and impacted by the project. A completed FAA Title VI Pre-Grant Award Checklist is required for every grant application, unless excused by the FAA. The Sponsor shall affirmatively ensure that when carrying out any project supported by this grant that it complies with all federal nondiscrimination and civil rights laws based on race, color, national origin, sex, creed, age, disability, genetic information, in consideration for federal financial assistance. The Department's and FAA's Office of Civil Rights may provide resources and technical assistance to recipients to ensure full and sustainable compliance with Federal civil rights requirements. Failure to comply with civil rights requirements will be considered a violation of the agreement or contract and be subject to any enforcement action as authorized by law.

Title VI List of Pertinent Nondiscrimination Acts and Authorities

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

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq*., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);
- 49 CFR Part 21 (Non-discrimination in Federally-Assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964) including amendments thereto;
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794 *et seq*.), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);
- The Age Discrimination Act of 1975, as amended (42 .U.S.C. § 6101 *et seq*.) (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);

- The Civil Rights Restoration Act of 1987 (P.L. 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act of 1990 (42 U.S.C. § 12101, et seq) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR Parts 37 and 38;
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. § 1681, et seq).

Compliance with Nondiscrimination Requirements

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

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

b. Cancelling, terminating, or suspending a contract, in whole or in part.

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

6. CLEAN AIR AND WATER POLLUTION CONTROL

(Reference: 2 CFR § 200, Appendix II(G), 42 U.S.C. § 7401, et seq, 33 U.S.C. § 1251, et seq)

CLEAN AIR AND WATER POLLUTION CONTROL

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

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

7. CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS

(Reference: 2 CFR § 200 Appendix II (E), 29 CFR § 5.5(b), 40 U.S.C. § 3702. And 40 U.S.C. § 3704)

CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS

1. **Overtime Requirements.**

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

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

   In the event of any violation of the clause set forth in paragraph (1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this clause, in the sum of $29 for each calendar day on which such individual was required or permitted to

work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this clause.

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

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

4. **Subcontractors.**

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

8. COPELAND "ANTI-KICKBACK" ACT

(Reference: 2 CFR § 200, Appendix II(D) and 29 CFR Parts 3 and 5)

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.

9. DAVIS-BACON REQUIREMENTS

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

DAVIS-BACON REQUIREMENTS

1. Minimum Wages.

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

of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

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

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

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

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

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

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

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

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

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit

as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

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

2. Withholding.

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

3. Payrolls and Basic Records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records that show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

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

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

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

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

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

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

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

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

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

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized

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

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

5. Compliance with Copeland Act Requirements.

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

6. Subcontracts.

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

7. Contract Termination: Debarment.

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

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

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

9. Disputes Concerning Labor Standards.

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

10. Certification of Eligibility.

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

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

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

10. DEBARMENT AND SUSPENSION

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

CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT

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

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

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

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

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

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

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

11. DISADVANTAGED BUSINESS ENTERPRISE

(Reference: 49 CFR part 26, and 49 U.S.C. § 47113)

SOLICITATION REQUIREMENTS

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

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

1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;

2) A description of the work that each DBE firm will perform;

3) The dollar amount of the participation of each DBE firm listed under (1);

4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal

5) Written confirmation from each listed DBE firm that it is participating in the contract in the kind and amount of work provided in the prime contractor's commitment; and

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

The successful Bidder or Offeror must provide written confirmation of participation from each of the DBE firms the Bidder or Offeror lists in its commitment within five days after bid opening.

DISADVANTAGED BUSINESS ENTERPRISES

Contract Assurance (49 CFR § 26.13) - The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26, including any amendments thereto, in the award and administration of DOT-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

1) Withholding monthly progress payments;

2) Assessing sanctions;

3) Liquidated damages; and/or

4) Disqualifying the Contractor from future bidding as non-responsible.

Prompt Payment (49 CFR § 26.29) – The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than **30 days** from the receipt of each payment the prime contractor receives from the **Glynn County Airport Commission**. The prime contractor agrees further to return retainage payments to each subcontractor within **30 days** after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the **Glynn County Airport Commission**. This clause applies to both DBE and non-DBE subcontractors.

Termination of DBE Subcontracts (49 CFR § 26.53(f)) – The prime contractor must not terminate a DBE subcontractor listed in response to this Solicitation (or an approved substitute DBE firm) without prior written consent of the **Glynn County Airport Commission**. This includes, but is not limited to, instances in which the prime contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

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

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

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

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

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

12. DISTRACTED DRIVING

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

TEXTING WHEN DRIVING

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving", (10/1/2009) and DOT Order 3902.10, "Text Messaging While Driving", (12/30/2009), the Federal Aviation Administration encourages recipients of Federal grant funds to adopt and enforce safety policies

that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or subgrant.

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

13. PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

(Reference: 2 CFR § 200, Appendix II(K), and 2 CFR § 200.216)

PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

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

14. DRUG FREE WORKPLACE REQUIREMENTS)

(Reference: 49 CFR Part 32, and Drug-Free Workplace Act of 1988 (41 U.S.C. § 8101-8106, as amended)

Not applicable.

15. FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

(Reference: 29 USC § 201, et seq, and2 CFR § 200.430

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

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

16. LOBBYING AND INFLUENCING FEDERAL EMPLOYEES

(Reference : 31 USC § 1352 – Byrd Anti-Lobbying Amendment, 2 CFR Part 200, Appendix II(I), and 49 CFR Part 20, Appendix A)

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 31 U.S.C. § 1352. 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.

17. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

(Reference: 20 CFR part 1910)

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

18. PROCUREMENT OF RECOVERED MATERIALS

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

PROCUREMENT OF RECOVERED MATERIALS

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

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

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

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

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

19. RIGHT TO INVENTIONS

(Reference: 2 CFR § 200 Appendix II(F) and 37 CFR §401)

RIGHTS TO INVENTIONS

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

20. SEISMIC SAFETY

(Reference: 49 CFR Part 41)

SEISMIC SAFETY

In the performance of design services, the Consultant agrees to furnish a building design and associated construction specification that conform to a building code standard that provides a level of seismic safety substantially equivalent to standards as established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their building code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety. At the conclusion of the design services, the Consultant agrees to furnish the Owner a “certification of compliance” that attests conformance of the building design and the construction specifications with the seismic standards of NEHRP or an equivalent building code

21. TAX DELINQUENCY AND FELONY CONVICTONS

(Reference: Section 8113 of the Consolidated Appropriations Act, 2022 (P.L. 117-103) and similar provisions in subsequent appropriations acts, and DOT Order 4200.6 – Appropriations Act Requirements for Procurement and Non-Procurement Regarding Tax Delinquency and Felony Convictions)

CERTIFICATION OF BIDDER/OFFERR REGARDING TAX DELINQUNCY AND FELONY CONVICTIONS

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

Certifications

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

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

Note

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

Term Definitions

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

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

22. TERMINATION OF CONTRACT

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

TERMINATION FOR CONVENIENCE (CONSTRUCTION & EQUIPMENT CONTRACTS)

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

1) Contractor must immediately discontinue work as specified in the written notice.

2) Terminate all subcontracts to the extent they relate to the work terminated under the notice.

3) Discontinue orders for materials and services except as directed by the written notice.

4) Deliver to the Owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work, and as directed in the written notice.

5) Complete performance of the work not terminated by the notice.

6) Take action as directed by the Owner to protect and preserve property and work related to this contract that Owner will take possession.

Owner agrees to pay Contractor for:

1) Completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;

2) Documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;

3) Reasonable and substantiated claims, costs, and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and

4) Reasonable and substantiated expenses to the Contractor directly attributable to Owner's termination action.

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

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

TERMINATION FOR CAUSE (CONSTRUCTION)

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

TERMINATION FOR CAUSE (EQUIPMENT)

The Owner may, by written notice of default to the Contractor, terminate all or part of this Contract for cause if the Contractor:

1. Fails to begin the Work under the Contract within the time specified in the Notice- to-Proceed;
2. Fails to make adequate progress as to endanger performance of this Contract in accordance with its terms;
3. Fails to make delivery of the equipment within the time specified in the Contract, including any Owner approved extensions;
4. Fails to comply with material provisions of the Contract;
5. Submits certifications made under the Contract and as part of their proposal that include false or fraudulent statements; or
6. Becomes insolvent or declares bankruptcy.

If one or more of the stated events occur, the Owner will give notice in writing to the Contractor and Surety of its intent to terminate the contract for cause. At the Owner's discretion, the notice may allow the Contractor and Surety an opportunity to cure the breach or default.

If within [10] days of the receipt of notice, the Contractor or Surety fails to remedy the breach or default to the satisfaction of the Owner, the Owner has authority to acquire equipment by other procurement action. The Contractor will be liable to the Owner for any excess costs the Owner incurs for acquiring such similar equipment.

Payment for completed equipment delivered to and accepted by the Owner shall be at the Contract price. The Owner may withhold from amounts otherwise due the Contractor for such completed equipment, such sum as the Owner determines to be necessary to protect the Owner against loss because of Contractor default.

Owner will not terminate the Contractor's right to proceed with the work under this clause if the delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such acceptable causes include: acts of God, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, and severe weather events that substantially exceed normal conditions for the location.

If, after termination of the Contractor's right to proceed, the Owner determines that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the Owner issued the termination for the convenience the Owner.

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

23. TRADE RESTRICTION CERTIFICATION

(Reference: 49 USC § 50104 and 49 CFR part 30)

TRADE RESTRICTION CERTIFICATION

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

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

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

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

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

1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR; or

2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list; or
3) who incorporates in the public works project any product of a foreign country on such USTR list.

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

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

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

24. VETERAN'S PREFERENCE

(Reference: 49 USC § 47112(c))

VETERAN'S PREFERENCE

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

25. DOMESTIC PREFERENCES FOR PROCUREMENTS

(Reference: 2 CFR § 200.322, and 2 CFR Part 200, Appendix II(L))

CERTIFICATION REGARDING DOMESTIC PREFERENCES FOR PROCUREMENTS

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

26. PROHIBITION OF COVERED UNMANNED AIRCRAFT SYSTEMS (UAS)

(Reference: FAA Reauthorization Act of 2024 (Public Law 118-63), Section 936, and49 U.S.C. § 44801 note)

PROHIBITION OF COVERED UNMANNED AIRCRAFT SYSTEMS (UAS)

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

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

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

27. GEORGIA SECURITY & IMMIGRATION COMPLIANCE (GISC) AFFIDAVIT

(Reference: O.C.G.A. § 13-10-91 and DOL Rule 300-10-1-.02)

The Glynn County Airport Commission and Contractor agree that compliance with the requirements of O.C.G.A. § 13-10-91, as amended, and Rule 300-10-1-.02 of the Rules of the Georgia Department of Labor are conditions of this Agreement for the physical performance of services.

The Contractor further agrees that its compliance with the requirements of O.C.G.A. § 13-10-91, as amended, and DOL Rule 300-10-1-.02 is attested to on the executed Contractor Affidavit and Agreement attached hereto.

If employing or contracting with any subcontractor(s) in connection with this Agreement, Contractor further agrees:

(1) To secure from the subcontractor(s) an affidavit attesting to the subcontractor's compliance with O.C.G.A. § 13-10-91, as amended, and DOL Rule 300-10-1-.02; such affidavit being in the form attached hereto; and

(2) To submit such subcontractor affidavit(s) to the County when the subcontractor(s) is retained, but in any event, prior to the commencement of work by the subcontractor(s).

The failure of Contractor to supply the affidavit of compliance at the time of execution of this Agreement and/or the failure of Contractor to continue to satisfy the obligations of O.C.G.A. § 13-10-91, as amended, and DOL Rule 300-10-1-.02 as set forth in this Agreement throughout the contract period shall constitute a material breach of the contract. Upon notice of such breach, Contractor shall be entitled to cure the breach within ten days, upon providing satisfactory evidence of compliance with the terms of this Agreement and State law. Should the breach not be cured, the Glynn County Airport Commission shall be entitled to all available remedies, including termination of the contract and damages.

Affidavit forms are included in PROPOSAL FORMS section.

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PROPOSAL FORMS

PROPOSAL FORMS

GLYNN COUNTY AIRPORT COMMISSION

PROPOSAL FORM

TO: **Glynn County Airport Commission**
295 Aviation Parkway
Suite 205
Brunswick, Georgia 31525-6804

PROJECT: **SKYLANE DEVELOPMENT INFRASTRUCTURE – PHASE 2**

FAA Project No.:	(TBD)
GDOT Aviation Project No.:	(TBD)
PID:	(TBD)
GCAC Project No.:	215D
RS&H Project No.:	1021-0199-007

BIDDER: _____

BIDDER'S ADDRESS: _____

_____

DATE: _____

BIDDER'S REPRESENTATIVE (to be contacted for additional information on this Proposal):

_____ _____
(Name) (Telephone Number)

BIDDER'S DECLARATION AND UNDERSTANDING

The undersigned declares that no person in the employ of the Glynn County Airport Commission, Brunswick, Georgia (herein referred to as OWNER) is pecuniarily interested in this proposal, or in the contract or the work which he proposed to do; that he has carefully examined the contract and specifications and has informed himself fully in regard to all conditions pertaining to the site where the work is to be done and carefully estimated on the work. He understands that the OWNER, its agents and employees, are not to be in any manner held responsible for the accuracy of, or bound by, any estimates or plans of underground structures relating to the work and that if any have been given or made, they are to be considered solely as a base for filling out and preparing several proposals.

The undersigned proposes to furnish all labor, equipment material required for the above outlined construction at the airport known as St. Simons Island Airport at McKinnon Field located in Glynn County, Georgia, in accordance with the accompanying specifications and plans prepared for the OWNER for the sums specified herein, subject to additions and deductions according to the specifications and in all respects to the terms thereof.

It is understood that all workmanship and materials under all items of work are guaranteed for one year from the date of final acceptance, unless otherwise specified. It is understood that the OWNER reserves the right to accept or reject any or all bids and to waive any informalities. Wages not less than the minimum rates or wages, as pre-determined for this project by the Secretary of the U.S. Department of Labor, were used in the preparation of this proposal. It is agreed that the description under each item, being stated, implies although it does not mention, all incidentals and that the prices stated are intended to cover all such

work, materials and incidentals and constitute bidders obligations as described in the specifications, and any details not specifically mentioned, but evidently included in the contract shall be compensated for in the item which most logically includes it.

The bidder expressly agrees that should environmental permits not be granted for items contingent on their receipt, the OWNER may delete those items from the Contract without Supplemental Agreement or Change Order. In this event, the bidder agrees that the unit prices proposed for non-environmentally contingent items will remain unchanged and that no claims relating to the deletion of items contingent on environmental permitting will be made.

The Owner reserves the right to award any, all, or none of the alternate bid items.

Enclosed herewith is the Proposal Bond in the form specified in Section 20 of the General Provisions which is submitted as a guarantee of the good faith of the Proposal. The Bidder agrees that, upon receipt of notice to award, he will, within 20 calendar days, execute the Contract in accordance with the Proposal as accepted, and satisfy the Contract bonding and insurance requirements stipulated in Section 30 of the General Provisions and Section 2 of the Special Conditions; and that upon his failure or refusal to do so, the Proposal Bond accompanying his bid shall be forfeited to and become the property of the OWNER as liquidated damages for such failure or refusal.

ADDENDA

The Bidder hereby acknowledges that he has received the following Addenda:

Addenda No.	Dated
_____	_____
_____	_____
_____	_____

TAXES

The Bidder agrees that any applicable Federal, State and Local sales and use taxes, are included in the stated bid prices. Since often the Glynn County Airport Commission, Brunswick, Georgia may be exempt from taxes for equipment, materials and services, it is the responsibility of the Contractor to determine whether sales taxes are applicable. The Contractor is liable for any applicable taxes which are not included in the stated bid prices.

NOTE: THE BID PRICES SET FORTH ON THE ATTACHED SHEETS SHALL BE CONSIDERED FIRM BIDS NOT SUBJECT TO PRICE ADJUSTMENT.

SIGNATURE ACKNOWLEDGES THAT: (Check as applicable)

_____ Bid is in full compliance with the Specifications.
_____ Bidder is appropriately licensed in the State of Georgia to perform the Scope of Work.

(CORPORATE SEAL)

ATTEST: BIDDER:

_____ _____
Signature Signature

By: _____ By: _____

Title: _____ Title: _____

GLYNN COUNTY AIRPORT COMMISSION

PROPOSAL AFFIDAVIT

The following affidavit must be executed in order that your Proposal may be considered.

STATE OF _____)

COUNTY OF _____)

_____ of lawful age, being first duly sworn, upon his oath, deposes and says: That he executed the accompanying Proposal on behalf of the Contractor therein named, and that he had lawful authority so to do, and said Contractor has not directly or indirectly, entered into any agreement, expressed or implied, with any Contractor or Contractors, having for its object the controlling of the price or amount of such Proposal or any Proposals, the limiting of the Proposal of Contractors, the parceling or farming out to any Contractor or Contractors, to other persons of any part of the Contract or any of the subject matter of the Proposals, or of the profits thereof, and that he has not and will not divulge the sealed Proposal to any person whomsoever; except those having a partnership or other financial interest with him in said Proposal or Proposals, until after the sealed Proposal or Proposals are opened.

Signed: _____

Subscribed and sworn to before me this ____ day of _____, 20___.

My Commission Expires:

_____ _____

Notary Public

GLYNN COUNTY AIRPORT COMMISSION

PROPOSAL BOND

Bond No._____

(Not to be filled in if a Cashier's check is submitted)

KNOW ALL MEN BY THESE PRESENTS: That the undersigned Bidder, _____ _____, as Principal, and firmly bound unto the **Glynn County Airport Commission, Brunswick, Georgia** in the sum of _____ dollars $_____), for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THIS OBLIGATION is such that if Principal:

1. Does not withdraw the attached Proposal of _____ dollars ($_____) for the improvement of **St. Simons Island Airport at McKinnon Field** for a period of **ninety (90) days** after the date on which the bids are opened; and

2. Enters into the written contract and furnishes the required Certificates of Insurance, Payment and Performance Bonds, with Surety or Sureties acceptable to the **Glynn County Airport Commission, Brunswick, Georgia**, within twenty (20) days after notice that the said Proposal is accepted, then this obligation shall be void; otherwise the same shall be in full force and the full amount of this Proposal Bond shall be paid to the **Glynn County Airport Commission, Brunswick, Georgia** as stipulated herein as liquidated damages.

Signed this ____ day of _____, 20___.

(PRINCIPAL MUST INDICATE WHETHER CORPORATION, PARTNER-SHIP, COMPANY OR INDIVIDUAL)

_____

_____
Principal

THE PERSON SIGNING FOR THE PRINCIPAL SHALL, IN HIS OWN HANDWRITING, SIGN THE PRINCI-PAL'S NAME, HIS OWN NAME AND HIS TITLE. WHERE THE PERSON SIGNING FOR A CORPORATION IS OTHER THAN THE PRESIDENT OR VICE PRESIDENT, HE MUST FURNISH A CORPORATE RESOLUTION SHOWING HIS AUTHORITY TO BIND THE CORPORATION.

By:_____

_____
Title

_____

(Affix Surety's Corporate Seal)

_____
Surety

GLYNN COUNTY AIRPORT COMMISSION

SURETY'S BOND AFFIDAVIT

STATE OF _____)

COUNTY OF _____)

Before me the undersigned authority, personally appeared _____ Who, being duly sworn deposes and says that he is a duly authorized (resident) (non-resident) insurance agent, properly licensed under the laws of the State of _____, and the State of Georgia, to represent _____ of _____, a company authorized to make corporate surety bonds under the laws of the State of Georgia (the "Surety").

Said _____ Further certifies that as agent or attorney-in-fact for the said surety, he has signed the attached bond in the sum of _____ (U.S. $_____) on behalf of _____

to the **Glynn County Airport Commission, Brunswick, Georgia** covering the **Skylane Development Infrastructure – Phase 2 Project (GCAC Project No.: 215D)**, at St. Simons Island Airport at McKinnon Field.

Said _____ Further certifies that the premium on the said bond is $_____

which will be paid in full directly to the surety or to him as agent or attorney-in-fact, and included in his regular commission as agent or attorney-in-fact, for the execution of said bond and that his commission will not be divided with anyone except to _____ who is a duly authorized insurance agent properly licensed under the laws of the State of Georgia.

Countersigned:

_____
Surety

_____
Georgia Resident Agent

_____
Attorney-in-Fact

_____
Address of Resident Agent

Acknowledgment for _____
Attorney-in-Fact

Sworn to and Subscribed
Before me this _____ Day of
_____, 20___.

_____
Address of Bond Company

_____
Phone Number

Notary Public, State of_____

My commission expires:_____

_____
Fax Number

GLYNN COUNTY AIRPORT COMMISSION

CERTIFICATION OF COMPLIANCE WITH FAA BUY AMERICAN PREFERENCE – CONSTRUCTION PROJECTS

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

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

a) Only installing iron, steel and manufactured products produced in the United States;

b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.

c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or

d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

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

a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product

b) To faithfully comply with providing U.S. domestic products

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

d) Certify that all construction materials used in the project are manufactured in the U.S.

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

a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.

b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.

c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.

d) To furnish U.S. domestic product for any waiver request that the FAA rejects.

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

Required Documentation

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

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire

b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;

c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

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

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;

b) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).

c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.

d) Percentage of non-domestic component and subcomponent cost as compared to total “facility” component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

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

a) A completed Content Percentage Worksheet and Final Assembly Questionnaire form

b) At minimum two comparable equal bids and/or offers;

c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;

d) Completed waiver applications for each comparable bid and/or offer.

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

Date	Signature
Company Name	Title

GLYNN COUNTY AIRPORT COMMISSION

DISADVANTAGED BUSINESS ENTERPRISES PLAN

The **Glynn County Airport Commission, Brunswick, Georgia** (Owner) in accordance with Title VI Civil Rights Act of 1964, 78 Stat. 262, 42 USC and 49 CFR, Part 21 issued pursuant to such Act, affords Disadvantage Business Enterprises full opportunity to submit an indication of interest in response to this invitation and will not discriminate against any interested firm on the ground of race, creed, color, sex, age or national origin in a contract award. In addition, the Owner has established goals for DBE participation in Owner projects.

REQUIRED ASSURANCE TO BE INCLUDED IN ALL BID PROPOSALS

The firm assures that it will utilize not less than **0.0 percent** of Disadvantaged Business participation. Percentage applies to bidder if a DBE or to qualifying subcontractors to be used by Bidder. Upon request, Bidder and/or Contractor, if contract is entered into with Bidder, shall furnish the names of such subcontractors and the anticipated dollar volume to be furnished by Bidder. If the goal for DBE participation is not met, the Bidder is required to submit documentation of efforts it made. The Owner will then determine whether these are "good faith efforts."

CERTIFICATION OF BIDDER for the above:

BIDDER'S NAME: _____

ADDRESS: _____

IRS NUMBER: _____

GLYNN COUNTY AIRPORT COMMISSION

STATEMENT OF BIDDER'S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he desires.

1. Name of Bidder: _____

2. Permanent main office address: _____

_____

3. When organized: _____

4. If a corporation, where incorporated: _____

5. How many years engaged in the business related to this Project under present firm or trade name? Provide former names of firm or trade names, with dates of operation under each: _____

_____

_____

6. General character of work performed by your company: _____

_____

_____

_____

_____

7. Have you ever failed to complete any work awarded to you? If so, where and why? Provide name of Owner: _____

_____

_____

8. Have you ever defaulted on a contract? If so, where and why? Provide name of Owner: _____

_____

_____

9. Have you ever sued an Owner of a project? If so, where and why? Provide name of Owner: _____

_____

_____

10. Have you ever failed to close out a contract within six (6) months after final acceptance of a project by not submitting contractually required information to the Owner?

11. Have you ever sued a Consultant or subconsultant representing the Owner of a project? If so, where and why? Provide name of Owner:

12. Have you ever been terminated by the Owner of a project? If so, where and why? Provide name of Owner:

13. Experience in work similar in importance to this project, including night work and/or tightly time-constrained work. List contract name, contract value, location, owner, and completion date:

14. Experience in Airport/Airfield projects is not a specific contract requirement. List Airport/Airfield project experience, including contract name, contract value, location, owner, and completion date:

15. List of equipment that would be available for use on this project:

15. Background and experience of the principal members of your organization, including the officers:

_____

_____

_____

_____

16. Provide bank references: _____

_____

_____

17. Will you, upon request, fill out a detailed financial statement and furnish any other pertinent information that may be required by the Glynn County Airport Commission, Brunswick, Georgia?

_____

18. The undersigned hereby authorizes and requests any persons, firm or corporation to furnish any information requested by the Glynn County Airport Commission, Brunswick, Georgia, in verification of the recitals comprising this Statement of Bidder's Qualifications.

Dated at _____, this _____ day of _____20___.

_____ By: _____
(Contractor)

Title: _____

State of _____

License Number _____

Date of License_____

_____, being duly sworn deposes and says that he is

_____ of _____ and that the answers to the foregoing questions and all statements therein contained are true and correct.

SUBSCRIBED AND SWORN to before me this _____ day of _____, 20___.

_____
Notary's Signature

_____
Notary's Printed Name

NOTARY PUBLIC, STATE OF _____
My commission expires:

_____, 20____

GLYNN COUNTY AIRPORT COMMISSION

DBE SUBCONTRACTOR SOLICITATION

Project Name: **SKYLANE DEVELOPMENT INFRASTRUCTURE – PHASE 2**
St. Simons Island Airport at McKinnon Field

DBE Project Goal: **0.0%** GDOT Certified DBE Firms

Name, Address, Phone # of Sub.	Date of Contract	Result(s) of Contact

Title of Official **Company**

Date **Title of Official**

THIS FORM MUST BE SUBMITTED WITH THE BID PROPOSAL.

NOTE: Please attach copies of any written solicitation information, including, but not limited to, information regarding follow-up contacts.

GLYNN COUNTY AIRPORT COMMISSION

DBE INTENT TO PERFORM AS A SUBCONTRACTOR

TO: _____, in response to a telephone/written request for a quote on _____, 20___, _____agrees to perform the work outline below in the project known as _____ _____ for the Glynn County Airport Commission, Brunswick, Georgia.

The work description is as follows:

_____

_____

_____

The price of said work is $_____ will enter into a formal agreement for the above work conditional upon your entering a contract with the Glynn County Airport Commission, Brunswick, Georgia. Any changes, including the addition or deletion of DBE firms after bid opening, must have written approval of the Contractor Coordinator.

_____ _____

Date **Name of DBE Firm**

****

_____ _____

Name of Prime Contractor **Title of Official Signing**

_____

Signature of Official

GLYNN COUNTY AIRPORT COMMISSION

DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION

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

_____ The bidder/offeror is committed to a minimum of **0.0%** DBE utilization on this contract.

_____The bidder/offeror (if unable to meet the DBE goal of **0.0%**) is committed to a minimum of_____% DBE utilization on this contract and submits documentation demonstrating good faith efforts.

DBE firms must be certified DBE by GDOT at the time of bid submittal.

Name of bidder/offeror's firm:_____

State Registration No._____

By_____ _____
Signature Title

GLYNN COUNTY AIRPORT COMMISSION

LETTER OF INTENT

Name of bidder/offeror's firm:_____

Address:_____

City:_____ State:_____ Zip:_____

Name of DBE firm:_____

Address:_____

City:_____ State:_____ Zip:_____

Telephone:_____

Description of work to be performed by DBE firm:

_____

_____

_____

_____

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

Affirmation

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

By_____
(Signature) (Title)

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

(Submit this page for each DBE subcontractor.)

GLYNN COUNTY AIRPORT COMMISSION

NON-COLLUSION AFFIDAVIT

STATE OF GEORGIA

COUNTY OF GLYNN

_____, being first duly sworn, deposes and says that:

1. (S)He is _____ of _____, the Bidder that has submitted the attached Bid;

2. (S)He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

3. Such Bid is genuine and is not a collusive or sham Bid;

4. Neither the Bidder nor anyone acting on behalf of the Bidder, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached bid has be submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Glynn County Airport Commission, Brunswick, Georgia or any person interested in the proposed Contract; and,

5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or anyone acting on his/her/its behalf.

_____
(Signature)

_____
(Title)

Subscribed and Sworn to before me of this ____ day of _____, 20___.

_____
(Notary's Signature)

_____
(Notary's Stamped or Printed Name)

Notary Public, in and for _____

_____County,

My commission expires:_____

GLYNN COUNTY AIRPORT COMMISSION

GEORGIA SECURITY & IMMIGRATION COMPLIANCE (GSIC) AFFIDAVIT
CONTRACTOR AFFIDAVIT & AGREEMENT

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, as amended, stating affirmatively that the individual, firm or corporation which is contracting with Glynn County Airport Commission, has registered and is participating in a federal work authorization program* [an electronic verification of work authorization program operated by the U.S. Department of Homeland Security or any equivalent federal work authorization program operated by the U.S. Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603], in accordance with the provisions established in O.C.G.A. § 13-10-91, as amended.

The undersigned further agrees that should it contract with any subcontractor(s) for the physical performance of services pursuant to the contract with Glynn County Airport Commission, the Contractor will secure from the subcontractor(s) verification of compliance with O.C.G.A. § 13-10-91, as amended, on the attached Subcontractor Affidavit. The undersigned contractor further agrees to use the federal work authorization program throughout the contract period and to maintain records of such compliance and to provide a copy of each such verification to Glynn County Airport Commission, at the time the subcontractor(s) is retained to perform such services.

_____ _____
EEV / Basic Pilot Program* User Identification Number — Date of Authorization for Program

_____ _____
BY: Authorized Officer or Agent — Date of execution of Affidavit
[Contractor Name]

_____
Title of Authorized Officer or Agent

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
____ DAY OF _____, 20__

_____
Notary Public
My Commission Expires:

As of the effective date of O.C.G.A. § 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot Program" operated by the U.S. Citizenship and Immigration Services Bureau (USCIS) of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

GLYNN COUNTY AIRPORT COMMISSION

GEORGIA SECURITY & IMMIGRATION COMPLIANCE (GSIC) AFFIDAVIT
SUBCONTRACTOR AFFIDAVIT & AGREEMENT

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. § 13-10-91, as amended, stating affirmatively that the individual, firm or corporation which is contracting with Glynn County Airport Commission, has registered and is participating in a federal work authorization program* [an electronic verification of work authorization program operated by the U.S. Department of Homeland Security or any equivalent federal work authorization program operated by the U.S. Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603], in accordance with the provisions established in O.C.G.A. § 13-10-91, as amended.

_____
EEV / Basic Pilot Program* User
Identification Number

_____ _____
BY: Authorized Officer or Agent Date
[Subcontractor Name]

_____
Title of Authorized Officer or Agent

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
____ DAY OF _____, 20___

_____
Notary Public
My Commission Expires:
_____

**As of the effective date of O.C.G.A. § 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot Program" operated by the U.S. Citizenship and Immigration Services Bureau (USCIS) of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).*

Glynn County Airport Commission
Affidavit Verifying Residency Status of an Applicant as Required by the Georgia Security and Immigration Compliance Act

By executing this affidavit under oath, as an applicant for a contract or other public benefit administered through the Glynn County Airport Commission, as referenced in the Georgia Security and immigration Compliance Act (O.C.G.A. § 50-36-1. as amended), I am stating the following with respect to my application for such contract or other public benefit.

By executing this affidavit under oath, as an applicant for a contract or other public benefit administered through the Columbus Airport Commission, as referenced in the Georgia Security and Immigration Compliance Act (O.C.G.A. § 50-36-1, as amended), I am stating the following with respect to my application for such contract or other public benefit.

_____ **I am a United States citizen**

OR

_____ **I am a legal permanent resident 18 years of age or older or I am an otherwise qualified alien or non-immigrant under the Federal Immigration and Nationality Act 18 years of age or older and lawfully present in the United States.***

In making the above representation under oath, I understand that any person who knowingly and willfully makes a false, fictitious, or fraudulent statement or representation in an affidavit shall be guilty of a violation of O.C.G.A. § 16-10-20.

_____ _____
Signature of Applicant Date

_____
Printed Name

_____
*Alien registration number for non-citizens

SUBSCRIBED AND SWORN BEFORE ME ON
THIS _____ DAY OF _____, 20_____

_____ Notary Public

My Commission Expires: _____

*Note: O.C.G.A. § 50-36-1(e)(2) requires that aliens under the federal Immigration and nationality Act, Title 8 U.S.C., as amended, provide their alien registration number. Because legal permanent residents are included in the federal definition of "alien", legal permanent residents must also provide their alien registration number

****

PLEASE INDICATE THE DOCUMENT VERIFYING YOUR RESIDENCY STATUS AND ATTACH A COPY OF THE DOCUMENT (front and back)

- ☐ I-327 (Reentry Permit)
- ☐ I-551 (Permanent Resident Card)
- ☐ I-571 (Refugee Travel Document)
- ☐ I-688 (Temporary Resident Card)
- ☐ I-688A (Employment Authorization Card)
- ☐ I-688B (Employment Authorization Document)
- ☐ I-766 (Employment Authorization Card)
- ☐ Certificate of Citizenship
- ☐ Naturalization Certificate
- ☐ Machine Readable Immigrant Visa
- ☐ Temporary I-551 Stamp (on passport or I-94)
- ☐ I-94 (Arrival/Departure Record)
- ☐ Unexpired Foreign Passport
- ☐ I-20 (Certificate of Eligibility for Nonimmigrant (F-1) Student Status)
- ☐ DS2019 (Certificate of Eligibility for Exchange Visitor (J-1) Status)
- ☐ Other (Use Document Description)

_____
Entity for which Applicant has applied

December 2009

GLYNN COUNTY AIRPORT COMMISSION

CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

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

Certifications

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 ( ) a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

Note

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

Term Definitions

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

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

(Signature Page follows)

By executing this affidavit, the undersigned certifies the accuracy of the information provided herein.

_____
(Signature)

_____
(Name/Title)

Subscribed and Sworn to before me of this ____ day of _____, 20____.

_____
(Notary's Signature)

_____
(Notary's Stamped or Printed Name)

Notary Public, in and for _____

_____County,

GLYNN COUNTY AIRPORT COMMISSION

BID SCHEDULE

Airport: **ST. SIMONS ISLAND AIRPORT AT McKINNON FIELD**
Project: **Skylane Development Infrastructure – Phase 2**
FAA Project No: **(TBD)**
GDOT Aviation Project No: **(TBD)**
GCAC Project No.: **215D**
RS&H Project No. **1021.0199.007**

BASE BID

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
C-100-14.1	Contractor Quality Control Program (CQCP)	1	LSUM	$_____	$_____
C-102-5.1	Temporary Erosion and Sedimentation Control Program	1	LSUM	$_____	$_____
C-102-5.2	Crushed Stone Construction Exit	1	EACH	$_____	$_____
C-102-5.3	Silt Fence, Non-Sensitive Type	3,930	LFT	$_____	$_____
C-102-5.4	Inlet Protection	8	EACH	$_____	$_____
C-102-5.5	Temporary Rock Check Dam	7	EACH	$_____	$_____
C-102-5.6	Outlet Protection (Rip-Rap)	40	SYD	$_____	$_____
C-105-6.1	Mobilization	1	LSUM	$_____	$_____
C-105-6.2	Engineer / RPR Field Office and Equipment	1	LSUM	$_____	$_____
P-101-5.1	Pavement Removal, Material and Depth Varies	19,273	SYD	$_____	$_____
P-102-10.1	Safety and Security	1	LSUM	$_____	$_____
P-104-5.1	Project Survey and Stakeout	1	LSUM	$_____	$_____
P-105-5.1	Temporary Construction Items	1	LSUM	$_____	$_____
P-108-5.1	Painted Pavement Marking Removal	1,263	SFT	$_____	$_____

BASE BID

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
P-151-4.1	Clearing and Grubbing	12	ACRE	$_____	$_____
P-152-4.1	Unclassified Excavation	28,500	CYD	$_____	$_____
P-152-4.2	Unsuitable Excavation	2,410	CYD	$_____	$_____
P-152-4.3	Borrow Excavation	2,850	CYD	$_____	$_____
P-209-5.1	Crushed Aggregate Base, 8” Thickness	7,398	SYD	$_____	$_____
P-401-8.1	Asphalt Surface Course	815	TON	$_____	$_____
P-401-8.2	Asphalt Base Course	815	TON	$_____	$_____
P-602-5.1	Bituminous Prime Coat	3,657	GAL	$_____	$_____
P-603-5.1	Bituminous Tack Coat	355	GAL	$_____	$_____
P-620-5.1	Airfield Pavement Marking, White, with Type III Reflective Media	46	SFT	$_____	$_____
P-620-5.2	Airfield Pavement Marking, Yellow, with Type III Reflective Media	4,529	SFT	$_____	$_____
P-620-5.3	Airfield Pavement Marking, Black, without Reflective Media	7,069	SFT	$_____	$_____
P-620-5.4	Airfield Pavement Marking, “X” Marking, White with Type III Reflective Media, with Black Outline	2	EACH	$_____	$_____
P-620-5.5	Airfield Pavement Marking, “STOP” Text Box, White with Type III Reflective Media on Black Field	3	EACH	$_____	$_____
P-702-5.1	Water Main, 6” Dia., AWWA C900, MJ Fittings	106	LFT	$_____	$_____
P-702-5.2	Water Main, 8” Dia., AWWA C900, MJ Fittings	3,290	LFT	$_____	$_____

BASE BID

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
P-702-5.3	Water Main, 8” Dia., HDPE, DR 11, Including Fittings	128	LFT	$_____	$_____
P-702-5.4	Water Main, Service Stub, 2” Dia.	10	LFT	$_____	$_____
P-702-5.5	Water Main, Reconnect Existing Service Line, Size as Required	8	LFT	$_____	$_____
P-702-5.7	Water Valve, 8” Gate Valve with Road Box	9	EACH	$_____	$_____
P-702-5.8	Water Main, Connection to Existing, 8”x8” Tapping Valve and Sleeve with Road Box	3	EACH	$_____	$_____
P-702-5.9	Water Valve, Flush Valve and Riser	1	EACH	$_____	$_____
P-702-5.10	Fire Hydrant Assembly, Complete	2	EACH	$_____	$_____
P-702-5.11	Relocate Fire Hydrant Assembly, Complete	4	EACH	$_____	$_____
P-702-5.12	Remove Existing Watermain	2,520	LFT	$_____	$_____
P-702-5.13	Remove Meter and Box	1	EACH	$_____	$_____
P-702-5.14	Remove Gate Valve	3	EACH	$_____	$_____
P-703-5.1	Sanitary Sewer Service Lead, 4” Dia., SDR 26 PVC	421	LFT	$_____	$_____
P-703-5.2	Sanitary Sewer Main, 8” Dia., SDR 26 PVC	1,589	LFT	$_____	$_____
P-703-5.3	Sanitary Sewer Force Main, 1.25” Dia., HDPE DR 11	376	LFT	$_____	$_____
P-703-5.4	Sanitary Sewer Force Main, 2” Dia., HDPE DR 11	596	LFT	$_____	$_____
P-703-5.5	Sanitary Sewer, Manhole, Standard	5	EACH	$_____	$_____
P-703-5.6	Sanitary Sewer, Manhole, High-Risk (Force Main)	2	EACH	$_____	$_____
P-703-5.7	Connect to Existing Sanitary Manhole	2	EACH	$_____	$_____

BASE BID

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
P-703-5.8	Remove Existing Sanitary Manhole	4	EACH	$_____	$_____
P-703-5.9	Remove Existing Sanitary Sewer Main, Size Varies	1500	LFT	$_____	$_____
P-703-5.10	Remove Existing Sanitary Force Main, Size Varies	485	LFT	$_____	$_____
P-703-5.11	Adjust Sanitary Manhole to Grade	2	EACH	$_____	$_____
P-703-5.12	Sanitary Sewer Service, Restore or Re-Connect Existing System	6	EACH	$_____	$_____
P-703-5.13	Packaged Sanitary Pump Station, P-1, Complete	1	EACH	$_____	$_____
P-703-5.14	Packaged Sanitary Pump Station, P-2, Complete	1	EACH	$_____	$_____
D-701-.5.1	Box Culvert, 36”x48”, Reinforced Concrete	652	LFT	$_____	$_____
D-701-.5.2	Box Culvert, 36”x60”, Reinforced Concrete	656	LFT	$_____	$_____
D-701-.5.3	Reinforced Concrete Pipe, 15” Dia., Class III	48	LFT	$_____	$_____
D-701-.5.4	Reinforced Concrete Pipe, 18” Dia., Class III	237	LFT	$_____	$_____
D-701-.5.6	Reinforced Concrete Pipe, 24” Dia., Class V	230	LFT	$_____	$_____
D-701-.5.7	Corrugated Polyethylene Pipe, 6” Dia., AASHTO M252, Watertight Joints	178	LFT	$_____	$_____
D-701-.5.8	Corrugated Polyethylene Pipe, 12” Dia., AASHTO M294, Watertight Joints	39	LFT	$_____	$_____
D-701-.5.11	Corrugated Polyethylene Pipe, 24” Dia., AASHTO M294, Watertight Joints	60	LFT	$_____	$_____
D-701-.5.12	Pavement Underdrain, 6” Perforated Corrugated Polyethylene Pipe in Aggregate Bedding with Filter Fabric Wrap, Complete	963	LFT	$_____	$_____
D-701-.5.13	Remove Existing HDPE, 8” Dia.	75	LFT	$_____	$_____

BASE BID

Item No.	Item Description	Estimated Quantity	Unit Price in Numbers	Total Amount per Item
D-701-.5.14	Remove Existing CMP, 12” Dia.	28 LFT	$_____	$_____
D-701-.5.15	Remove Existing RCP, 24” Dia.	83 LFT	$_____	$_____
D-701-.5.16	Remove Headwall	1 EACH	$_____	$_____
D-751-5.1	Drainage Inlet, GDOT Standard No. 1019A Type C, SDGI 04	1 EACH	$_____	$_____
D-751-5.2	18” ADS Yard Inlet	5 EACH	$_____	$_____
D-751-5.3	Junction Box, GDOT Special Design, SDGI 01	1 EACH	$_____	$_____
D-751-5.4	Junction Box, GDOT Special Design, SDGI 02	1 EACH	$_____	$_____
D-751-5.5	Junction Box, GDOT Special Design, SDGI 03	1 EACH	$_____	$_____
D-751-5.6	Junction Box, GDOT Special Design, B-1	1 EACH	$_____	$_____
D-751-5.7	Junction Box, GDOT Special Design, B-2	1 EACH	$_____	$_____
D-751-5.8	Junction Box, GDOT Special Design, B-3	1 EACH	$_____	$_____
D-751-5.9	Junction Box, GDOT Special Design, B-4	1 EACH	$_____	$_____
D-751-5.10	Outlet Control Structure, OCS-1, Complete	1 EACH	$_____	$_____
D-751-5.11	Outlet Control Structure, OCS-2, Complete	1 EACH	$_____	$_____
D-751-5.12	Outlet Control Structure, OCS-3, Complete	1 EACH	$_____	$_____
D-751-5.13	Outlet Control Structure, OCS-4, Complete	1 EACH	$_____	$_____
D-751-5.14	Outlet Control Structure, OCS-5, Complete	1 EACH	$_____	$_____
D-752-5.1	Flared End Section, 15” RCP, GDOT 1120 FES	1 EACH	$_____	$_____
D-752-5.2	Flared End Section, 18” RCP, GDOT 1120 FES	1 EACH	$_____	$_____

BASE BID

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
D-752-5.3	Concrete Headwall, 36”x48” Box Culvert, GDOT 1001B	1	EACH	$_____	$_____
D-752-5.4	Underground Stormwater Detention System, Delegated Design, ADS Stormtech or Equal, 54,000 CF Storage Volume, Installed Complete	1	LSUM	$_____	$_____
D-752-5.5	Remove Drainage Structure, Pond 1	1	EACH	$_____	$_____
T-901-5.1	Seeding	8.0	ACRE	$_____	$_____
T-904-5.1	Sodding	22,693	SYD	$_____	$_____
T-905-5.2	Topsoil, 4” Thickness, Furnished from Off-Site Sources	61,833	SYD	$_____	$_____
T-908-5.1	Mulching	39,140	SYD	$_____	$_____
F-162-5.1	Chain Link Fence, 6’ High, 9 Gage, Vinyl Coated, Without Barbed Wire	2,724	LFT	$_____	$_____
F-162-5.2	Cantilever Gate, 6’ High by 24’ Wide, w/Operator & Access Control System, Vinyl Coated, Complete	2	EACH	$_____	$_____
F-162-5.3	Remove Existing Fencing and Gates	1,513	LFT	$_____	$_____
F-162-5.4	Remove Existing Electronic Gate	1	EACH	$_____	$_____
L-105-7.1	Remove Taxiway Edge Light, Isolation Transformer, and Base Can	8	EACH	$_____	$_____
L-105-7.2	Remove Existing Taxiway Edge Light Cable and Conduit, Complete	353	LFT	$_____	$_____
L-105-7.3	Maintenance of Airport Lighting Systems	1	LSUM	$_____	$_____
L-108-5.1	1/C No. 8 AWG, 5 KV, L-824, Type C Cable, Installed in Duct Bank or Conduit	866	LFT	$_____	$_____

BASE BID

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
L-108-5.2	1/C No. 6 AWG, Solid Bare Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Terminations and Ground Rods	866	LFT	$_____	$_____
L-110-5.1	1-Way, 2-Inch PVC Conduit, Schedule 40	739	LFT	$_____	$_____
L-110-5.2	1-Way, 2-Inch PVC Conduit, Schedule 40, Concrete Encased	127	LFT	$_____	$_____
L-125-5.1	L-861T(L) Taxiway Edge Light and Isolation Transformer and Base Can	15	EACH	$_____	$_____
L-125-5.2	L-863 Elevated Taxiway Edge Retro-Reflective Marker, Omni-Directional, 30” Height, Blue	56	EACH	$_____	$_____
L-858-1	Taxiway End Sign, L-858 C, Size 2, Style 4, Class 1, Unlighted, Complete	1	EACH	$_____	$_____
L-858-2	Guidance Sign, L-858 Y, Size 2, Style 4, Class 1, Unlighted, Complete	2	EACH	$_____	$_____
L-867-1	Junction Can, L867-D, Type B	1	EACH	$_____	$_____
E-100-1	Remove Utility Conduit and Cable	7,016	LFT	$_____	$_____
GDOT 310-1	Graded Aggregate Base, 6” Depth	11,105	SYD	$_____	$_____
GDOT 402-1	Hot Mix Recycled Asphaltic Concrete, 12.5 mm, Superpave	1,597	TON	$_____	$_____
GDOT 636-1	Sign Panel R1-1, STOP, 24”x24, Post-Mounted, Airfield Installation	3	EACH	$_____	$_____
GDOT 636-2	Sign Panel R1-1, STOP, 24”x24, Post-Mounted, Landside Installation	2	EACH	$_____	$_____
GDOT 652-1	Landside Pavement Marking, Yellow or White, Linework, with Reflective Media	1,966	SFT	$_____	$_____

BASE BID

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
GDOT 652-3	Landside Pavement Marking, White, Traffic Arrow Symbol, with Reflective Media	20	EACH	$_____	$_____
GDOT 652-4	Landside Pavement Marking, White, Stop Bar, 24” Wide, with Reflective Media	46	SFT	$_____	$_____
GDOT 652-6	Landside Pavement Marking, White, Parking Stall Number, 4” Height	132	EACH	$_____	$_____
321713-1	Pre-Cast Concrete Wheel Stops	132	EACH	$_____	$_____
012100-1	Primary Power Relocation and Maintenance of Power to Existing Facilities, Allowance, Georgia Power	25,000	EACH	$1.00	$25,000.00
012100-2	Primary Power to Skylane Development Infrastructure – Phase 2, Allowance, Georgia Power	50,000	EACH	$1.00	$50,000.00
012100-3	Maintenance of Communications Systems and Establishment of Primary Communications Portal, Allowance	25,000	EACH	$1.00	$25,000.00
012100-4	Landscape Planting and Irrigation, Allowance	25,000	EACH	$1.00	$25,000.00
I-1	Additional Insurance Premium Cost *	1	LSUM	$_____	$_____

BASE BID

Item No.	Item Description	Estimated Quantity	Unit Price in Numbers	Total Amount per Item

BASE BID: TOTAL AMOUNT $_____

*The insurance premium listed shall be the actual premium cost for including the Owner and Engineer as additional insurers and shall not include any hidden costs, overhead or profits. This item is an FAA Non-Participating item.

TOTAL AMOUNT OF BASE BID: (IN WORDS)

_____

_____ Dollars

_____ Cents

Total Base Bid: Bid Amount $_____

ADDITIVE BID SCHEDULE 01

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
C-100-14.1	Contractor Quality Control Program (CQCP)	1	LSUM	$_____	$_____
C-102-5.1	Temporary Erosion and Sedimentation Control Program	1	LSUM	$_____	$_____
C-102-5.4	Inlet Protection	3	EACH	$_____	$_____
C-105-6.1	Mobilization	1	LSUM	$_____	$_____
P-101-5.2	Cold Milling, 2” Depth	7,706	SYD	$_____	$_____
P-102-10.1	Safety and Security	1	LSUM	$_____	$_____
P-104-5.1	Project Survey and Stakeout	1	LSUM	$_____	$_____
P-105-5.1	Temporary Construction Items	1	LSUM	$_____	$_____
P-108-5.1	Painted Pavement Marking Removal	356	SFT	$_____	$_____
P-152-4.1	Unclassified Excavation	72	CYD	$_____	$_____
P-209-5.3	Crushed Aggregate Base, Trim and Repair	7,706	SYD	$_____	$_____
P-401-8.1	Asphalt Surface Course	887	TON	$_____	$_____
P-602-5.1	Bituminous Prime Coat	1,542	GAL	$_____	$_____
P-620-5.2	Airfield Pavement Marking, Yellow, with Type III Reflective Media	2,907	SFT	$_____	$_____
P-620-5.3	Airfield Pavement Marking, Black, without Reflective Media	2,907	SFT	$_____	$_____
T-904-5.1	Sodding	428	SYD	$_____	$_____
T-905-5.2	Topsoil, 4” Thickness, Furnished from Off-Site Sources	428	SYD	$_____	$_____
L-105-7.3	Maintenance of Airport Lighting Systems	1	LSUM	$_____	$_____

ADDITIVE BID SCHEDULE 01

Item No.	Item Description	Estimated Quantity	Unit Price in Numbers	Total Amount per Item
L-858-2	Guidance Sign, L-858 Y, Size 2, Style 4, Class 1, Unlighted, Complete	3 EACH	$_____	$_____
I-1	Additional Insurance Premium Cost *	1 LSUM	$_____	$_____

ADDITIVE BID SCHEDULE 01: TOTAL AMOUNT $_____

*The insurance premium listed shall be the actual premium cost for including the Owner and Engineer as additional insurers and shall not include any hidden costs, overhead or profits. This item is an FAA Non-Participating item.

TOTAL AMOUNT OF ADDITIVE BID SCHEDULE 01: (IN WORDS)

_____

_____ Dollars

_____ Cents

Total Additive Bid Schedule 01: Bid Amount $_____

ADDITIVE BID SCHEDULE 02

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
C-100-14.1	Contractor Quality Control Program (CQCP)	1	LSUM	$_____	$_____
C-102-5.1	Temporary Erosion and Sedimentation Control Program	1	LSUM	$_____	$_____
C-102-5.4	Inlet Protection	1	EACH	$_____	$_____
C-105-6.1	Mobilization	1	LSUM	$_____	$_____
P-101-5.1	Pavement Removal, Material and Depth Varies	2,831	SYD	$_____	$_____
P-102-10.1	Safety and Security	1	LSUM	$_____	$_____
P-104-5.1	Project Survey and Stakeout	1	LSUM	$_____	$_____
P-105-5.1	Temporary Construction Items	1	LSUM	$_____	$_____
P-108-5.1	Painted Pavement Marking Removal	71	SFT	$_____	$_____
P-152-4.1	Unclassified Excavation	500	SFT	$_____	$_____
P-209-5.1	Crushed Aggregate Base, 6” Thickness	3,694	SYD	$_____	$_____
P-401-8.1	Asphalt Surface Course	425	SYD	$_____	$_____
P-602-5.1	Bituminous Prime Coat	739	GAL	$_____	$_____
P-620-5.2	Airfield Pavement Marking, Yellow, with Type III Reflective Media	1,152	SFT	$_____	$_____
P-620-5.3	Airfield Pavement Marking, Black, without Reflective Media	1,152	SFT	$_____	$_____
D-701-5.17	Corrugated Polyethylene Pipe, 10” Dia., AASHTO M252, Watertight Joints	208	LFT	$_____	$_____
D-751-5.15	Trench Drain System, 10” Dia., Aircraft Rated, Concrete Encased, ADS Duraslot of Equal, Complete	701	LFT	$_____	$_____

ADDITIVE BID SCHEDULE 02

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
D-751-5.16	Trench Drain System Sump, Aircraft Rated, Concrete Encased, ADS or Equal, Complete	2	EACH	$_____	$_____
T-904-5.1	Sodding	1,674	SYD	$_____	$_____
T-905-5.2	Topsoil, 4” Thickness, Furnished from Off-Site Sources	1,164	SYD	$_____	$_____
L-105-7.1	Remove Taxiway Edge Light, Isolation Transformer, and H Base Can	10	EACH	$_____	$_____
L-105-7.2	Remove Existing Taxiway Edge Light Cable and Conduit, Complete	263	LFT	$_____	$_____
L-105-7.3	Maintenance of Airport Lighting Systems	1	LSUM	$_____	$_____
L-108-5.1	1/C No. 8 AWG, 5 KV, L-824, Type C Cable, Installed in Duct Bank or Conduit	291	LFT	$_____	$_____
L-108-5.2	1/C No. 6 AWG, Solid Bare Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Terminations and Ground Rods	291	LFT	$_____	$_____
L-110-5.1	1-Way, 2-Inch PVC Conduit, Schedule 40	201	LFT	$_____	$_____
L-110-5.2	1-Way, 2-Inch PVC Conduit, Schedule 40, Concrete Encased	90	LFT	$_____	$_____
L-110-5.3	Remove Existing Conduit	133	LFT	$_____	$_____
L-125-5.1	L-861T(L) Taxiway Edge Light and Isolation Transformer and Base Can	9	EACH	$_____	$_____
L-125-5.2	L-863 Elevated Taxiway Edge Retro-Reflective Marker, Omni-Directional, 30” Height, Blue	1	EACH	$_____	$_____
I-1	Additional Insurance Premium Cost *	1	LSUM	$_____	$_____

ADDITIVE BID SCHEDULE 02

Item No.	Item Description	Estimated Quantity	Unit Price in Numbers	Total Amount per Item

ADDITIVE BID SCHEDULE 02: TOTAL AMOUNT $_____

*The insurance premium listed shall be the actual premium cost for including the Owner and Engineer as additional insurers and shall not include any hidden costs, overhead or profits. This item is an FAA Non-Participating item.

TOTAL AMOUNT OF ADDITIVE BID SCHEDULE 02: (IN WORDS)

_____

_____ Dollars

_____ Cents

Total Additive Bid Schedule 02: Bid Amount $_____

BID TABULATION

Item No.	Item Description	Total Amount
	BASE BID	$_____
	ADDITIVE BID SCHEDULE 01	$_____
	ADDITIVE BID SCHEDULE 02	$_____
BASE BID + ADDITIVE BID SCHEDULES 01 AND 02: TOTAL AMOUNT		$_____

TOTAL AMOUNT OF BASE BID + ADDITIVE BID SCHEDULES 01 AND 02: (IN WORDS)

_____

_____ Dollars

_____ Cents

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INSURANCE

BIDDER'S PRESENT INSURANCE COVERAGE TYPE OF INSURANCE			INSURANCE REQUIREMENTS FOR THIS PROJECT TYPE OF INSURANCE			
General Liability:	Coverage Limits Each Occurrence	Coverage Limits Aggregate	General Liability:	Coverage Limits Each Occurrence	Coverage Limits Aggregate	Extra Premium Cost (if any)
Bodily Injury, Personal Injury, Sickness, Disease or Death	$	$	Bodily Injury, Personal Injury, Sickness, Disease or Death	$1,000,000.00	$1,000,000.00	$
Property Damage	$	$	Property Damage	$1,000,000.00	$1,000,000.00	$
BI & PD Combined	$	$	BI & PD Combined		$1,000,000.00	$
Does policy provide blanket broad form contractual liability coverage? (Check One)	Yes ____ No ____		Policy must provide blanket broad form contractual liability coverage.			$
Does policy provide coverage for completed operations? (Check One)	Yes ____ No ____		Policy must provide coverage for premises, operations, products and completed operations.	$1,000,000.00	$1,000,000.00	$
Does policy have standard collapse and underground hazards exclusions removed? (Check one)	Yes ____ No ____		Policy must have standard collapse and underground hazards exclusions removed.	$1,000,000.00	$1,000,000.00	$
			Independent Contractors	$1,000,000.00	$1,000,000.00	$
Automobile Liability:	Coverage Limits Each Occurrence	Coverage Limits Aggregate	Automobile Liability:	Coverage Limits Each Occurrence	Coverage Limits Aggregate	Extra Premium Cost (if any)
Bodily Injury (Per person)	$		Bodily Injury and Property Damage Combined	$1,000,000.00		
Bodily Injury (Per Accident)	$					
Property Damage	$					
BI & PD Combined	$					
Does policy cover the following vehicles:			Policy must cover the following:			
Owned? (Check One)	Yes ____ No ____		Owned Vehicles	$1,000,000.00		$
Non-Owned? (Check One)	Yes ____ No ____		Non-Owned Vehicles	$1,000,000.00		$
Hired? (Check One)	Yes ____ No ____		Hired Vehicles	$1,000,000.00		$
Employee Non-Ownership? (Check One)	Yes ____ No ____		Employee Non-Ownership	$1,000,000.00		$

INSURANCE

BIDDER'S PRESENT INSURANCE COVERAGE

TYPE OF INSURANCE		
Excess Liability:	Coverage Limits Each Occurrence	Coverage Limits Aggregate
Umbrella Form	$	$
Other than Umbrella Form	$	$
Does policy follow form with primary general liability coverage? (Check One)	Yes ___ No ___	
Is there a deductible? (Check One)	Yes ___ No ___	
If yes, how much?	$	
Is there a gap between primary coverage and excess liability coverage (other than the deductible)? (Check One)	Yes ___ No ___	
If yes, how much?	$	

Worker's Compensation	Coverage Limits
Each Accident	$
Disease Policy Limit	$
Disease – Each Employee	$

Property Hazard Insurance:	Coverage Limits Each Occurrence	Coverage Limits Aggregate
Builder's Risk (Check One)	Yes ___ No ___	

Miscellaneous Requirements:	Coverage Limits Each Occurrence	Coverage Limits Aggregate
Companies Affording Coverage	Ratings of Companies Affording Coverage (According to most recent edition of Best's Key Rating Guide, Property Casualty)	
Company A:		
Company B:		
Company C:		
Company D:		

INSURANCE REQUIREMENTS FOR THIS PROJECT

TYPE OF INSURANCE			
Excess Liability:	Coverage Limits Each Occurrence	Coverage Limits Aggregate	Extra Premium Cost (if any)
Following-form Umbrella Policy		$1,000,000.00	$

Worker's Compensation	Coverage Limits Each Occurrence		
Must meet minimum requirements	Minimum Statutory Limits		$
Accident	$100,000.00		
Disease	$100,000.00	$500,000.00	

Property Hazard Insurance:	Coverage Limits Each Occurrence	Coverage Limits Aggregate	Extras Premium Cost (if any)
Builder's Risk Policy	Must cover full amount of the contract price		$

Miscellaneous Requirements:	Coverage Limits Each Occurrence:	Coverage Limits Aggregate:	Extra Premium Cost (if any)
Companies Affording Coverage: All insurance policies must be written by Insurance carriers duly authorized to do business in the State of Georgia having a B+ IX rating or better by the most recent edition of the Best's Key Rating Guide, Property-Casualty.			$
All general liability and automobile liability insurance policies must name the GCAC and Consultant as an additional insured.			$
The Commission shall be provided 30 days prior notice in the event of cancellation, restrictive amendment, or non-renewal of Contractor's insurance coverages. Notice of 10 days if policy is cancelled for non-payment of premium.			$
TOTAL ADDITIONAL ACTUAL PREMIUM COSTS			

CONTRACT FORMS

CONTRACT FORMS

CONTRACT (SAMPLE)

GLYNN COUNTY AIRPORT COMMISSION

THIS AGREEMENT made and entered into this _____ day of _____ by and between the **Glynn County Airport Commission, Brunswick, Georgia** (Party of the First Part, hereinafter called the Owner) and _____ Party of the Second Part, hereinafter called the Contractor).

WITNESSETH:
That the said Contractor has agreed and by these presents does agree with the said Owner, for the consideration herein mentioned in his proposal and under the penalty expressed in Bonds, hereto attached, to furnish all equipment, tools, material, skill and labor of every description necessary to carry out and complete in good firm, substantial, and workmanlike manner, the work specified in strict conformity with the drawings, and the specifications hereinafter set forth, which drawings and specifications together with foregoing Proposal made by the Contractor, the Instructions to Bidders, Mandatory Contract Provisions, Special Conditions, General Provisions, Technical Specifications, Plans and this Agreement constitute the contract. The work covered by this Agreement includes all work shown on the plans and specifications and listed in the attached Proposal, at the St. Simons Island Airport at McKinnon Field, to-wit:

Project:	**Skylane Development Infrastructure – Phase 2**
Airport:	St. Simons Island Airport at McKinnon Field
FAA Project No.:	(TBD)
GDOT Aviation Project No.:	(TBD)
PID:	(TBD)
GCAC Project No.:	215D
RS&H Project No.:	1021.0199.007

The Contractor shall commence the work with adequate force and equipment on a date to be specified in a written order of the Owner and shall complete the work within **275 Calendar Days**, from and including the date stipulated in the “Notice to Proceed.” Further, certain portions of the work as specified in the Contract Documents shall be initiated and completed within date-specific and time-specific requirements.

The Contractor shall fully guarantee his workmanship and materials furnished for a period of one year following the date of final acceptance of the work. The performance and payment bonds shall remain in full force for this one year period.

If Contractor fails to complete the Work by the date specified herein for achievement of Substantial Completion, including any additional time as may be adjusted pursuant to the Contract Documents, Owner shall deduct from progress payments or any other funds remaining due to Contractor or, if no funds remain due, Contractor shall pay to Owner the amount specified under the Subsection 80-08 of the General Provisions for each day that the Work remains uncompleted beyond the specified Substantial Completion Date for each phase of work. Such sum is hereby, in view of the difficulty of estimating such damages, agreed upon, fixed and determined by Contractor and Owner as the liquidated damages that Owner shall suffer by such default and not by way of penalty.

The Owner shall pay and the Contractor shall receive the unit prices stipulated in the Contractor’s Proposal hereto attached as full compensation for everything furnished and accepted and done by the Contractor _____ _____($_____), in an acceptable manner, which sum

shall be paid in the manner and terms specified in the Contract Documents but, before issuance of certificates of payments if the Contractor shall not have submitted evidence satisfactory to the Owner that all payrolls, materials, bills, and other indebtedness connected with the work have been paid, the Owner may withhold, in addition to the retained percentages such amount or amounts as may be necessary to pay just claims for labor and services rendered and materials in and about the work, and such amount or amounts withheld or retained may be applied by the Owner to the payment of such just claim.

It is further mutually agreed between the parties hereto that if, at any time after the execution of this agreement and the surety bond hereto attached for its faithful performance, the first party shall deem the surety or sureties upon such bonds to be unsatisfactory, or if, for any reason, such bonds cease to be adequate to cover the performance of the work, the second party shall at its expense, within five days after the receipt of notice from the first party so to furnish an additional bond or bonds in such form and amount, and with surety or sureties as shall be satisfactory to the first party. In such event, no further payment to the second party shall be deemed to be due under this agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the first party.

The obligations of Contractor described herein shall not extend to the liability of Engineer, Engineer's consultants, agents or employees arising out of errors and omissions found in maps, drawings, opinions, reports, surveys, change orders, designs or specifications prepared by the Engineer.

This Agreement will be governed by and construed in accordance with the laws of the State of Georgia. Venue for any actions arising out of the Agreement will lie in Glynn County, Georgia.

IN WITNESS WHEREOF, the parties hereto have executed this agreement, this __ day of _____ _____, 20__.

ATTEST:

_____ Glynn County Airport Commission

_____ _____
Robert Burr, Executive Director

SEAL

ATTEST:

_____ _____
(Contractor)

SEAL

BY:_____

BOND NO. _____

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, THAT WE _____ of the State of _____ and County of _____hereinafter, known as the Principal and _____ a corporation chartered and existing under the laws of the State of _____ and duly authorized to do business in the State of Georgia as Surety, are held and firmly bound unto the Glynn County Airport Commission, Brunswick, Georgia hereinafter known as the Owner, in the penal sum of _____ _____Dollars ($_____) to be paid to the Owner, for the use and benefit of all persons doing work or furnishing skill, tools, machinery or materials, or subcontracting under or for the purpose of the hereinafter named contract, for which payment, well and truly to be made, we hereby bind ourselves, our heirs, executors, administrators, successors and assignees, jointly and severally, by these presents.

Project:	**Skylane Development Infrastructure – Phase 2**
Airport:	St. Simons Island Airport at McKinnon Field
FAA Project No.:	(TBD)
GDOT Aviation Project No.:	(TBD)
PID:	(TBD)
GCAC Project No.:	215D
RS&H Project No.:	1021.0199.007

This obligation is, however, subject to the following conditions:

The above bound Principal has entered into a contract with the Owner under which it agrees to furnish all the labor and material and do all work necessary to construct all improvements described in these contract documents under certain terms, conditions, and stipulations and in accordance with the plans and specifications for the project, which are hereto attached and made a part of this obligation.

NOW, THEREFORE, the conditions of this obligation are such that the above bound Principal shall faithfully and fully carry out and comply with the terms and conditions of said contract, to complete the work therein specified and in the event Contractor fails to perform, it shall be the duty of the Surety herein to assume the responsibility for the performance of the contract and to complete the work specified therein, including, but not limited to, obligations created by way of warranties and/or guarantees for workmanship and materials which warranty and/or guarantee may extend for a period of time beyond completion of said contract, and such alterations or additions as may be made therein or in the plans and specifications, and shall indemnify and save the Engineer and the Owner harmless against any claims for using any form of material process, composition or anything which is patented, and likewise indemnify and save the Engineer and the Owner harmless against all claims for damages by reason of any default or negligence, want of skill or care on the part of said Principal or Agents in and about the performance of said contract, and shall comply with all laws pertaining to said work, and shall comply with and perform any and all warranties and/or guarantees provided for in said contract, then this obligation shall be void; otherwise it shall remain in full force and effect.

And the Surety to this bond, for value received agrees that no change, extensions of time, alterations or additions to the terms of the contract or to the work to be performed thereunder of the specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alterations or additions to the terms of the Contract or the work or to the Plans and Specifications.

Said Principal and Surety hereby for themselves and their families waive and renounce the benefit of all homestead and exemption laws of this or any other state or the laws of the United States, as against any claim or judgment based upon the obligations of this bond.

It is agreed that this bond is executed pursuant to and in accordance with the provisions of the Georgia Statutes, and is intended to be and shall be construed to be a bond in compliance with the requirements thereof, except and to the extent that this bond provides Owner with greater or additional rights than those set forth in the Georgia Statutes. The performance bond required to exempt an Owner under this part shall be furnished by the Contractor in at least the amount of the original contract price before commencing the construction of the improvement under the direct contract. The bond shall be executed as surety by a surety insurer authorized to do business in this state and shall be conditioned that the Contractor shall promptly make payments for labor, services, and material to all lienors under the Contractor's direct contract. Any form of bond given by a Contractor conditioned to pay for labor, services, and material used to improve real property shall be deemed to include the condition of this subsection.

IN WITNESS WHEREOF, said Principal and Surety have thereunto affixed their hands and seals on this _____ day of _____, 20___, either in person or by agents fully authorized.

As to Principal:

Signed, sealed and delivered in the presence of:

_____
Witness

_____
Notary Public

State of _____

County of _____

_____
Principal

By:_____ (L.S.)

As to Surety:

Signed, sealed and delivered in the presence of:

_____
Witness

_____
Notary Public

State of _____

County of _____

_____
Surety

By:_____ (L.S.)

Approved as to form:

_____

BOND NO. _____

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, THAT WE _____ of the State of _____ and County of _____ hereinafter, known as the Principal, and _____, a corporation chartered and existing under the laws of the State of _____ and duly authorized to business in the State of Georgia as Surety, are held and firmly bound unto the Glynn County Airport Commission, Brunswick, Georgia hereinafter known as the Owner, in the penal sum of _____ _____ Dollars ($_____) to be paid to the Owner, for the use and benefit of all persons doing work or furnishing skill, tools, machinery or materials, or subcontracting under or for the purpose of the hereinafter named contract, for which payment, well and truly to be made, we hereby bind ourselves, our heirs, executors, administrators, successors and assignees, jointly and severally, by these presents.

Project:	**Skylane Development Infrastructure – Phase 2**
Airport:	St. Simons Island Airport at McKinnon Field
FAA Project No.:	(TBD)
GDOT Aviation Project No.:	(TBD)
PID:	(TBD)
GCAC Project No.:	215D
RS&H Project No.:	1021.0199.007

This obligation is, however, subject to the following conditions:

The above bound Principal has entered into a contract with the Owner under which it agrees to furnish all the labor and material and do all work necessary to construct all improvements described in these contract documents under certain terms, conditions, and stipulations and in accordance with the plans and specifications for the project, which are hereto attached and made a part of this obligation.

NOW should the above named Principal and all subcontractors, if any, to whom any portion of the work provided for in the attached contract is sublet and all assignees of the said Principal and of such subcontractors shall promptly make payments to all persons supplying him or them with labor, materials, or supplies for or in the prosecution of the work provided for in such Contract, or in any amendment or extension of or addition to said contract, and for the payment of reasonable attorney's fees, incurred by the claimant or claimants in suits on said bond, then the above obligation shall be void; otherwise, to remain in full force and effect.

And the Surety to this bond, for value received agrees that no change, extensions of time, alterations or additions to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alterations or additions to the terms of the Contract or the work to the Plans and Specifications.

Said Principal and Surety hereby for themselves and their families waive and renounce the benefit of all homestead and exemption laws of this or any other state or the laws of the United States, as against any claim or judgment based upon the obligations of this bond.

It is agreed that this bond is executed pursuant to and in accordance with the provisions of the Georgia Statutes, and is intended to be and shall be construed to be a bond on compliance with the requirements thereof. The payment bond required to exempt an Owner under this part shall be furnished by the Contractor in at least the amount of the original contract price before commencing the construction of the improvement under the direct contract. The bond shall be executed as surety by a surety insurer authorized to do business in this state and shall be conditioned that the Contractor shall promptly make

payments for labor, services, and material to all lienors under the Contractor's direct contract. Any form of bond given by a Contractor conditioned to pay for labor, services, and material used to improve real property shall be deemed to include the condition of this subsection.

IN WITNESS WHEREOF, said Principal and Surety have thereunto affixed their hands and seals on this _____day of _____, 20___, either in person or by agents fully authorized.

As to Principal:

Signed, sealed and delivered in the presence of:

_____
Principal

_____
Witness

_____ By:_____ (L.S.)
Notary Public

State of _____

County of _____

As to Surety:

Signed, sealed and delivered in the presence of:

_____
Surety

_____
Witness

_____ By:_____ (L.S.)
Notary Public

State of _____ Approved as to form:

County of _____ _____
Owner's Attorney

NOTICE OF AWARD (SAMPLE)

STATE OF GEORGIA

COUNTY OF GLYNN

THIS CONTRACT AWARD made this _____ day of _____, 20___, by the Glynn County Airport Commission, Brunswick, Georgia, hereinafter called the OWNER, to_____

_____

_____

_____ hereinafter called the CONTRACTOR, is for the completion of a certain project described as: **Skylane Development Infrastructure – Phase 2, St. Simons Island Airport at McKinnon Field**, FAA Project No. (TBD), GDOT Aviation Project No. (TBD), PID: (TBD), GCAC Project No. 215D, for the use and benefit of the Owner as shown on the plans and described in the specifications as prepared by:

RS&H, Inc.
10748 Deerwood Park Boulevard South
Jacksonville, Florida 32256

The project consists of the Base Bid plus the following Alternates, if applicable:

_____

_____

_____

_____

_____

The consideration to be paid by the Owner to the Contractor for completion of the project in accordance with the contract documents is the sum of _____

_____Dollars ($_____).

Commencement of work under this contract shall begin on the date identified in the Notice to Proceed issued by the Owner and the project is to be fully completed on or before **275 Calendar Days** after that specified date unless otherwise subsequently agreed.

OWNER: Glynn County Airport Commission, Brunswick, Georgia

By: _____
Name

_____
Signature

Robert Burr
Printed Name

Executive Director
Title

Acknowledgement of Receipt of Contract Award by Contractor:

_____
Name

_____
Signature

_____
Printed Name

_____
Title

DATE: _____

NOTICE TO PROCEED (SAMPLE)

TO:_____ DATE:_____

_____ PROJECT:_____

_____ **Skylane Development Infrastructure -**

_____ **Phase 2**

_____ St. Simons Island Airport at McKinnon Field

You are hereby notified to commence work on _____ in accordance with the Agreement dated _____, and you are to complete the work within **275 Calendar Days** from the project start date established as set forth herein above. Based on the agreed start date noted above, completion of the project is expected on or before _____**.**

Glynn County Airport Commission, Brunswick, Georgia

BY:_____
Robert Burr, Executive Director

ACCEPTANCE OF NOTICE:

Receipt of the above NOTICE TO PROCEED and
Establishment of the PROJECT START DATE
is hereby acknowledged by:

_____

this _____ day of _____, 20 ___

By: _____
(Signature)

_____
(Printed Name)

_____
(Title)

GLYNN COUNTY AIRPORT COMMISSION

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting legal representative of the **GYLNN COUNTY AIRPORT COMMISSION**, do hereby certify as follows:

I have examined the foregoing Contract, Performance and Payment Bonds and the manner of execution thereof, and am of the opinion that each of the aforesaid agreements has been duly executed by the **GLYNN COUNTY AIRPORT COMMISSION** thereto acting through its duly authorized representatives; that said representatives have full power and authority to execute said contract on behalf of the **GLYNN COUNTY AIRPORT COMMISSION** and that the foregoing contract constitutes valid and legally binding obligations upon the **GLYNN COUNTY AIRPORT COMMISSION** in accordance with the terms, conditions and provisions thereof.

Dated at _____ this ___ day of _____, 20___.

Signature:_____

Title:_____

FINAL RELEASE OF CLAIMS

KNOWN ALL MEN BY THESE PRESENTS, that the undersigned, for and in consideration of the payment of the sum of _____ _____ Dollars ($ _____), paid by the Glynn County Airport Commission, Brunswick, Georgia (hereinafter referred to as "Owner"), receipt of which is hereby acknowledged as total and complete compensation for performance of the below-described Contract, does hereby fully and completely discharge and release the Owner from and waives any and all debts, accounts, promises, damages, liens, encumbrances, causes of action, suits, bonds, judgments, claims and demands whatsoever, in law or in equity, which the undersigned ever had, now has or might hereafter have on account of labor performed, material furnished or services rendered, directly or indirectly, for the Contract between the parties dated _____, 20 ___, known as_____ _____ except for those claims, disputes and other matters arising out of or relating to said Contract which have been raised by written demand in accordance with the Contract Documents prior to this date and identified by the Contractor as unsettled in the final Application for Payment and are either in arbitration or court litigation, as the case may be, in accordance with the Contract Documents.

The undersigned further covenants that subcontractors, suppliers, and material suppliers, and any or all other persons supplying materials, supplies, services or labor used directly or indirectly in the prosecution of the work provided for in the Contract, have been paid in full for all work under this contract.

The undersigned agrees to maintain in full force and effect the provisions of the Contract Documents respecting the guaranty against defective work, and any other special guaranties required by the Contract Documents, for the terms provided in the Contract Documents, which terms shall begin to run from the date specified in the Contract Documents.

The undersigned represents and warrants that the statements contained in the foregoing Release are true and correct.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this ___ day of _____, 20___

WITNESSES:

_____
CONTRACTOR

_____ By:_____

_____ Title:_____

(Seal)

STATE OF _____

COUNTY OF _____

Sworn to and subscribed before me this _____ day of _____, 20___.

(NOTARY SEAL)

_____
NOTARY PUBLIC
My Commission Expires:

Final Release of Claims form must be signed by a corporate officer or such other representative of the Contractor with authority to bind the Contractor to this release.

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GENERAL PROVISIONS

GENERAL PROVISIONS

Section 10 Definition of Terms

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

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

Paragraph Number	Term	Definition
10-01	**AASHTO**	The American Association of State Highway and Transportation Officials.
10-02	**Access Road**	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	**Advertisement (or Invitation to Bid)**	A public announcement, as required by **state and / or** local law, inviting bids for work to be performed and materials to be furnished.
10-04	**Airport**	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	**Airport Improvement Program (AIP)**	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	**Air Operations Area (AOA)**	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
10-07	**Apron**	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.

Paragraph Number	Term	Definition
10-08	**ASTM International (ASTM)**	Formerly known as the American Society for Testing and Materials (ASTM).
10-09	**Award**	The Owner's notice to the successful bidder of the acceptance of the submitted bid.
10-10	**Bidder**	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
10-11	**Building Area**	An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.
10-12	**Calendar Day**	Every day shown on the calendar.
10-13	**Certificate of Analysis (COA)**	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
10-14	**Certificate of Compliance (COC)**	The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.
10-15	**Change Order**	A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.
10-16	**Contract**	A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment. The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.
10-17	**Contract Item (Pay Item)**	A specific unit of work for which a price is provided in the contract.

Paragraph Number	Term	Definition
10-18	**Contract Time (or Contract Duration)**	The number of calendar days ~~or working days,~~ stated in the proposal, allowed **to substantially complete the work** ~~for completion of the contract~~, including authorized time extensions. ~~If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.~~
10-19	**Contractor**	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	**Contractors Quality Control (QC) Facilities**	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
10-21	**Contractor Quality Control Program (CQCP)**	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.
10-22	**Control Strip**	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	**Construction Safety and Phasing Plan (CSPP)**	The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	**Drainage System**	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	**Engineer**	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering **design**~~, inspection, and/or observation~~ of the contract work and acting directly or through an authorized representative. **May or may not be the same individual, partnership, firm, or corporation identified as the RPR.**

Paragraph Number	Term	Definition
10-26	**Equipment**	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
10-27	**Extra Work**	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.
10-28	**FAA**	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	**Federal Specifications**	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
10-30	**Force Account**	**a.** Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. **b.** Owner Force Account - Work performed for the project by the Owner's employees.
10-31	**Intention of Terms**	Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner. Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.

Paragraph Number	Term	Definition
10-32	**Lighting**	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
10-33	**Major and Minor Contract Items**	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.
10-34	**Materials**	Any substance specified for use in the construction of the contract work.
10-35	**Modification of Standards (MOS)**	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
10-36	**Notice to Proceed (NTP)**	A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
10-37	**Owner**	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is **the Glynn County Airport Commission**.
10-38	**Passenger Facility Charge (PFC)**	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
10-39	**Pavement Structure**	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
10-40	**Payment bond**	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
10-41	**Performance bond**	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.

Paragraph Number	Term	Definition
10-42	**Plans**	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'
10-43	**Project**	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
10-44	**Proposal**	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.
10-45	**Proposal guaranty**	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
10-46	**Quality Assurance (QA)**	Owner's responsibility to assure that construction work completed complies with specifications for payment.
10-47	**Quality Control (QC)**	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
10-48	**Quality Assurance (QA) Inspector**	An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
10-49	**Quality Assurance (QA) Laboratory**	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	**Resident Project Representative (RPR)**	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative. **May or may not be the same individual, partnership, firm, or corporation identified as the Engineer.**

Paragraph Number	Term	Definition
10-51	**Runway**	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	**Runway Safety Area (RSA)**	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.
10-53	**Safety Plan Compliance Document (SPCD)**	Details how the Contractor will comply with the CSPP.
10-54	**Specifications**	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.
10-55	**Sponsor**	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.
10-56	**Structures**	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	**Subgrade**	The soil that forms the pavement foundation.
10-58	**Superintendent**	The Contractor's executive representative**, having authority and responsibility to act for and represent the Contractor,** who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.

Paragraph Number	Term	Definition
10-59	**Supplemental Agreement**	A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%: (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.
10-60	**Surety**	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
10-61	**Taxilane**	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
10-62	**Taxiway**	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	**Taxiway/Taxilane Safety Area (TSA)**	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.
10-64	**Work**	**Entire construction required by the Contract, including the** ~~The~~ furnishing of all labor, materials, **products, services,** tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.
10-65	**Working day**	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.

END OF SECTION 10

Section 20 Proposal Requirements and Conditions

20-01 Advertisement (Notice to Bidders or Invitation to Bid). The Owner, or their authorized agent, shall publish the advertisement at such places and at such times as are required by local law or ordinances. The published advertisement shall state the time and place for submitting sealed proposals; a description of the proposed work; instructions to bidders as to obtaining proposal forms, plans and specifications; proposal guaranty required; and the Owner's right to reject any and all bids.

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

Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.

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

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

Mobilization is limited to **10** percent of the total project cost. **Where Mobilization is identified per Bid Schedule, Mobilization is limited to 10 percent of the related Bid Schedule.**

A pre-bid conference ~~is required~~ **will be held** on this project to discuss as a minimum, the following items: material requirements; submittals; Quality Control/Quality Assurance requirements; the construction safety and phasing plan including airport access and staging areas; and unique airfield paving construction requirements. The time, date, and place of the meeting **will be as noted in the Invitation to Bid and the Instructions 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 the Section 40, paragraph 40-02, Alteration of Work and Quantities, without in any way invalidating the unit bid prices.

20-06 Examination of plans, specifications, and site. The bidder is expected to carefully examine the site of the proposed work **(at the pre-bid conference)**, 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.

A project site visit will be conducted at the pre-bid conference for prospective bidders to study the existing conditions. No additional project site visits will be conducted or allowed after the pre-bid conference.

Boring logs 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 tests that are furnished by the Owner.

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

Prices should generally be written in whole dollars and cents. The extended total amount of each item should not be rounded.

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

20-08 Responsive and responsible bidder. A responsive bid conforms to all significant terms and conditions contained in the Owner's invitation for bid. It is the Owner's responsibility to decide if the

exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

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

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

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

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

c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.

d. If the proposal contains unit prices that are obviously unbalanced **as interpreted by the Owner**.

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 **state and** local laws and ordinances pertaining to the letting of construction contracts.

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

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

20-12 Withdrawal or revision of proposals. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing 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.

d. Where the Bidder has an interest in any litigation or other claim against the Owner or Engineer.

e. Lack of competency as revealed by the Statement of Bidder's Qualifications.

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

g. Previous projects where, in the judgment of the Owner, the Bidder performed unsatisfactorily and did not complete and close out the project in a timely manner resulting in the Owner not being able to close out the project with various funding agencies and resulting in the Owner potentially or actually losing planned funding for other projects.

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 **four (4) calendar** days prior to bid opening.

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

END OF SECTION 20

Section 30 Award and Execution of Contract

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

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 **ninety (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 responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

The Proposal may include multiple bid schedules. These bid schedules may / may not be awarded and the Owner reserves the right to evaluate the bids as such during the evaluation period. The basis of award will include any combination of the bid schedules as determined exclusively by the Owner to be in the Owner's best interest. For AIP contracts, unless otherwise specified in this subsection, no award shall be made until the FAA has reviewed the Owner's recommendation to make such award in accordance with 2 CFR 200.324.

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 **fifteen (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 **state and** 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**, and incidentals** required to complete the work in accordance with the plans, specifications, and terms of the contract.

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

Applicable federal contract provisions for procurement and contracting under AIP are found on the following website: www.faa.gov/airports/aip/procurement/federal_contract_provisions/

40-03 Omitted items. The Owner, the Owner's ~~Engineer~~ **representative** ~~or the RPR~~ may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with Section 90, paragraph 90-04, *Payment for Omitted Items*.

40-04 Extra work. Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work. Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the RPR's opinion, is necessary for completion of the extra work.

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work

that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *Supplemental Agreement*.

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

40-05 Maintenance of traffic. It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

a. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, *Limitation of Operations*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *Contractor's Responsibility for Utility Service and Facilities of Others*.

b. With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (http://mutcd.fhwa.dot.gov/), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways.

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. **All such structures must be disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner.** The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading

sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-07 Rights in and use of materials found in the work. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

a. Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,

b. Remove such material from the site, upon written approval of the RPR; or

c. Use such material for the Contractor's own temporary construction on site; or,

d. Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., the Contractor shall request the RPR's approval in advance of such use.

Should the RPR approve the Contractor's request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at their expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for use of such material used in the work or removed from the site.

Should the RPR approve the Contractor's exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

All materials not re-used in the project must be disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project.

40-08 Final cleanup. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of the property Owner.

END OF SECTION 40

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Section 50 Control of Work

50-01 Authority of the Resident Project Representative (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements. **Refer to Special Conditions, Section 4: *Listing of Duties, Responsibilities, and Limitations of Authority of the Resident Project Representative* for additional information.**

50-02 Conformity with plans and specifications. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans, or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications, but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of their determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

If the RPR finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the RPR's written orders.

The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the RPR's opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term "reasonably close conformity" is also intended to provide the RPR with the authority, after consultation with the Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required by the requirements of the contract, plans and specifications.

All defined tolerances will apply before, during, and after incorporation of the materials into the work. It is the intent of the specifications that all materials meet all of the requirements of the specifications after all material has been set in place in its final form.

The RPR will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

50-03 Coordination of contract, plans, and specifications. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work**. It is the intent of these plans and specifications to ensure that construction, demolition, and all associated materials,**

equipment, and appurtenances are completed and installed in compliance with all applicable local, state, and federal regulations. In case of discrepancy **or conflicting information, the interpretation or clause most favorable to the Owner will control. If it is not readily apparent which requirement is most favorable to the Owner, plans will govern over contract technical specifications**, 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~~ **quantities shown on the plans will govern over those shown in the Unit Price Bid Form**. If any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately ask the RPR for an interpretation and decision, and such decision shall be final.

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

50-04 List of Special Provisions. Refer to attached Special Conditions.

50-05 Cooperation of Contractor. The Contractor shall be supplied with ~~[ ] hard copies or~~ an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hard copy 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 is responsible for his / her own reproduction costs.**

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the RPR and their inspectors and with other Contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as their agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized representative.

50-06 Cooperation between Contractors. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

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

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

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

50-07 Construction layout and stakes. The ~~Engineer/RPR~~ Contractor shall establish and maintain necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established ~~by Engineer/RPR~~. In case of negligence on the part of the

Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. **Coordinate format of survey deliverables with the RPR at the pre-construction conference.**

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.

See additional survey and stakeout requirements in Item P-104, Project Survey and Stakeout.

50-08 Authority and duties of Quality Assurance (QA) inspectors. QA inspectors shall be authorized to inspect all work done and all material furnished. Such QA inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. QA inspectors are not authorized to revoke, alter, or waive any provision of the contract. QA inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

QA Inspectors are authorized to notify the Contractor or their representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the RPR for a decision.

50-09 Inspection of the work. All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor's expense.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

The Owner and / or RPR will have full authority to inspect all materials on the project site, test all materials at as many locations and at any frequency deemed necessary to satisfy himself / herself that the final in-place product meets the requirements of the plans and specifications.

50-10 Removal of unacceptable and unauthorized work. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

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

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

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

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

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

The Contractor is responsible for providing construction equipment and vehicles that will be supported by the on-site project access roads and haul routes. The Contractor will be responsible for preserving and, if necessary, rehabilitating any access roads or haul routes damaged by the Contractor's construction operations.

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

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

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

50-13 Failure to maintain the work. Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *Maintenance during Construction*, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

50-14 Partial acceptance. ~~If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.~~

The completion of any work period and subsequent usage by the Owner does not define final acceptance of the work in that phase. Prior to partial acceptance, a pre-final inspection of all phases within the bid schedules will be performed and all associative corrective items must be completed. The entire project will be accepted once all bid schedules are complete, a final inspection of the entire project has occurred, and all associated punch list items have been completed to the satisfaction of the Owner and RPR.

50-15 Final acceptance. Upon due notice from the Contractor of presumptive completion of the entire project, the RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the RPR will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the RPR will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

50-16 Claims for adjustment and disputes. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with **state and** local laws or ordinances.

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

END OF SECTION 50

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Section 60 Control of Materials

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

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the RPR's option, materials may be approved at the source of supply before delivery. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program* and *Addendum*, that is in effect on the date of advertisement.

The Contractor must notify the Owner when items of work are ready for acceptance testing. Passing acceptance tests shall be paid for by the Owner. The cost of failing acceptance tests and re-testing shall be at the expense of the Contractor and deducted from the amount due the Contractor at the time of final payment.

60-02 Samples, tests, and cited specifications. All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor's expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), federal specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the RPR. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at their request after review and approval of the RPR.

A copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

60-03 Certification of compliance/analysis (COC/COA). The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the RPR.

When a material or assembly is specified by "brand name or equal" and the Contractor elects to furnish the specified "or equal," the Contractor shall be required to furnish the manufacturer's certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

a. Conformance to the specified performance, testing, quality or dimensional requirements; and,

b. Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

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

60-04 Plant inspection. The RPR or their authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for acceptance of the material or assembly.

Should the RPR conduct plant inspections, the following conditions shall exist:

a. The RPR shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.

b. The RPR shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.

c. If required by the RPR, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The RPR shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

60-05 Engineer/ Resident Project Representative (RPR) field office and equipment. An Engineer/RPR field office and equipment shall be provided in accordance with requirements specified in Section P-105 Mobilization for the duration of the project.

60-06 Storage of materials. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60-07 Unacceptable materials. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the RPR has approved its use in the work.

60-08 Owner furnished materials. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

END OF SECTION 60

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Section 70 Legal Regulations and Responsibility to Public

70-01 Laws to be observed. The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

70-02 Permits, licenses, and taxes. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

70-03 Patented devices, materials, and processes. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall **defend,** 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 **(including attorney fees)**, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

70-04 Restoration of surfaces disturbed by others. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. ~~To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans and is indicated as follows: [ ].~~

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

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

70-05 Federal Participation. The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-06 Sanitary, health, and safety provisions. The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

70-07 Public convenience and safety. The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, *Maintenance of Traffic,* and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *Limitation of Operations*.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

70-08 Construction Safety and Phasing Plan (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. ~~The CSPP is on sheet(s) [ ] of the project plans.~~ **The CSPP is included as an appendix to the Project Manual.**

70-09 Use of explosives. The use of explosives is not permitted on this project.

70-10 Protection and restoration of property and landscape. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the ~~Engineer/~~RPR has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at their expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

70-11 Responsibility for damage claims. The Contractor shall **defend,** 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.

	Work or Phase Scheduled for Beneficial Occupancy	**Date of Beneficial Occupancy**
1.	(None)	N/A
2.	(None)	N/A

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

No portion of the work may be opened by the Contractor until directed by the Owner in writing. Should it become necessary to open a portion of the work to traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the RPR, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of the work so opened or a waiver of any provision of the contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the Contractor at their expense.

The Contractor shall make their own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the contract work.

The Contractor must conform to safety standards contained AC 150/5370-2 and the approved CSPP.

Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety requirements prior to opening up sections of work to traffic.

70-14 Contractor's responsibility for work. Until the RPR's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *Partial Acceptance*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause 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.

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of the responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *Restoration of Surfaces Disturbed By Others*. A copy of each notification shall be given to the RPR.

In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner of their plan of operation. If, in the Contractor's opinion, the Owner's assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's "Person to Contact" no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the RPR.

The Contractor's failure to give the two days' notice shall be cause for the Owner to suspend the Contractor's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, the Contractor shall immediately notify the proper authority and the RPR and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the RPR continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

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

70-16 Furnishing rights-of-way. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

70-17 Personal liability of public officials. In carrying out any of the contract provisions or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

70-18 No waiver of legal rights. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or their surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill their obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under any warranty or guaranty.

70-19 Environmental protection. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

70-20 Archaeological and historical findings. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during their operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that location and notify the RPR. The RPR will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work,* and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

70-21 Insurance Requirements. Insurance requirements are specified in Special Conditions, Section 2, Insurance Requirements.

END OF SECTION 70

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Section 80 Execution and Progress

80-01 Subletting of contract. The Owner will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Resident Project Representative (RPR).

The Contractor shall perform, with his organization, an amount of work equal to at least **30** percent of the total contract cost.

Should the Contractor elect to assign their contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

The Contractor shall provide copies of all subcontracts to the RPR 14 days prior to being utilized on the project. As a minimum, the information shall include the following:

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

80-02 Notice to proceed (NTP). The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within **seven (7)** days of the NTP date. The Contractor shall notify the RPR at least **48 hours** in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

80-03 Execution and progress. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least **three (3)** days prior to the ~~start of work~~ **pre-construction conference**. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

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

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

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM). 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 RPR) at least **48 hours** prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP)*.

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as specified; immediately obey all instructions to vacate the AOA; and immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AOA until satisfactory conditions are provided. The areas of the AOA identified in the Construction Safety Phasing Plan (CSPP) and as listed below, cannot be closed to operating aircraft to permit the Contractor's operations on a continuous basis and will therefore be closed to aircraft operations intermittently as follows:

1. Refer to CSPP for airfield closure limitations, schedule, and other requiremtents

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

80-04.1 Operational safety on airport during construction. All Contractors' operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

80-05 Character of workers, methods, and equipment. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

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

In addition, the following requirements will apply concerning all workers utilized on the project:

a. The Contractor must provide and maintain, at all times on the project site of the work during its progress, adequate and competent superintendence of all operations for and in connection with the work. The Contractor must provide a capable superintendent acceptable to the Owner. Such representative must be able to read, write and speak English fluently and shall be authorized to receive instructions from the Engineer or his authorized representative. Said superintendent must have authority to see that the work is carried out in accordance with the Contract Documents and in a thorough and workmanlike manner in every respect.

b. Incompetent, disorderly, intemperate or incorrigible employees of any authority level must be dismissed from the project by the Contractor or his representative when requested by the Engineer or the Owner, and such persons may not again be permitted to return to the work site without the written consent of the Owner.

c. Any Contractor or subcontractor employee who violates the security and/or badging regulations of the Airport will be removed from the Airport and not allowed back on Airport property without the prior approval of the Owner.

d. The Contractor must provide at the request of the Owner such reasonable information about his employees as may be necessary, including in part, name, address and eligibility to work on federally funded projects.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the

Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

80-06 Temporary suspension of the work. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with **state and** 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.

Bid Schedule	Liquidated Damages Cost	Allowed Construction Duration
Base Bid + Additive Bid Schedules 01 and 02	$1,000 /Calendar Day	275 Calendar Days

The maximum construction time allowed for ~~Schedules [ ]~~ **all awarded phases** will be as tabulated above and indicated in the bid documents ~~the sum of the time allowed for individual schedules~~ but not more than **275 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 wavier on the part of the Owner of any of its rights under the contract.

80-08a Failure to re-open on time. Where runway facilities are to be closed to accommodate overnight work or off-peak work programs, facilities shall be made to re-open at the time designated in the contract documents. Failure to re-open on time shall subject to liquidated damages (LD) at the rate of $500 per hour or each portion of hour thereof. Damages 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 that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract. The Owner reserves the right to adjust re-opening time to accommodate changes to scheduled air carrier service or other factors.

Work Element	Liquidated Damages Cost	Allowed Construction Period
Overnight Runway or Taxiway Work Closure	$500 /Hour or portion of hour	Re-Open Facilities NLT 07:30AM or as otherwise directed

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**, but not limited to,** reasons, if the Contractor:

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

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

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

d. Discontinues the execution of the work, or

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

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

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

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

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

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

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

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

80-10 Termination for national emergencies. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

80-11 Work area, storage area and sequence of operations. The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

END OF SECTION 80

Section 90 Measurement and Payment

90-01 Measurement of quantities. All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

The term "lump sum" when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When requested by the Contractor and approved by the RPR in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the RPR and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Measurement and Payment Terms

Term	Description
Excavation and Embankment Volume	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
Measurement and Proportion by Weight	The term "ton" will mean the short ton consisting of 2,000 pounds (907 km) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark.
Measurement by Volume	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided

Term	Description
	that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.
Asphalt Material	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
Cement	Cement will be measured by the ton (kg) or hundredweight (km).
Structure	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
~~**Timber**~~	~~Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.~~
Plates and Sheets	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
Miscellaneous Items	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
Scales	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end. Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the scale, but not less than one pound (454 grams). The use of spring balances will not be permitted.

Term	Description
	In the event inspection reveals the scales have been "overweighing" (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%. In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded. Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them. Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment. All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.
Rental Equipment	Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 *Payment for Extra Work*.
Pay Quantities	When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

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

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

90-03 Compensation for altered quantities. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work and*

Quantities, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 Payment for omitted items. As specified in Section 40, paragraph 40-03, *Omitted Items,* the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR's order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR's order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR's order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

90-05 Payment for extra work. Extra work, performed in accordance with Section 40, paragraph 40-04, *Extra Work*, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

90-06 Partial payments. Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *Payment for Materials on Hand*. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

a. From the total of the amount determined to be payable on a partial payment, ten percent (10%) of such total amount will be deducted and retained by the Owner for protection of the Owner's interests. Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:

(1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-03. Contractor must provide a certified invoice to the RPR that supports the value of retainage held by the Owner for partially accepted work.

(2) In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08.

b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

c. When at least 95% of the work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the

contract value and the cost of the remaining work to be done. The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *Acceptance and Final Payment*.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

90-07 Payment for materials on hand. No payment will be made for materials on hand that have not been incorporated into the work. ~~Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:~~

~~**a.** The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.~~

~~**b.** The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.~~

~~**c.** The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.~~

~~**d.** The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material stored or stockpiled.~~

~~**e.** The Contractor has furnished the Owner evidence that the material stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.~~

~~It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of their responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.~~

~~In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.~~

~~No partial payment will be made for stored or stockpiled living or perishable plant materials.~~

~~The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.~~

90-08 Payment of withheld funds. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may**, with written consent of the surety,** request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

d. The Contractor shall obtain the written consent of the surety to such agreement.

90-09 Acceptance and final payment. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

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

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

90-10 Construction warranty.

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

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

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

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

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

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

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

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

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *Final Cleanup*.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

g. When applicable per state requirements, return copies of sales tax completion forms.

h. Manufacturer's certifications for all items incorporated in the work.

i. All required record drawings, as-built drawings or as-constructed drawings.

j. Project Operation and Maintenance (O&M) Manual(s).

k. Security for Construction Warranty.

l. Equipment commissioning documentation submitted, if required.

END OF SECTION 90

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SPECIAL CONDITIONS

SPECIAL CONDITIONS

SPECIAL CONDITIONS

SECTION 1

PROJECT INFORMATION

1. CONTRACT PROVISIONS. The General Provisions and these Special Conditions are applicable to all divisions and sections of the Contract Documents and Specifications. It shall be the Contractor's responsibility to so inform all parties who should be bound or influenced thereby.

In the event there are discrepancies between the technical specifications, general provisions and the special conditions, the interpretation most advantageous to the Owner shall apply.

2. DESCRIPTION OF WORK. The proposed Work includes the following:

Refer to Invitation to Bid for a description of the work.

3. LOCATION OF THE WORK. The site of the proposed Work is at the **St. Simons Island Airport at McKinnon Field, St. Simons Island, Georgia.**

4. DEFINITIONS. The following terms when used in the Contract Documents shall mean the following and are supplemental to Section 10 of the General Provisions:

A. ADDENDA. Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

B. BID. The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work and services to be performed.

C. CONTRACT DOCUMENTS. The Contract Documents shall include the Invitation to Bid, Instructions to Bidders, Mandatory Contract Provisions, Proposal forms, Contract forms, Security Program forms, General Provisions, FAA Orders, Advisory Circulars, Special Conditions, Wage Rates, Technical Specifications, Appendices and Addenda.

D. DAY. Unless otherwise defined shall mean “calendar” day.

E. DRAWINGS. The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by the Engineer and are referred to in the Contract Documents.

F. ENGINEER. As a supplement to General Provision 10-25, the term "Engineer" in the Contract Documents means RS&H, Inc., 10748 Deerwood Park Boulevard South, Jacksonville, Florida 32256.

G. FIELD ORDER. A written order issued by the Engineer which orders minor changes in the Work consistent with the intent of the Contract Documents but which does not involve a change in the Contract Price or the Contract Time.

The Engineer may authorize minor changes in the Work not involving an adjustment in the Contract Price or the Contract Time, which are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and shall be binding on the Owner, and also on the Contractor who shall perform the change promptly. If the Contractor believes that a Field Order justifies an increase in the Contract Price or Contract Time, the Contractor shall make a claim under Section 50, Subsection 50-16, Claims for Adjustment and Disputes of the General Provisions before doing the Work.

H. FURNISH or INSTALL or PROVIDE or SUPPLY. Unless specifically limited in the context, the word "Furnish" or the word "Install" or the word "Provide" or the word "Supply" or any combination or similar directive or usage thereof, shall mean FURNISHING AND INCORPORATION IN THE WORK including all necessary labor, materials, equipment, and anything necessary to perform the Work indicated.

I. GOOD REPAIR. Good repair shall be construed to mean any defect, functional or structural deterioration (except that from ordinary and reasonable use) which appreciably reduces the effectiveness or efficiency of the Work or improvement for the purpose intended, or any serious departure from the standards of original construction described in the Contract Documents, shall be remedied by the Contractor. Such remedy will be made without further cost to the Owner, including in part, all damages caused by such defect, deficiency, deterioration or departure, and by its repair, replacement or correction.

J. MAY. Permissive.

K. REFERENCE TO TRADE OR SUBCONTRACTORS. When only one principal contract exists for all Work covered by the Contract Documents, reference to trade or subcontractors in the Contract Documents shall not create any contractual relationship between the Owner and any trade or subcontractor, with whom the principal contractor may subcontract.

L. SAMPLES. Samples are physical examples furnished or constructed by the Contractor to illustrate materials, equipment, workmanship or finishes, and to establish standards by which the Work will be judged.

M. "SHALL" IMPLIED. In the interest of conciseness, some sentences, statements, and clauses used in the specifications exclude any form of the verb "shall" normally expressed in a verb phrase with verbs such as "furnish", "install", "provide", "perform", "construct", "erect", "comply", "apply", "submit", or similar "verb", but any such sentences, statements, and clauses shall be interpreted to include the applicable form of the phrase "The Contractor shall" and the requirements described therein shall be interpreted as mandatory elements of the Contract.

N. SHALL. Mandatory.

O. SUBCONTRACTOR. Party supplying labor and material or any labor for work at the site of the project for, and under separate contract or agreement with the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner and any Subcontractor.

P SUBSTANTIAL COMPLETION. When the Work is sufficiently complete so it may be safely, conveniently and beneficially utilized by the Owner for all of the purposes for which it was intended.

Q. WILL. Mandatory.

5. APPLICABLE DRAWINGS. The drawings applicable to this project are listed in the Index of Drawings as included in the project plans.

6. PROPOSAL REQUIREMENTS. In addition to those herein before described items to be submitted with the Bidder's Proposal, the Bidder shall submit, with his Proposal, a list of all Subcontractors the Bidder proposes to use on the Work of this Contract.

After the Owner accepts the Bidder's Proposal and such Bidder is awarded a Contract, the successful Bidder may not substitute a Subcontractor listed in the Proposal without the prior written approval of the Owner. Such approval shall be obtained at least ten Calendar Days prior to the date scheduled for that Subcontractor to begin Work.

7. CONTRACTOR'S LIABILITY INSURANCE. The following provisions supplement the requirements specified in the Special Conditions - Section 2.

The Contractor shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them or by any one for whose acts any of them may be liable:

A. Claims under workmen's compensation, disability benefit and other similar employee benefits acts;

B. Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;

C. Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;

D. Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person; and

E. Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

General notes regarding liability:

A. The Commercial General Liability policy shall include explosion, collapse and underground (X-C-U) coverage.

B. The Contractual Liability shall include provisions for covering the indemnity specified under Paragraph 70-11 “Responsibility for Damage Claims,” of the General Provisions.

C. Commercial Automobile Liability shall include owned, leased, non-owned, and hired vehicles.

D. The Commercial General Liability and Automobile Liability insurance shall include Contingent Liability and Contingent Property Damage Insurance to protect the Contractor against claims arising from the operations of Subcontractors, suppliers, vendors, or any person, firm or entity providing service to the Contractor.

E. The Contractor's General Liability insurance shall include coverage to protect the Owner and Engineer from damage resulting either directly or indirectly from acts or omissions of the Contractor to existing buildings, facilities or equipment near the Work of the Contractor under the Contract, and the contents of such buildings, facilities or equipment.

F. Certificates of the Contractor's Commercial Liability insurance, Commercial Automobile Liability insurance and Worker's Compensation insurance shall be furnished to the Owner prior to commencement of Work. The certificates of insurance shall contain a provision that coverage afforded under the policies will not be canceled until at least 30 days prior written notice has been given to the Owner.

G. Certificates of insurance shall be executed on appropriate ACORD or Owner approved equal insurance forms.

8. ACCESS TO THE WORK. Access to the Work shall be via the access routes designated on the Contract Layout Plan. The Contractor shall identify access routes with suitable signs, barricades and similar equipment. The entire access route and construction site shall be kept free and clean of all debris at all times and maintained in good repair by the Contractor. All damage to the access route caused by the actions of the Contractor or his agents shall be immediately repaired to the satisfaction of the Owner.

No separate payment will be made for complying with the requirements of this paragraph "ACCESS TO THE WORK." No other access to the Work site will be permitted without written approval by the Owner and Engineer. Contractor's vehicles and equipment, including vehicles and equipment of the Subcontractors and others coming under the Contractor's control, will not be permitted to traverse other airfield areas or pavements without written approval of the Owner and Engineer. Contractor's vehicles, equipment and materials may be stored in the area designated on the Plans. Upon completion of the Work, the storage area shall be cleaned up and returned to its original condition to the satisfaction of the Owner. No separate payment will be made for cleanup and restoration of the storage area. Personal services, such as canteen trucks, will not be permitted beyond this area and drivers of vehicles being operated beyond this area shall be subject to loss of permission to enter the construction site.

9. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

A. Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

B. Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams or other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.

C. Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

D. The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the Work of the Owner or any separate Contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

E. By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

F. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Engineer's approval of Shop Drawings, Product Data or Samples unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submission and the Engineer has given written approval of the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Engineer's approval thereof.

G. The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples to revisions other than those requested by the Engineer on previous submittals.

H. No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittals have been approved by the Engineer. All such portions of the Work shall be in accordance with approved submittals.

I. The Contractor shall not reproduce the Engineer's project drawings for Shop Drawing use without prior written approval of the Engineer.

J. The Contractor shall submit six copies, or at Engineer's option, one reproducible copy and one print of all Shop Drawings required for the Work of the various trades unless greater quantities are specifically requested for certain equipment. Of these, three copies, or the reproducible copy, will be annotated as appropriate and returned to the Contractor with appropriate action indicated. By agreement with the Engineer, the Contractor may submit more than the required number of copies. Receipt of less

than the required number of copies will be cause for withholding the Shop Drawings from being checked until receipt of the necessary additional copies.

Shop Drawings shall be forwarded to:

RS&H, Inc.,
10748 Deerwood Park Blvd. South,
Jacksonville, Florida 32256
Attention: Pamela Zenon
Email: Pam.Zenon@RSandH.com
Telephone: (904) 256-2121

The Contractor's letter of submittal must conform to the typical Contractor's "Transmittal Letter" which is available from the Engineer. The quantity of transmittal letters to be submitted shall be equal to the number of sets of drawings or brochures being submitted plus one. Each drawing or part of the brochure shall be listed separately on the letter and identified as indicated thereon. Failure to do this will cause rejection of the submittal. The Engineer will return to the Contractor the same transmittal letter, with the Shop Drawing disposition noted thereon along with the drawings or brochures when the review is completed. The Contractor shall forward separate transmittal letters for submitting each group of Shop Drawings common to a Specification Section.

K. In checking Shop Drawings prior to submittal, the Contractor is requested to note corrections or comments on the drawings in green pen.

L. Drawings returned to the Contractor will be stamped "Approved," "Approved as Noted," "Returned for Corrections," or "Not Approved." Drawings stamped "Approved as Noted" need not be returned for further approval if the notations are acceptable to the Contractor and Subcontractors. Drawings stamped "Returned for Corrections" or "Not Approved" shall require new submission. Comments and corrections by the Engineer will be made in red pen on blue or black line prints.

M. Samples shall be submitted to the attention of Pam Zenon, accompanied with the same transmittal letter prescribed for Shop Drawings. Checking by the Contractor of samples before transmittal is required the same as for Shop Drawings.

10. PROJECT DOCUMENTATION.

A. Project Drawings: The successful Contractor will be furnished, at no charge, electronic copies of drawings and specifications in PDF format.

A field set of Plans and Specifications shall remain on the job site at all times and shall be available at all times to the Engineer.

The Contractor shall immediately include plainly and conspicuously on the field set of drawings, and at appropriate paragraphs in the specifications, all changes or corrections made by addenda, field orders and Change Orders as they are issued.

Approved copies of all shop drawings and other submittals are to be kept on the job site at all times and shall be available at all times to the Engineer.

Changes and deviations from the existing conditions shall be submitted in writing for approval prior to installation. In no case shall any unspecified equipment or materials be installed without prior approval by the Engineer.

B. **Record Documents**:

(1) Definition: Record documents are defined to include those documents or copies relating directly to performance of the Work, which the Contractor is required to prepare or maintain for the Owner's records, recording the Work as actually performed. In particular, record documents show changes in the Work in relation to the way in which shown and specified by original Contract Documents; and show additional information of value to the Owner's records, but not indicated by original Contract Documents. Record documents include newly prepared drawings (if any are specified), marked-up copies of Contract drawings, shop drawings, Specifications, addenda, field orders, Change Orders, marked-up product data submittals, record samples, field records for variable and concealed conditions such as excavations and foundations, and miscellaneous record information on Work which is otherwise recorded only schematically or not at all.

(2) Record Drawings: The Contractor shall maintain a set of record drawings at the job site. The record drawings shall be kept legible and current and shall be available for inspection at all times by the Engineer. The Contractor shall show all changes or Work added on these record drawings in a contrasting color.

(a) Mark-Up Procedure: During progress of the Work, maintain a blue-line or black-line set of Contract drawings and shop drawings, with mark-up of actual installations which vary substantially from the Work as originally shown. Mark whatever drawing is most capable of showing actual physical condition, fully and accurately. Where shop drawings are marked up, mark cross-reference on the Contract drawings at corresponding locations. Mark with erasable colored pencil, using separate colors where feasible to distinguish between changes for different categories of Work at the same general location. Mark-up important additional information which was either shown schematically or omitted from original drawings. Give particular attention to information on Work concealed, which would be difficult to identify or measure and record at a later date. Note alternate numbers, Field Orders or Change Order numbers and similar identification. Require each person preparing mark-ups to initial and date mark-ups and indicate name of firm. Label each sheet "PROJECT RECORD" in 1-1/2-inch high letters.

In showing changes in the Work, use the same legends as used on the original drawings. Indicate exact locations by dimensions and exact elevations by job datum. Give dimensions from a permanent point.

~~**(b) Preparation of Transparencies**: In preparation for Certification of Substantial Completion on last major portion of the Work, review completed mark-up of record drawings and shop drawings with Engineer. Engineer will then proceed with preparation of a full set of corrected transparencies for Contract drawings. Engineer will date each updated drawing and label each sheet "RECORD DRAWING" in 1-1/2-inch high letters. Printing as required herein is the responsibility of the Engineer~~.

(c) Copies, Distribution: Upon completion of ~~transparency~~ record drawings, Engineer shall prepare three blue-line or black-line prints of each drawing, regardless of whether changes and additional information were recorded thereon. Engineer shall then organize each of three copies into manageable sets, bind with durable paper cover sheets, and print suitable titles and dates. Mark-up set of prints maintained during the construction period shall be bound in the same manner. The Engineer shall also organize **record drawings** ~~transparencies~~ into sets matching print sets, place set in a durable tube-type drawing container (with end caps) and mark end cap of each with suitable identification. The Engineer will retain one copy set. At completion of the project, the Engineer shall submit one set of **record drawings** ~~transparencies~~, with changes noted thereon, to the Owner.

(3) Record drawings shall contain the names, addresses and phone numbers of the Contractor and all subcontractors.

(4) The Engineer shall be the sole judge of the acceptability of the record drawings. Receipt and acceptance of the record drawings is a prerequisite for Final Payment.

C. Record Specifications:

(1) During the progress of the Work, the Contractor shall maintain one copy of Specifications, including addenda, Change Orders and similar modifications issued in printed form during construction, mark-up variations (of substance) in actual Work in comparison with text of Specifications and modifications as issued at the jobsite. Give particular attention to substitutions, selection of options, and similar information on Work where it is concealed or cannot otherwise by readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable. Upon completion of mark-up, submit to the Engineer for Owner's records. Label front cover "PROJECT RECORD" in 1-1/2-inch high letters.

(2) Where the record specifications is printed on one side of page only, mark variation on blank left-hand pages of the record specifications, facing printed right-hand pages containing original text affected by variation.

D. Record Product Data: During progress of the Work, maintain one copy of each product data submittal, and mark-up significant variations in the actual Work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned at a later date by direct observation. Note related Field Orders and Change Orders and mark-up of record drawings and specifications. Upon completion of mark-up, submit complete set of product data submittal to the Engineer for the Owner's records. Label each data submittal "PROJECT RECORD" in 1-1/2-inch high letters.

E. Record Sample Submittal: Immediately prior to date(s) of Substantial Completion, the Engineer and Owner's personnel will meet with the Contractor at the work site and will determine if any of the submitted samples maintained by the Contractor during progress of the Work are to be transmitted to the Owner for record purposes. The Contractor shall comply with the Engineer's instructions for packaging, identification marking and delivery to the Owner's sample storage space. Dispose of other samples in a legal manner specified for disposal of surplus and waste materials, unless otherwise indicated by the Engineer.

F. Miscellaneous Record Submittals: Refer to other sections of these Specifications for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to date(s) of Substantial Completion, complete all miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Engineer for the Owner's records. Categories of requirements resulting in miscellaneous Work records are recognized to include, but not be limited to, the following:

(1) Required field records on excavations, foundations underground construction, wells and similar Work.

(2) Accurate survey showing locations and elevations of underground lines, including invert elevations of drainage piping, valves, tanks and manholes.

(3) Surveys establishing lines and levels of buildings, where applicable.

(4) Soil treatment certification.

(5) Inspection and Test Reports: Where not processed as shop drawings or product data.

(6) Concrete mix design record.

(7) Asphaltic concrete mix design record.

(8) Concrete block certification, where applicable.

G. Not used.

H. Not used.

I. Not used.

J. Not used.

K. Record Document Submittals: Specific requirements for record documents are shown in Paragraph 10, PROJECT DOCUMENTATION herein. Other requirements are indicated in the General Provisions. General submittal requirements are indicated in "Submittals" sections. Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer's reference during normal working hours.

(1) Record Drawings: The Engineer shall organize record drawing sheets into manageable sets, bind with durable paper cover sheets and print suitable titles, dates and other identification on the cover of each set.

(2) Record Specifications: Upon completion of mark-up, submit to the Engineer for the Owner's records.

(3) Record Product Data: Upon completion of mark-up, submit complete set to the Engineer for the Owner's records.

(4) Record Sample Submittal: Comply with the Engineer's instructions for packaging, identification marking and delivery to the Owner's sample storage space.

(5) Miscellaneous Record Submittals: Complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Engineer for the Owner's records.

(6) Maintenance Manuals: Complete, place in order, properly identify and submit to the Engineer for the Owner's records.

L. Not used.

11. Not used.

END OF SPECIAL CONDITIONS - SECTION 1

SPECIAL CONDITIONS

SECTION 2

INSURANCE REQUIREMENTS

INSURANCE AND INDEMNIFICATION
Before starting and until termination of work for, or on behalf of, the Glynn County Airport Commission (Commission), the Contractor shall procure and maintain insurance of the types and to the limits specified.

The term Commission as used in this section of the Contract is defined to mean the Glynn County Airport Commission itself, any subsidiaries or affiliates, elected and appointed officials, employees, volunteers, representatives, agents and Engineer.

With regard to the Contractor's obligations for products and completed operations, the Contractor shall be responsible for providing and maintaining insurance and contractual agreements for a minimum period of at least three (3) years subsequent to the Commission's acceptance of the products and/or services.

Insurance shall be issued by an insurer whose business reputation, financial stability and claims payment reputation is satisfactory to the Commission, for the Commission's protection only. Unless otherwise agreed, the amounts, form and type of insurance shall conform to the following minimum requirements:

WORKER'S COMPENSATION
The Contractor shall purchase and maintain Worker's Compensation Insurance Coverage for all Worker's Compensation obligations whether legally required or not. Additionally, the policy, or separately obtained policy, must include Employers Liability Coverage of at least $100,000 each person - accident, $100,000 each person - disease, $500,000 aggregate - disease.

COMMERCIAL GENERAL AUTOMOBILE AND UMBRELLA LIABILITY COVERAGES
The Contractor shall purchase coverage on forms no more restrictive than the latest editions of the Commercial General Liability and Business Auto policies filed by the Insurance Services Office. **The Commission and RS&H, Inc.** shall be listed separately as **Additional Insured** and such coverage shall be at least as broad as that provided to the Named Insured under the policy for the terms and conditions of this contract. The Commission shall not be considered liable for premium payment, entitled to any premium return or dividend and shall not be considered a member of any mutual or reciprocal company. Minimum limits of $1,000,000 per occurrence, and per accident, combined single limit for liability must be provided, with umbrella insurance coverage making up any difference between the policy limits of underlying policies coverage and the total amount of coverage required. If the required limits of liability afforded should become impaired by reason of any claim, then the Contractor agrees to have the minimum limits reinstated under the policy.

Commercial General Liability coverage must be provided, including bodily injury and property damage liability for premises, operations, products and completed operations, contractual liability, independent contractors, and property damage resulting from collapse and underground (c, u) exposures. Broad Form Commercial General Liability coverage, or its equivalent shall provide at least, broad form contractual liability applicable to this specific contract, as well as personal injury liability and broad form property damage liability. The coverage shall be written on occurrence-type basis.

Business Auto Policy coverage must be provided, including bodily injury and property damage arising out of operation, maintenance or use of owned, non-owned and hired automobiles and employee non-ownership use.

Umbrella Liability Insurance coverage shall not be more restrictive than the underlying insurance policy coverages. The coverage shall be written on an occurrence-type basis.

CERTIFICATES OF INSURANCE

Required insurance shall be documented in the Certificates of Insurance which provided that the Commission shall be notified at least thirty (30) days in advance of cancellation, non-renewal or adverse change or restriction in coverage. Separate Certificates shall be issued to the Commission and to the Engineer naming each as an Additional Insured and this contract shall be listed. If required by the Commission, the Contractor shall furnish copies of the Contractor's insurance policies, forms, endorsements, jackets and other items forming a part of, or relating to such policies. Certificates shall be on the "Certificate of Insurance" form equal to, as determined by the Commission an ACORD 25. Any wording in a Certificate which would make notification of cancellation, adverse change or restriction in coverage to the Commission an option shall be deleted or crossed out by the insurance carrier or the insurance carrier's agent or employee. The Contractor shall replace any canceled, adversely changed, restricted or non-renewed policies with new policies acceptable to the Commission and shall file with the Commission Certificates of Insurance under the new policies prior to the effective date of such cancellation, adverse change or restriction. If any policy is not timely replaced, in a manner acceptable to the Commission, the Contractor shall, upon instructions of the Commission, cease all operations under the contract until directed by the Commission, in writing, to resume operations. The "Certificate Holder" address should read: Glynn County Airport Commission, Executive Director, 295 Aviation Parkway, Suite 205, Brunswick, Georgia 31525-6804.

INSURANCE OF THE CONTRACTOR PRIMARY

The Contractor required coverage shall be considered primary, and all other insurance shall be considered as excess, over and above the Contractor's coverage. The Contractor's policies of coverage will be considered primary as relates to all provisions of the contract.

LOSS CONTROL AND SAFETY

The Contractor shall retain control over its employees, agents, servants and subcontractors, as well as control over its invitees, and its activities on and about the subject premises and the manner in which such activities shall be undertaken and to that end, the Contractor shall not be deemed to be an agent of the Commission. Precaution shall be exercised at all times by the Contractor for the protection of all persons, including employees, and property. The Contractor shall make special effort to detect hazards and shall take prompt action where loss control/safety measures should reasonably be expected.

HOLD HARMLESS

The Contractor shall hold harmless the Glynn County Airport Commission and RS&H, Inc., their subsidiaries or affiliates, elected and appointed officials, employees, volunteers, representatives and agents from any and all claims, suits, actions, damages, liability and expenses in connection with loss of life, bodily or personal injury, or property damage, including loss or use thereof, directly or indirectly caused by, resulting from, arising out of, or occurring in connection with the performance of this Contract, whether arising solely out of the negligence of the Contractor or not. The Contractor's obligation shall not be limited by or in any way to, any insurance coverage or by any provision in or exclusion or omission from any policy of insurance.

PAY ON BEHALF OF THE COMMISSION

The Contractor agrees to pay on behalf of the Commission, as well as provide a legal defense for the Commission, both of which will be done only if and when requested by the Commission, for all Claims as described in the Hold Harmless paragraph. Such payment on behalf of the Commission shall be in addition to any and all other legal remedies available to the Commission and shall not be considered to be the Commission's exclusive remedy.

PAY ON BEHALF OF THE ENGINEER

The Contractor agrees to pay on behalf of the Engineer, as well as provide a legal defense for the Engineer, both of which will be done only if and when requested by the Engineer, for all claims as described in the

Hold Harmless paragraph. Such payment on behalf of the Engineer shall be in addition to any and all other legal remedies available to the Engineer and shall not be considered to be the Engineer's exclusive remedy.

END OF SPECIAL CONDITIONS - SECTION 2

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SPECIAL CONDITIONS

SECTION 3

MISCELLANEOUS

1. PROVISIONS REQUIRED BY LAW DEEMED INSERTED. Each and every provision of law and clause required by law to be inserted in the Contract Documents shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein. If, for any reason, any such provision is not inserted in the Contract, or is not correctly inserted, then upon application of either party, the Contract shall forthwith be physically amended to make such insertion or correction.

2. CORRELATION OF DOCUMENTS.

A. Drawings and specifications are cooperative and supplementary. Portions of the Work which can be best be illustrated by the drawings may not be included in the specifications and portions best described by the specifications may not be depicted on the drawings. All items necessary or incidental to completely construct or erect the Work shall be furnished, whether called for in the specifications or shown on the drawings. Anything mentioned in the specifications and not shown on the drawings, or anything shown or mentioned on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both.

B. In case of disagreement between the drawings and specifications, or within either document itself, the better quality or greater quantity of Work shall be estimated and included in the bid and Contract Price and the matter drawn to the Engineer's attention for decision.

3. NOTICE AND SERVICE THEREOF. Where the manner of giving notice is not otherwise provided for in the Contract Documents, any notice to the Contractor from the Owner relative to any part of the Contract shall be in writing and considered delivered and the service thereof completed, when said notice is posted, by certified or registered mail, to the Contractor at the address given in the Contractor's Proposal, or at the last business address known to him who gives the notice, or delivered in person to the Contractor or his authorized representative on the site. It is mutually agreed that such notice shall be sufficient and adequate.

4. SUBCONTRACTING.

A. The Contractor may utilize the services of specialty or minority Subcontractors on those parts of the Work which, under normal contracting practices, are performed by specialty or minority Subcontractors.

B. The Owner reserves the right to approve Subcontractors for any Work. The Contractor, if requested by the Owner, shall submit to the Owner the proposed award and such information as the Owner may require concerning any subcontractor.

C. The Contractor shall be as fully responsible to the Owner for the acts and omissions of his Subcontractors, and of persons either directly or indirectly employed by them, or under their control, as he is for the acts and omissions of persons directly employed by him.

D. The Contractor shall cause appropriate provisions to be inserted in all Subcontracts relative to the Work to bind Subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the Work of Subcontractors, and to give the Contractor the same power as regards terminating any Subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.

E. Nothing contained in the Contract Documents shall create any contractual relationships between any Subcontractor and the Owner.

5. PROTECTION OF PERSONS.

A. The Contractor shall:

(1) At all times protect the lives and health of his employees under the Contract;

(2) Take all necessary precautions for the safety of all persons on or in the vicinity of the project site.

(3) Comply with all applicable provisions of Federal, State and Municipal safety laws and building codes.

(4) Comply with all pertinent provisions of the Manual of Accident Prevention in Construction issued by the Associated General Contractors of America, Inc., latest edition, to prevent accidents or injury to persons on or about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of persons and shall post danger signs warning against the hazards created in part by features of construction such as protruding nails, rod hoists, well holes, falling materials, etc., and he shall designate a responsible member of his organization on the Work site whose duty shall be the prevention of accidents;

(5) Provide for all safeguards for the protection of those having Right-of-Entry during field review and observation of the Work.

B. The Contractor shall comply with all provisions of the "Williams-Steiger Occupational Safety and Health Act of 1970" including any amendments thereto and rules and regulations issued pursuant thereto, applicable to the Work and performance of the Contract. Where a State in which Work is performed has passed legislation bearing on Occupational Safety and Health, such legislation and amendments thereto, together with rules and regulations issued pursuant thereto shall be complied with by the Contractor.

6. AUTHORITY OF ENGINEER.

A. The Engineer, through its duly authorized representatives, shall furnish engineering services during construction of the Work to the extent provided in the Contract Documents. He shall observe and review the Work in the process of construction or erection. Compliance with the Contract Documents shall be the Contractor's responsibility notwithstanding such observation or review. The Engineer has authority to recommend suspension of the Work to the Owner when it appears such suspension may be necessary to accomplish the proper implementation of the intent of the Contract Documents. The authority to observe, review or recommend suspension of the Work, or exercise such other authority as may be granted by the Contract Documents, shall not be construed or interpreted to mean supervision of construction, which is the Contractor's responsibility, nor make the Engineer responsible for providing a safe place for the performance of Work by the Contractor or by the Contractor's employees, or those of suppliers or Subcontractors, or for access, visits, use, work, travel, or occupancy by any other person. The Engineer shall also have the authority to reject any Work, materials, or equipment which do not conform to the Contract Documents and to decide technical questions which arise in the execution of the Work.

B. The Engineer shall determine the amount, quality, acceptability, and fitness of the several kinds of Work, materials, equipment and supplies which are to be paid for under the Contract and shall decide questions which may arise in relation to said Work and its compliance with the Contract Documents. The Engineer's estimates and decisions shall be final and conclusive, except as otherwise expressly provided in case any question shall arise between the parties to the Contract relative to the Contract Documents, the determination or decision of the Engineer shall be a condition precedent to the right of the Contractor to

receive any money or payment for Work under the Contract affected in any manner or to any extent by such question.

C. The Engineer shall decide the meaning and intent of any portion of the Contract Documents where the same may be found obscure or be in dispute.

7. "GOOD REPAIR" PERIOD.

A. The Contractor hereby agrees to keep all Work constructed under the Contract in Good Repair for a minimum period of one (1) year, unless a longer period is otherwise specified in the Contract Documents, from the date of final acceptance of all of the Work by the Owner. No provision of the Contract documents shall be valid which limits the "Good Repair" period to less than one (1) year from the date of acceptance of all of the Work by the Owner. The Work is to be phased. Each phase of Work completed shall be inspected and approved for use by the Owner but shall not be accepted until all Work for all phases is complete and a final inspection for all Work has been performed.

B. It is intended that this provision shall apply whether or not bond is required, as a personal obligation of the Contractor.

C. The obligations of the Contractor as herein provided shall be in addition to and not in limitation of any obligations imposed upon him by special guarantees required by the Contract Documents or otherwise prescribed by law.

8. Not used.

9. WATER FOR CONSTRUCTION. Water used for construction of this project will be furnished by the Contractor. The Contractor shall make the necessary arrangements with the Owner of the source of water for securing and/or transporting such water. No separate payment will be made for water used but the cost thereof shall be included in the various items of the proposal and bid schedule.

10. LIGHTS AND POWER. The Contractor shall provide, at his own expense, temporary lighting and facilities required for the proper prosecution and inspection of the work.

11. COORDINATION WITH OTHERS. In the event other contractors are doing work in the same area simultaneously with this project, the Contractor shall coordinate his proposed construction with that of the other contractors. The Contractor shall notify the Engineer of said coordination attempts and the results.

12. TESTING, INSPECTION, AND CONTROL. The Owner shall pay for all passing tests, the Contractor shall pay for all failing tests. Charges for failing tests will be deducted from the Contractor's earnings at the end of project at the time of final payment. The Contractor will pay for tests, other than Acceptance testing, and shall be incidental to those items which require testing. The Contractor shall furnish, at his own expense, all necessary specimens for testing of the materials, as required by the Engineer. The Contractor shall be responsible for notifying the testing laboratory to pick up the test samples. Also, the Engineer reserves the right to test at any location on the project, and at any frequency he deems necessary before, during and after incorporation of all materials into the project to satisfy himself and ensure that all materials meet the specified requirements. All materials utilized in the project must meet specification requirements before, during and after incorporation into the project. Any additional testing that the Contractor deems necessary to ensure himself that the materials he is installing meet the required specifications and/or as a proof of the authorized testing laboratory shall be solely the expense of the Contractor whether the tests pass or fail.

13. Not used.

14. TRADE NAMES AND MATERIALS. No material which has been used by the Contractor for any temporary purpose whatsoever is to be incorporated in the permanent structure without written consent of the Engineer.

Where materials or equipment are specified by a trade or brand name, it is not the intention of the Owner to discriminate against an equal product of another manufacturer, but rather to set a definite standard of quality or performance, and to establish an equal basis for the evaluation of bids. Where the words "equivalent", "proper", or "equal to" are used, they shall be understood to mean that the thing referred to shall be proper, the equivalent of, or equal to some other thing, in the opinion or judgement of the Engineer. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases fully equal to approved samples. Notwithstanding that the words "or equal to" or other such expressions may be used in the plans and specifications in connection with the material, manufactured article or process, the material, manufactured article or process specifically designated shall be used, unless a substitute shall be approved in writing by the Engineer and the Engineer shall have the right to require the use of such specifically designated material, article or process.

15. PROPERTY LINES AND MONUMENTS. The Contractor shall protect all property corner markers and any other monument, and when any such markers or monuments are in danger of being disturbed, they shall be properly referenced and if disturbed shall be reset at the expense of the Contractor.

16. FENCES AND DRAINAGE CHANNELS. Boundary fences or other improvements removed to permit the installation of the work shall be replaced in the same location and left in a condition as good or better than that in which they were found. Existing fences not to be removed and intersecting with new fencing (fencing outside airport property) shall be connected to the new fencing in a manner acceptable to the fence owner and the Owner and/or Engineer.

Where surface drainage channels are disturbed or blocked during construction, they shall be restored to their original condition of grade and cross section after the work of construction is completed.

17. DISPOSAL OF WASTE AND SURPLUS EXCAVATION. All trees, stumps, slashings, brush or other debris to be removed from the site as a preliminary to the construction work shall be removed from the property and legally disposed of in a manner approved by the Engineer and at a site approved by the Owner. No burning on site will be permitted.

All excavated earth in excess of that required for embankment and backfill shall be disposed of in a satisfactory manner as shown on the plans or as directed by the Engineer to a site approved by the Owner.

18. AIR POLLUTION. The Contractor shall comply with all Federal, State and Local Requirements.

19. EXISTING UTILITIES AND SERVICE LINES. The Contractor shall be responsible for the protection of all existing utilities or service lines crossed or exposed by his construction operations. Where existing utilities or service lines are cut, broken or damaged, the Contractor shall replace or repair the utilities or service lines with the same type of original material and construction, or better, at his own cost and expense, with the exception of those items included in the bid schedule.

20. RECORDS OF MATERIALS PURCHASED. By a certain time each month as defined and established at the preconstruction conference, the Contractor shall furnish to the Engineer, duplicate copies of all invoices for materials furnished to be incorporated into the work, plus a statement of all materials previously included on monthly estimates and incorporated into the work during the preceding month. This information is to be used to determine the value of materials on hand to be included in the monthly estimate for periodical payment.

21. CONTRACTOR ACCESS TO PROJECT SITE. The Contractor shall have a specific access route to the project site. This route is shown in the construction drawings. The Contractor shall use this route to bring all equipment and materials in. If the Contractor has a better route which would prevent damage to

existing roads or provide safer access to the construction site, the Contractor shall supply a drawing showing the recommended route to the Owner and Engineer for approval at the preconstruction conference.

22. NIGHTTIME WORK. In phases of work requiring daytime work, the Contractor shall not perform nighttime work unless given approval in writing by the Engineer. The Contractor shall request in writing approval to perform nighttime work. If the Engineer approves said nighttime work, the Contractor shall coordinate closely with the Engineer and the Owner during any and all approved nighttime work. This includes any nighttime hauling of materials to the project site. If the Contractor wishes to perform nighttime work or haul materials at night, the Contractor shall reimburse the Owner for any nighttime inspection costs incurred by the Owner to adequately and properly inspect said nighttime work or hauling of materials.

In phases of work requiring night time work, the Contractor shall perform said night time work within the time frame allotted by the Owner. The Contractor shall coordinate with the Owner and Engineer each day before night time operations to ensure all special instructions, time limitations, directives, etc. are adhered to each night of night time operations. The Contractor shall not enter areas requiring night time construction operations until cleared to do so by the Owner. Any violation will result in a $1,000.00 fine for each infraction.

23. DUST CONTROL. The Contractor shall maintain strict dust control during the project duration. There are operational areas, aircraft parked on the airport as well as commercial facilities which perform maintenance and repair work to aircraft. Therefore, it is imperative that strict dust control be maintained so that damage or nuisance to the areas and facilities described above or airport operational areas is prevented. This dust control shall also include the dust which may occur during any construction procedure.

24. TRIP TICKETS, INVOICES, WEIGH BILLS, ETC. The Contractor shall be responsible for supplying any and all trip tickets, invoices, weigh bills, etc. which show the quantities actually used in the construction of the project. All said trip tickets, invoices, weigh bills, etc. shall relate directly to specific bid items. If the Contractor fails to submit said trip tickets, invoices, weigh bills, etc. to the Engineer or his authorized representative prior to or during the time of installation of materials into the project, any material overruns claimed by the Contractor at the end of the project shall not be accepted.

25. Not used.

26. Not used.

27. CONTRACT TIME AND ASSOCIATED CONSTRUCTION PHASING. Refer to Section 80-07 of the General Provisions for the contract time. The phasing shall be as established during the pre-construction conference and as approved by the Owner and Engineer to minimize traffic access to the various areas of the airport associated with the pavements having work accomplished on.

28. LIQUIDATED DAMAGES TO BE CHARGED. Refer to Section 80-08 of the General provisions for the Liquidated damages to be charged.

END OF SPECIAL CONDITIONS - SECTION 3

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SPECIAL CONDITIONS

SECTION 4

LISTING OF DUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY OF THE RESIDENT PROJECT REPRESENTATIVE

The Owner and/or Engineer may furnish a Resident Project Representative (RPR), assistants and other field staff to assist the Engineer in observing performance of the Work of the Contractor.

Through more extensive on-site observations of the Work in progress and field checks of materials and equipment by the RPR and assistants, the Engineer shall endeavor to provide further protection for the Owner against defects and deficiencies in the Work; but, the furnishing of such services will not make the Engineer responsible for or give the Engineer control over construction means, methods, techniques, sequences or procedures or for safety precautions or programs, or responsibility for the Contractor's failure to perform the Work in accordance with the Contract Documents.

The duties and responsibilities of the RPR are limited to those of the Engineer in the Engineer's agreement with the Owner and in the construction Contract Documents, and are further limited and described as follows:

A. General

1. The RPR is the Engineer's agent at the site and will act as directed by and under the supervision of the Engineer, and will confer with the Engineer regarding the RPR's actions. The RPR's dealings in matters pertaining to the on-site Work shall in general be with the Engineer and the Contractor keeping the Owner advised as necessary. The RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of the Contractor. The RPR shall generally communicate with the Owner with the knowledge of and under the direction of the Engineer.

B. Duties and Responsibilities of the RPR

1. Schedules: Review the progress schedule, schedule of Shop Drawing submittals and schedule of values prepared by the Contractor and consult with the Engineer concerning acceptability.

2. Conferences and Meetings: Attend meetings with the Contractor and Owner, such as preconstruction conferences, weekly progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.

3. Liaison:

a. Serve as the Engineer's liaison with the Contractor, working principally through the Contractor's superintendent and assist in understanding the intent of the Contract Documents; and 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.

b. Assist in obtaining from the Owner additional details or information, when required for proper execution of the Work.

4. Shop Drawings and Samples:

a. Record date of receipt of Shop Drawings and samples.

b. Receive samples which are furnished at the site by the Contractor, and notify the Engineer of availability of samples for examination.

c. Advise the Engineer and the Contractor of the commencement of any Work requiring a Shop Drawing or sample if the submittal has not been approved by the Engineer.

5. Review of Work, Rejection of Defective Work, Inspections and Tests:

a. Conduct on-site observations of the Work in progress to assist the Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

b. Report to the Engineer whenever the RPR believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise the Engineer of Work that the RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

c. Verify that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate personnel, and that the Contractor maintains adequate records thereof; and observe, record and report to the Engineer appropriate details relative to the test procedures and startups.

d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of those inspections and report to the Engineer.

6. Interpretation of Contract Documents: Report to the Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to the Contractor clarifications and interpretations as issued by the Engineer.

7. Modifications: Consider and evaluate the Contractor's suggestions for modifications in Drawings or Specifications and report the suggestions along with the RPR's recommendations to the Engineer. Transmit to the Contractor decisions as issued by the Engineer.

8. Records:

a. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples, reproductions of original Contract Documents including all Work Directive Changes, Addenda, Change Orders, Field Orders, additional Drawings issued subsequent to the execution of the Contract, the Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.

b. Keep a diary or log book, recording the Contractor hours on the job site, weather conditions, data relative to questions of Work Field Orders, Change Orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to the Engineer.

c. Record names, addresses and telephone numbers of all the Contractors, Subcontractors and major suppliers of materials and equipment.

9. Reports:

a. Furnish the Engineer daily progress reports of progress of the Work and of the Contractor's compliance with the progress schedule and schedule of Shop Drawing and sample submittals.

b. Consult with the Engineer in advance of scheduled major tests, inspections or start of important phases of the Work.

c. Draft proposed Change Orders and Field Orders, obtaining backup material from the Contractor and recommend to the Engineer Change Orders and Field Orders.

d. Report immediately to the Engineer and the Owner the occurrence of any accident.

10. Payment Requests: Review applications for payment with the Contractor for compliance with the established procedure for their submission and forward with recommendations to the Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.

11. Certificates, Maintenance and Operation Manuals: During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by the Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to the Engineer for review and forwarding to the Owner prior to final payment for the Work.

12. Completion:

a. Before the Engineer issues a Certificate of Substantial Completion, submit to the Contractor a list of observed items requiring completion or correction.

b. Conduct final inspection in the company of the Engineer, the Owner and the Contractor and prepare a final list of items to be completed or corrected.

c. Observe that all items on the final list have been completed or corrected and make recommendations to the Engineer concerning acceptance.

C. Limitations of Authority of the Resident Project Representative (RPR):

1. He shall not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by the Engineer.

2. He shall not exceed limitations of the Engineer's authority as set forth in the Contract Documents.

3. He shall not undertake any of the responsibilities of the Contractor, Subcontractors or the Contractor's superintendent.

4. He shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.

5. He shall not advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.

6. He shall not accept Shop Drawing or sample submittals from anyone other than the General Contractor.

7. He shall not authorize the Owner to occupy the Project in whole or in part.

8. He shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by the Engineer.

END OF SPECIAL CONDITIONS - SECTION 4

SPECIAL CONDITIONS

SECTION 5

SHOP DRAWING SUBMITTAL SUMMARY

1. The following list is intended to assist the Contractor in identifying shop drawings which are required to complete the Work described in the Contract Documents. The list is not necessarily all inclusive and other shop drawings not listed may be required to be submitted by the Contractor to meet the requirements stated in General Provision Section 60, "Control of Materials" and Special Conditions Section 1, Paragraph 9, "Shop Drawings, Product Data and Samples."

Item No.	Item Description

(Refer to Technical Specifications)

END OF SPECIAL CONDITIONS - SECTION 5

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DESTRUCTIVE WEATHER PLAN

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St. Simons Island Airport at McKinnon Field
SKYLANE DEVELOPMENT INFRASTRUCTURE – PHASE 2
FAA PROJECT No.: (TBD)
GDOT AVIATION PROJECT No.: (TBD)
PID: (TBD)
GLYNN COUNTY AIRPORT COMM PROJECT No.: 215D
ST. SIMONS ISLAND, GEORGIA

Destructive weather (hurricanes) extends from approximately June 1 to November 30. The Contractor must be prepared to implement certain actions should destructive weather be imminent. Should the Airport be notified that destructive weather is possible or will affect the Airport, the Contractor shall take certain actions to ensure readiness and to prepare the construction site for which he is responsible, the materials on site, the equipment and the personnel are protected to the fullest extent possible. The following shall be complied with when the Airport notifies the Contractor either verbally or in writing that destructive weather potential exists.

1. The Contractor shall complete the following information and make it a part of the Contract Documents. The following list of personnel is to be contacted in the order provided when destructive weather is possible or eminent.

   Contractor Name:_____
   Address:_____
   Company Officer:_____
   Office Phone No.:_____
   Cell Phone No.:_____
   Home Phone No.:_____
   Project Manager:_____
   Office Phone No.:_____
   Cell Phone No.:_____
   Home Phone No.:_____
   Project Superintendent:_____
   Office Phone No.:_____
   Cell Phone No.:_____
   Home Phone No.:_____

2. The Contractor shall always maintain a clean work site free of debris and trash. However, during a destructive weather period, the Contractor shall take extra care to prevent trash and debris from littering the construction site or other parts of the airport. The Contractor shall take whatever measures are necessary to protect the site from trash and debris including removal of small equipment, trash barrels, storage buildings, etc. that might be damaged or destroyed during destructive weather and cause debris and trash on airport property.

3. In the event of a hurricane, the following conditions for hurricane readiness will be complied with:
   A. Condition ONE (Sustained winds of 50 knots or greater expected within 18 hours):
      a. Perform complete actions required for “Condition TWO, THREE and FOUR”.
      b. Contact the Engineer and the Operations Coordinator for directive on status of equipment and all barricades.
      c. Secure the construction site and leave the Airport property.

   B. Condition TWO (Sustained winds of 50 knots or greater expected within 24 hours):
      a. Curtail or cease routine activities until securing operations are complete.
      b. Secure machinery, tools, equipment, materials, or remove from the project site.
      c. Expend every effort to clear all missile hazards and loose equipment from the project site.

d. Contact the Engineer and the Operations Coordinator for weather and Condition of Readiness updates and completion of required actions.

C. Condition THREE (Sustained winds of 50 knots or greater expected within 36 hours):
   a. Maintain “Condition FOUR” requirements and commence securing operations necessary for “Condition ONE” which cannot be completed within 18 hours.
   b. Cease all routine activities which might interfere with Airport related or construction related securing operations.
   c. Commence securing and stow all gear and portable equipment.
   d. Make preparations for securing all staging area materials, port-0-lets, etc.
   e. Review requirements pertaining to “Condition TWO” and continue action as necessary to attain “Condition THREE readiness”.
   f. Contact the Engineer and the Operations Coordinator for weather and Condition of Readiness updates and completion of required actions.

D. Condition FOUR (Sustained winds of 50 knots or greater expected within 48 hours):
   b. Perform normal daily project site cleanup and good housekeeping practices.
   c. Collect and store in piles or containers waste material and rubbish for removal and disposal at the close of each workday.
   d. Maintain the construction site including storage areas free of accumulation of debris.
   e. Remove all debris, trash or objects that could become missile hazards.
   f. Contact the Engineer and the Operations Coordinator for weather and Condition of Readiness updates and completion of required actions.

The items defined above shall be adhered to and shall be contract document requirement. The Contractor shall perform all defined elements above in the proper sequence and shall follow any verbal or written instructions provided by the Operations Coordinator at St. Simons Island Airport at McKinnon Field.

The Contractor agrees to all terms and conditions of the Destructive Weather Plan by executing at the place provided herein without additional compensation.

CONTRACTOR NAME:_____

ADDRESS:_____

Signature:_____

Title:_____

WAGE RATES

WAGE RATES

WAGE RATE REQUIREMENTS

DAVIS-BACON WAGE DETERMINATION
GLYNN COUNTY, GEORGIA

General Decision Number: **GA20260065 01/02/2026**
Superseded General Decision Number: **GA20250065**
State: **Georgia**
Construction Type: **Highway**
Counties: Brantley, Bryan, Chatham, Effingham, **Glynn**, Liberty, Long and McIntosh **Counties in Georgia**.

HIGHWAY CONSTRUCTION PROJECTS
Modification Number Publication Date
0 **01/02/2026**
SUGA2022-005 07/12/2024

	Rates	Fringes
CARPENTER	$ 32.68	0.00
CEMENT MASON/CONCRETE FINISHER	$ 28.44	0.00
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor	$ 16.72	2.23
LABORER: Common or General	$ 18.46	0.00
LABORER: Pipelayer	$ 22.42	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 23.40	3.73
OPERATOR: Bulldozer	$ 22.82	0.00
OPERATOR: Crane	$ 39.31	0.00
OPERATOR: Grader/Blade	$ 26.31	5.43
OPERATOR: Loader	$ 22.81	1.91
OPERATOR: Paver (Asphalt,Aggregate, and Concrete)	$ 23.22	4.10
OPERATOR: Roller	$ 18.51	3.99
TRAFFIC CONTROL: Flagger	$ 14.64	0.00
TRUCK DRIVER: Dump Truck	$ 21.58	3.58

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

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not beenrenewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded, If a contract is subject to Executive Order 13658, 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 the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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

Union Rate Identifiers
A four-letter identifier beginning with characters other than "SU", "UAVG", “SA”, or ”SC” denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

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

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

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

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

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

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

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:
   a) a survey underlying a wage determination
   b) an existing published wage determination
   c) an initial WHD letter setting forth a position on a wage determination matter
   d) an initial conformance (additional classification and rate) determination

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

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

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

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

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

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

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

FAA SPECIFICATIONS

FAA SPECIFICATIONS

Item C-100 Contractor Quality Control Program (CQCP)

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

100-1 General. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

a. Provide qualified personnel to develop and implement the CQCP.

b. Provide for the production of acceptable quality materials.

c. Provide sufficient information to assure that the specification requirements can be met.

d. Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the Resident Project Representative (RPR). No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the RPR ~~or Contractor as specified in the specifications~~.

A Quality Control (QC)/Quality Assurance (QA) workshop with the ~~Engineer,~~ Resident Project Representative (RPR), Contractor, subcontractors, testing laboratories, and Owner's representative must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the RPR on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

a. Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.

b. Discussion of the QA program.

c. Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.

d. Establish regular meetings to discuss control of materials, methods and testing.

e. Establishment of the overall QC culture.

100-2 Description of program.

a. General description. The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

b. Contractor Quality Control Program (CQCP). The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the RPR prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the RPR for review and approval at least **14** calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

The CQCP shall be organized to address, as a minimum, the following:

1. QC organization and resumes of key staff
2. Project progress schedule
3. Submittals schedule
4. Inspection requirements
5. QC testing plan
6. Documentation of QC activities and distribution of QC reports
7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract.

100-3 CQCP organization. The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function, and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

a. Program Administrator. The Contractor Quality Control Program Administrator (CQCPA) must be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must

have a minimum of five (5) years of experience in QC pavement construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of paving/QC experience, the CQCPA must meet at least one of the following requirements:

(1) Professional Engineer with one (1) year of airport paving experience.

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

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

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

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

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

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

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

(2) Performance of all QC tests as required by the technical specifications and paragraph100-8.

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

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

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

100-4 Project progress schedule. Critical QC activities must be shown on the project schedule as required by **FAA General Provisions,** 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 **FAA** Item P-401, **FAA** Item P-403, and **/ or FAA** 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 **FAA Item** 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., **FAA Item** P-401)

b. Item description (e.g., Hot Mix Asphalt Pavements)

c. Test type (e.g., gradation, grade, asphalt content)

d. Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)

e. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)

f. Responsibility (e.g., plant technician)

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

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

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

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

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

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

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

(1) Technical specification item number and description

(2) Compliance with approved submittals

(3) Proper storage of materials and equipment

(4) Proper operation of all equipment

(5) Adherence to plans and technical specifications

(6) Summary of any necessary corrective actions

(7) Safety inspection.

(8) Photographs and/or video

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

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least one copy of each daily inspection report on the work day following the day of

record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

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

(1) Technical specification item number and description
(2) Test designation
(3) Location
(4) Date of test
(5) Control requirements
(6) Test results
(7) Causes for rejection
(8) Recommended remedial actions
(9) Retests

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

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

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

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

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

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

100-12 Noncompliance.

a. The Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.

b. When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions

have been taken after notification of non-compliance, the RPR will recommend the Owner take the following actions:

(1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or

(2) Order the Contractor to stop operations until appropriate corrective actions are taken.

METHOD OF MEASUREMENT

100-13 Basis of measurement and payment. Contractor Quality Control Program (CQCP) is for the personnel, tests, facilities and documentation required to implement the CQCP. The CQCP will be paid as a lump sum with the following schedule of partial payments:

a. With first pay request, 25% with approval of CQCP and completion of the Quality Control (QC)/Quality Assurance (QA) workshop.

b. When 25% or more of the original contract is earned, an additional 25%.

c. When 50% or more of the original contract is earned, an additional 20%.

d. When 75% or more of the original contract is earned, an additional 20%

e. After final inspection and acceptance of project, the final 10%.

BASIS OF PAYMENT

100-14 Payment will be made under:

Item C-100-14.1 Contractor Quality Control Program (CQCP) - per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

National Institute for Certification in Engineering Technologies (NICET)

ASTM International (ASTM)

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

END OF ITEM C-100

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Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

102-1 This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

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.

The Contractor shall prepare all required documentation, pay all fees and perform all services and work necessary to obtain all permits and approvals from any and all local, state and federal regulatory agencies for the Contractor's staging, stockpile, blending and batch plant areas and operations. The cost of all permitting will be subsidiary to other items of work.

The Contractor must also submit to the RPR written documentation that all required permits have been obtained prior to commencement of construction activities.

MATERIALS

102-2.1 Grass. Grass that will not compete with the grasses sown later for permanent cover per Item T-901 shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.

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

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

102-2.4 Slope drains. Slope drains may be constructed of pipe, fiber mats, rubble, concrete, asphalt, or other materials that will adequately control erosion.

102-2.5 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.

102-2.6 Inlet Protection Barriers. Install inlet protection barriers as shown in the plans. .

102-2.7 Crushed Stone Construction Exit. Provide crushed aggregate for long- and short-term construction exits. Furnish aggregates that are clean, hard, durable, and free from adherent coatings such as salt, alkali, dirt, clay, loam, shale, soft or flaky materials, and organic and injurious matter. Install as shown in the plans.

102-2.8 Other. All other materials shall meet commercial grade standards and shall be approved by the RPR before being incorporated into the project.

CONSTRUCTION REQUIREMENTS

102-3.0 Installation, Maintenance, and Removal, and Disposal Work. Perform work in accordance with the contract documents, and in accordance with the NPDES permit. Install and maintain the integrity of temporary erosion and sedimentation control devices to accumulate silt and debris until soil disturbing activities are completed and permanent erosion control features are in place or the disturbed area has been adequately stabilized as approved.

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

102-3.2 Schedule. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

Several methods of controlling dust and other air pollutants include but are not limited to: exposing the minimum area of erodible earth, applying temporary mulch with or without seeding, using water sprinkler trucks, using covered haul trucks, using dust palliatives or penetration asphalt on haul roads, and using plastic sheet coverings. The cost of controlling dust and other air pollutants will be subsidiary to other items of work.

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 **sodding,** seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

102-3.4 Installation, maintenance and removal of silt fence. Install to allow surface or channel runoff percolation through fabric in sheet-flow manner and to retain and accumulate sediment. Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more than 10 feet (3 m) on center**, or less if so indicated on the plans**. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR. **Maintain silt fence to remain in proper position and configuration at all times.**

102-3.5 Installation of intet protection barriers. Install inlet protection barriers to retain and accumulate sediment, but maintain inlet protection barriers to allow minimal inlet inflow restrictions and blockage during storm events. Maintain inlet protection barriers to remain in proper position and configuration at all times.

102-3.6 Installation, maintenance, and removal of crushed stone construction exits. Install stabilized construction roads and exits at construction, staging, parking, storage, and disposal areas, as required to keep the adjacent pavements clean of mud carried by construction vehicles and equipment. Install at locations adjacent to pavement where contractor will enter paved areas from areas of disturbed earth. Install crushed stone construction exits at the loctiaons and to the minimum dimensions as shown in the plans.

Install geotextile fabric as a permeable separator to prevent mixing of coarse aggregate with underlying soil.

Inspect and maintain crushed stone construction exits daily. Provide periodic top dressing with additional coarse aggregates too maintain the required depth as shown in the plans. Repair and clean out damaged rock construction exits periodically to remove sediment build-up.

Remove crushed stone construction exits promptly when directed by the RPR..

102-3.7 Maintenance, Inspection, and Repair. Maintain existing erosion and sediment controls, if any, until directed by the RPR to remove and dispose of existing controls.

Inspect erosion and sedimentation controls daily during periods of prolonged rainfall, at end of rainfall period, and minimum once each week.

Repair or replace damaged sections immediately.

Remove eroded and sedimented products when silt reaches a depth one-third the height of the control or six (6) inches, whichever is less.

102-3.8 Temporary Erosion and Sedimentation Protection Program shall include all work necessary to establish and maintain the erosion and sedimentation program, including but not limited to planning, permitting, testing, as reporting as necessary to establish and maintain NPDES permit compliance. This item shall also include variable items of work that determined by the contractors construction sequencing, including but not limited to temporary grassing and mulching, fertilization, diversion berms, settling basins, and other protective measures.

METHOD OF MEASUREMENT

102-4.1 Temporary erosion and pollution control work required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

a. Temporary Erosion and Sedimentation Protection Program is paid as a lump sum, and is not separately measured for payment.

b. Temporary seeding and mulching **is considered incidental to Temporary Erosion Control Program, and will not be separately measured for payment.**

c. ~~Temporary slope drains will be measured by the linear foot.~~

d. Temporary rock check dams will be measured by each dam unit provided. Removal of temporary rock dam and restoration of the site is subsitidary to the item of work. ~~Temporary benches, dikes, dams, and sediment basins will be measured by the cubic yard of excavation performed, including necessary cleaning of sediment basins, and the cubic yard of embankment placed as directed by the RPR.~~

e. All fertilizing **is considered incidental to Temporary Erosion Control Program, and will not be separately measured for payment.**

f. Installation and removal of silt fence will be measured by the linear foot **per type specified**.

g. Installation and removal of inlet protection barriers will be measured on a per each basis.

g. Installation and removal of crushed stone construction exits will be measured on a per each basis.

Temporary erosion and pollution control work required will be performed by the Contractor as shown in the plans **to control pollution of air and water, soil erosion, and siltation through the use of erosion**

control devices, as detailed in the **contract documents** and / or as directed by the RPR. **The temporary erosion control measures must be approved by the RPR and 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.** Installation, maintenance, and removal of all erosion control measures will not be measured for separate payment.

102-4.2 Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

BASIS OF PAYMENT

102-5.1 Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the RPR and measured as provided in paragraph 102-4.1 will be paid for under:

Item C-102-5.1	Temporary Erosoion and Sedimentation Control Program – per lum sum
Item C-102-5.2	Crushed Stone Construction Exit – per each
Item C-102-5.3	Silt Fence, Non-Sensitive – per linear foot
Item C-102-5.4	Inlet Protection – per each
Item C-102-5.5	Temporary Rock Check Dam – per each
Item C-102-5.6	Outlet Protection (Rip-Rap) – per square yard

Removal of erosion controls is subsidiary to installation of erosion controls.

Where other directed work falls within the specifications for a work item that has a contract price, the units of work shall be measured and paid for at the contract unit price bid for the various items.

Temporary control features not covered by contract items that are ordered by the RPR will be paid for in accordance with **FAA General Provisions,** Section 90, paragraph 90-05, *Payment for Extra Work*.

102-5.2 Based upon the contract lump sum price for **Temporary Erosion and Sedimentation Program,** partial payments will be allowed as follows:

a. With first pay request, 50%.

b. When 75% or more of the original contract is earned, an additional 25%.

c. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by **FAA General Provisions,** Section 90, paragraph 90-11, *Contractor Final Project Documentation,* the final 25%.

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

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

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.

The work specified in this item also includes the preparatory work and operations in mobilizing for beginning work on the project, including, but not limited to, those operations necessary for the establishment of temporary offices, buildings, guard houses, utilities, safety equipment and first aid supplies, sanitary facilities and any other work not included in other contract pay items.

The cost of bonds and any required insurance and any other preconstruction expenses necessary for the start of the work, excluding the cost of construction materials, must also be included in this section.

The cost of all permit and inspection fees associated with the establishment of temporary facilities will be the Contractor's responsibility and included in this section.

This item also includes preconstruction costs exclusive of bidding costs, continuing general conditions and general maintenance of the contract, demobilization, restoration and general clean-up of the contract areas, and other similar costs.

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

105-3 Posted notices. Prior to commencement of construction activities, the Contractor must **provide and** post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 Engineer/RPR field office and equipment. The Contractor shall provide dedicated space for the use of the field RPR and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity in accordance with local building codes.

The office shall have the following minimum requirements:

a. The office (trailer or office space) or Contractor's trailer with a separate secured area dedicated for use by the Engineer shall have a minimum area of 300 square feet.

b. Electrical service and outlet receptacles throughout the office. The electrical service shall be a minimum of a 120/240 volt single phase power with at least 100-150 amp service. The office shall be lighted meeting local lighting codes. The Contractor shall also provide electrical hookup and termination. A separate 120/240 single phase service with a main disconnect panel at power pole for the on-site laboratory shall also be provided.

c. Heating and air conditioning shall be provided of adequate amount for the volume of space and meeting local heating and air conditioning codes.

d. Sanitary facilities with a sanitary sewer holding tank that will be emptied weekly at the Contractor's expense. Sanitary facilities in the office to be continuously supplied with toilet paper, paper towels and soap. Water service connected to the municipal potable water system.

e. New office furniture consisting of 2 double pedestal desks, 10 chairs, conference table sized to seat at least eight people, drafting table and chair, two fire proof and lockable four-drawer file cabinets, plan rack suitable to hold six sets of plans, two reference or storage tables, 2 fully adjustable high back swivel chairs, and four waste baskets. The Contractor shall also provide a new bottled water dispensing unit with both hot and cold water dispensers and the water supply service to continually provide bottled water for the trailer occupants.

f. Office equipment consisting of two, three-line conference call capable telephones, and digital scanner/copier capable of 11x17 copies.

g. Field equipment consisting of two 16-foot aluminum straight edges.

h. Local and long distance telephone service for two telephone lines (one phone, one communications) and high speed internet cable service line for the computer. The Contractor shall pay all local and long distance and high speed internet cable service until acceptance of the entire project plus an additional 30 days.

i. The Contractor shall be responsible for moving, proper blocking, tie-downs and removal of the office and shall conform to local ordinances and laws. If office trailer site is not on a satisfactory paved surface, the Contractor shall install a temporary gravel parking area adjacent to the trailer. The gravel parking area shall be 40' x 50' with a gravel access road 10' wide to paved roadway and a 4-foot gravel walk from the parking area to the trailer steps. The Contractor shall provide positive drainage around the office and laboratory trailers with no standing water during or after rainfall events.

j. The Contractor shall provide a set of stairs and landing with the appropriate handrails from the gravel walk to the threshold of the trailer entrance meeting all required local municipal codes.

k. The Contractor shall provide janitorial service on a weekly basis including trash collection and disposal for the entire project length plus 30 days.

l. The Contractor shall obtain, for use by the Resident Project Representative, two radio transceivers which will operate on a frequency of 123.05 MHZ. The transceivers shall be ICOM 1C-A16, ICOM America, Inc. or approved equal. The radios shall have two additional battery packs, one standard 120V wall charger and 2-12 V (cigarette lighter) charger for the entire project length plus 30 days.

METHOD OF MEASUREMENT

105-5 Basis of measurement and payment.

105-5.1 Mobilization. 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. d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by **FAA General Provisions,** Section 90, paragraph 90-11, Contractor Final Project Documentation, the final 10%.

The Percent of Contract Amount Earned equals the work completed to date (including the total of all previous mobilization) plus or minus work completed associated with executed change orders, if any, divided by the Total Original Contract Amount plus or minus the Total Executed Change Order Amounts, if any.

105-5.2 Engineer/RPR Field Office and Equipment. Based upon the contract lump sum price for "Engineer/RPR Field Office and Equipment" partial payments will be allowed as follows:

a. **With first pay request, 25%.**
b. **Remaining 75% of lump sum shall be paid in prorated monthly installments based on the contract duration.**

BASIS OF PAYMENT

105-6 Payment will be made under:

Item C-105-6.1	Mobilization - per lump sum
Item C-105-6.2	Engineer/RPR Field Office and Equipement - per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

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Item C-110 Method of Estimating Percentage of Material Within Specification Limits (PWL)

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

110-1 General. When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average (X) and sample standard deviation (S_n) of the specified number (n) of sublots for the lot and the specification tolerance limits, L for lower and U for upper, for the particular acceptance parameter. From these values, the respective Quality index, Q_L for Lower Quality Index and/or Q_U for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

110-2 Method for computing PWL. The computational sequence for computing PWL is as follows:

a. Divide the lot into n sublots in accordance with the acceptance requirements of the specification.

b. Locate the random sampling position within the sublot in accordance with the requirements of the specification.

c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.

d. Find the sample average (X) for all sublot test values within the lot by using the following formula:

$$\mathbf{X = (x_1 + x_2 + x_3 + \ldots x_n) / n}$$

Where: X = Sample average of all sublot test values within a lot

$x_1, x_2, \ldots x_n$ = Individual sublot test values

n = Number of sublot test values

e. Find the sample standard deviation (S_n) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \ldots d_n^2)/(n-1)]^{1/2}$$

Where: S_n = Sample standard deviation of the number of sublot test values in the set

$d_1, d_2, \ldots d_n$ = Deviations of the individual sublot test values $x_1, x_2, \ldots$ from the average value X

that is: $d_1 = (x_1 - X)$, $d_2 = (x_2 - X) \ldots d_n = (x_n - X)$

n = Number of sublot test values

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

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

Where: L = specification lower tolerance limit

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

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

$$Q_L = (X - L) / S_n$$
and
$$Q_U = (U - X) / S_n$$

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

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

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

Where: P_L = percent within lower specification limit

P_U = percent within upper specification limit

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.

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

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

$X = 97.95\%$ density

3. Calculate the standard deviation for the lot.

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

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

$S_n = 1.15$

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

$Q_L = (X - L) / S_n$

$Q_L = (97.95 - 96.30) / 1.15$

$Q_L = 1.4348$

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

PWL = 98

B. PWL Determination for Air Voids.

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

A-1 = 5.00

A-2 = 3.74

A-3 = 2.30

A-4 = 3.25

2. Calculate the average air voids for the lot.

$X = (x_1 + x_2 + x_3 . . . n) / n$

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

$X = 3.57\%$

3. Calculate the standard deviation S_n for the lot.

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

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

$S_n = 1.12$

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

$Q_L = (X - L) / S_n$

$Q_L = (3.57 - 2.00) / 1.12$

$Q_L = 1.3992$

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

$P_L = 97$

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

$Q_U = (U - X) / S_n$

$Q_U = (5.00 - 3.57) / 1.12$

$Q_U = 1.2702$

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

$P_U = 93$

8. Calculate Air Voids PWL

$PWL = (P_L + P_U) - 100$

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

EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)

Project: Example Project

Test Item: Item P-401, Lot A.

A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

A-3 = 99.30

A-4 = 98.35

A-2 = 97.55

A-1 = 96.60

2. From ASTM E178, Table 1, for n=4 an upper 5% significance level, the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

a. For measurements greater than the average:

If (measurement - average)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-3, check if (99.30 - 97.95) / 1.15 is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

b. For measurements less than the average:

If (average - measurement)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-1, check if (97.95 - 96.60) / 1.15 is greater than 1.463.

Since 1.435 is less than 1.463, the value is not an outlier.

Note: In this example, a measurement would be considered an outlier if the density were:

Greater than (97.95 + 1.463 × 1.15) = 99.63%

OR

less than (97.95 - 1.463 × 1.15) = 96.27%.

Table 1. Table for Estimating Percent of Lot Within Limits (PWL)

Percent Within Limits (P_L and P_U)	Positive Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
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

Percent Within Limits (P_L and P_U)	Negative Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM E178 Standard Practice for Dealing with Outlying Observations

END OF ITEM C-110

Item P-101 Preparation / Removal of Existing Pavements

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

101-1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal **and disposal** 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 Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.0 General. The Contractor must furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified herein. All work will be subject to the inspection and approval of the RPR. All machinery and equipment owned or controlled by the Contractor must be of sufficient size to meet the requirements of the work and must be such as to produce work to the requirements listed herein and in the plans.

Where only a portion of the existing pavement is to be demolished, special care must be exercised to avoid damage to that portion of the pavement to remain in place. The existing pavement must be cut to the neat lines shown on the plans or established by the RPR, and any existing pavement beyond the neat lines so established which is damaged or destroyed by these operations must be replaced at the Contractor's expense with no additional compensation from the Owner. The face of any sawcut must be sawed or otherwise trimmed so that there is no abrupt offset in any direction greater than 1/4 inch and no gradual offset greater than one (1) inch when tested in a horizontal direction with a 16-foot straightedge. Sawcutting depth may vary nominally and no extra payment will be allotted for varying depths.

The equipment used by the Contractor to demolish and / or remove existing pavement must be operated in a manner that will avoid damaging underlying base and / or subbase layers, underlying structures, cables, utilities and utility ducts, pipelines, drainage structures and facilities, bridge approach slabs, bridge decks and other facilities not also designated for removal. Accordingly, heavy pavement breaking equipment that would cause a seismic disturbance of the soil, must not be used for breaking pavement within: 50 feet of any existing water lines, fuel lines, storm sewers, sanitary sewers, or any other underlying utility or structure not also designated for removal; or within 50 feet of any edge of pavement designated to remain. Falling weight demolition equipment is not permitted on this project.

If any damage occurs, the Contractor must cease operations immediately, notify the RPR, and repair the damage at the direction of the RPR. Repairs must be made timely, without change in the construction schedule, and at the sole expense of the Contractor. Any damage must be repaired at the Contractor's expense.

For concrete pavement removal, removal of damaged areas must be to existing joint lines, unless otherwise shown in the plans or authorized by the RPR. Partial concrete slab replacement will not be allowed. The Contractor shall be responsible for all costs associated with removal and replacement of damaged slabs that are scheduled to remain.

The method of removal of existing pavements is at the Contractor's discretion, unless otherwise noted in the plans or project manual. The method of removal chosen by the Contractor will not impact the unit prices bid by the Contractor for the various pavement removal items.

The Contractor must comply with all current federal, state and local rules and regulations governing the safety of men and materials during construction operations. Specifically, the Contractor must observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching, and shoring are strictly adhered to.

All materials removed must be disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project.

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.

The RPR and the Contractor must mutually agree upon the pavement demolition and removal procedure based upon compliance with the criteria set forth in the plans and in this specification.

Removal and disposal of existing pavements will be measured and paid for by the surface pavement material per square yard removed, including underlying base and/or subgrade materials as noted. Existing pavement thicknesses to be removed, denoted in the project demolition plans, are approximate and may not accurately reflect actual existing pavement thicknesses. Removal of existing pavements includes sawcutting, removal, and disposal of all material layers of the pavement section as required to meet the removal depth requirements listed therein. Removal of any underlying material layers of the pavement section not specifically listed as a pay item must be removed as necessary to meet the appropriate proposed excavation depths and will be considered as unclassified excavation in accordance with FAA Item P-152. Removal of pavements also includes all reinforcement at no direct cost. No additional payment will be made if actual pavement sections vary from the pavement sections shown in the plans or geotechnical investigation report, including thickened pavement edges. It is the Contractor's responsibility, as part of the bidding process, to determine the level of effort required to remove the pavement areas shown.

Where removed materials are designated for reuse in the project or to be stockpiled on Airport property, the Contractor must pulverize the materials as necessary such that 100% of the removed materials pass a 2-inch sieve.

a. Concrete pavement removal. Full depth saw cuts shall be made perpendicular to the slab surface. The Contractor shall saw through the full depth of the slab including any dowels at the joint, removing the pavement and installing new dowels as shown on the plans and per the specifications. Where the perimeter of the removal limits is not located on the joint and there are no dowels present, the perimeter shall be saw cut the full depth of the pavement**, including all underlying base and / or subbase layers also designated for removal**. The pavement inside the saw cut shall be removed by methods which will

not cause distress in the pavement which is to remain in place. If the material is to be wasted on the airport site **or incorporated into embankment**, it shall be reduced to a maximum size of **two (2) inches**. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the RPR.

Where keyed joints are encountered, the Contractor must remove the "male" portion of the keyway, if it is a part of the pavement to remain in order to create a smooth vertical face. The male keyway must be removed by saw cutting if there are no dowels or tie bars which are scheduled to be saved. If the pavement that is to remain has the "female" portion of the keyway, the Contractor must remove the "female" portion of the keyway that is a part of the pavement scheduled to remain by sawcutting full depth six (6) inches away from that joint. The additional six (6) inches required for removal will be incidental to this item.

The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times. **Where the perimeter of the removal limts is adjacent to existing pavement to designated to remain, the Contractor must saw through the existing dowels and install new dowels. The pavement must be removed so the joint for each layer of pavement replacement is offset two (2) feet from the joint in the preceding layer.** Spall and underbreak repair**s must be made per RPR direction** ~~shall be in accordance with the plans~~. Any underlaying material that is to remain in place, shall be recompacted and/or replaced as shown on the plans. Adjacent areas damaged during repair shall be repaired or replaced at the Contractor's expense.

b. Asphalt pavement removal. Asphalt pavement to be removed shall be **saw**cut to the full depth of the asphalt pavement around the perimeter of the area to be removed**, as shown in the plans**. **The pavement must be removed so the joint for each layer of pavement replacement is offset one (1) foot from the joint in the preceding layer.** If the material is to be wasted on the airport site **or** incorporated into embankment, it shall be broken to a maximum size of **two (2)** inches.

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. Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm). If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the RPR. Fill all cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed ¼ inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface. **101-3.3 Removal of Foreign Substances/contaminates prior to remarking.** Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction. **This is subsidiary to the various bid items of the project**.

High-pressure water and rotary grinding may be used. ~~If chemicals are used, they shall comply with the state's environmental protection regulations.~~ Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the 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 ~~in areas indicated in this specification or shown on the plans~~ **off Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project**.

Additional requirements for removing existing markings are as noted in FAA Item P-620, Runway and Taxiway Marking.

101-3.4 Concrete spall or failed asphaltic concrete pavement repair. Not used.

101-3.5 Cold milling. Cold milling is required as a method of removal of pavements only where milling is specifically identified. Milling for removal of pavements not specified for milling will not be measured or paid under the milling work element.

Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlaying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed off Airport **in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner.** 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 (30 cm) widths. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor's Expense.

b. Profiling, grade correction, or surface correction. The milling machine shall have a minimum width **as required to perform the required work of the project** ~~of [7] feet~~ and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch (+0 mm and -6mm) of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to **either windrow the millings or remove the millings from the pavement and load them into a truck**. All millings shall be removed and disposed of off the airport **in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner.**

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 **in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project**.

101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment. Not used.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 Preparation of Joints in Rigid Pavement prior to resealing. Not used.

101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing. Not used.

METHOD OF MEASUREMENT

101-4.1 Pavement removal. The unit of measurement for pavement removal shall be the number of square yards **of surface pavement material, including underlying base and/or subgrade materials,** removed by the Contractor**, as shown on the plans and called out for in the basis of payment**. 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.

This work of this item provides for the complete removal, hauling, and placing of existing pavement materials of the type and thickness indicated, as identified in the drawings and specifications. The work includes any associated excavation, backfilling, pavement repair, replacement, compaction, and all other miscellaneous work necessary to remove existing pavement materials identified.

This item also includes the protection of any underlying base and/or subgrade materials designated to remain. No separate payment will be made for repair of underlying base materials damaged by the Contractor. The Contractor will be responsible for all costs associated with removal and replacement of damaged base and/or subgrade materials designated to remain.

101-4.2 Joint and crack repair. **Joint and crack repair is considered incidental to work performed under this section, and shall not be separately measured or paid.** ~~The unit of measurement for joint and crack repair shall be the linear foot (meter) of joint.~~

101-4.3 Removal of Foreign Substances/contaminates. **Not used.** ~~The unit of measurement for foreign Substances/contaminates removal shall be the square foot (meter).~~

101-4.4 Spalled and failed asphalt pavement repair. Not used. ~~The unit of measure for failed asphalt pavement repair shall be square foot (square meter).~~

101-4.5 Concrete Spall Repair. Not used. ~~The unit of measure for concrete spall repair shall be the number of square feet (square meter). The location and average depth of the patch shall be determined and agreed upon by the RPR and the Contractor.~~

101-4.6 Cold milling. 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. **Pavement areas removed by milling for the contractor convenience will not be measured for payment under the milling item**.

101-4.7 Removal of Pipe and other Buried Structures. Not used. ~~**[** Not require. **] [** The unit of measurement for removal of pipe and other buried structures will be **[** lump sum. No separate measurement for payment will be made. The work covered by this section shall be considered as a subsidiary obligation of the Contractor and covered under the other contract items. **] [** 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.~~
~~H~~

101-4.8 Sawcutting. No separate payment will be made for sawcutting associated with removal of existing pavement.

BASIS OF PAYMENT

101-5.1 Payment. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Item P 101-5.1	Pavement Removal, Material and Depth Varies - per square yard
Item P-101-5.2	Cold Milling, 2” Depth – per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.

ASTM International (ASTM)

ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

ITEM P-102 SAFETY AND SECURITY

GENERAL

102-1.1 The provisions of this safety and security plan and associated procedures are applicable within the boundaries of the **Brunswick Golden Isles Airport**. A complete understanding of all procedures and requirements contained herein is required to ensure safety during construction. This safety plan is a part of this Contract and deviations from the requirements established herein will be sufficient cause for Contract termination.

Required reference material associated with this safety plan includes:

FAA AC 150/5200-18D, Airport Safety Self-Inspection
FAA AC 150/5210-5D, Painting, Marking and Lighting of Vehicles Used on an Airport
FAA AC 150/5370-2G, Operational Safety on Airports During Construction

Copies of these documents are included in the specifications.

CONTRACTOR SAFETY AND SECURITY OFFICER

102-2.1 CONTRACTOR SAFETY AND SECURITY OFFICER (CSSO). The Contractor shall appoint its on-site Construction Superintendent or other qualified individual(s) as its duly authorized representative to serve as Contractor Safety and Security Officer (CSSO) for the duration of the Contract. The CSSO shall thoroughly understand the safety and security requirements of the Contract, the necessity for them and shall have sufficient authority to implement its provisions without significant deviation. The Contractor shall notify the Engineer in writing of the name of the individual(s) selected for the assignment.

The CSSO shall represent the Contractor on safety and security requirement compliance. The CSSO shall be especially knowledgeable regarding the requirements of FAA AC's 150/5200-18 (latest edition), Airport Self Inspection Guide and 150/5370-2 (latest edition) Operational Safety on Airports During Construction, latest edition.

102-2.2 RESPONSIBILITIES OF THE CONTRACTOR SAFETY AND SECURITY OFFICER. Prior to the desired date for commencement of any Work on the project, the CSSO shall accomplish the following:

a. Develop and submit in writing a detailed work sequence schedule with dates and times specified for all milestone events. This sequence schedule shall conform, as a minimum, to the events specified in Section 3.1, Construction Sequence, and shall be subject to the approval of the Engineer. To assure adequate time for coordination, this document shall be submitted at least one week prior to the date of the Preconstruction Conference.

b. Develop and submit in writing a detailed outline of the procedures to be followed to maintain safety and security of both Contractor operations and the integrity of airport landside and airside operations during the prosecution of Contract Work. This plan shall detail, in addition, the procedures to be followed in the event of an accident or fire involving Contractor personnel and the Contractors efforts to maintain fire protection and security. These procedures shall be subject to the approval of the Engineer and reflect any change as may be deemed necessary.

c. Conduct at least one meeting of all Contractor supervisory personnel prior to the start of Contract Work. The purpose of this meeting is to review the approved Work sequence schedule and safety and security procedures. Attendance at this meeting by the CSSO, all Contractor supervisory personnel and the Engineer is mandatory. This meeting shall also be open to other employees of the Contractor and others

as the Engineer may deem appropriate. Minutes of this meeting shall be taken by the CSSO, copies provided to each supervisor and kept on file in the Contractor's construction office for periodic review and updating.

d. Develop a safety and security orientation program and provide a briefing for all employees of the Contractor and Subcontractors that will be used on the project. A similar briefing will be given to new employees prior to their use on Contract Work. In addition, the CSSO shall be responsible for briefing, from time to time, all Contractor personnel on any changes to safety and security measures deemed necessary.

CONSTRUCTION SEQUENCING

102-3.1 CONSTRUCTION SEQUENCE. The Contractor shall prepare a Construction Schedule and submit to the Engineer at least one week prior to the Pre-Construction Conference.

102-3.2 CLOSING RUNWAYS. The Contractor shall acquaint his supervisors and employees with the sequence of construction and its relationship to airport activity and aircraft operations that are inherent to this airport. No runway, taxiway, apron or airport roadway shall be closed without the written approval of the Engineer or Owner, to enable necessary NOTAMS and/or advisories to airport FBOs, tenants and users.

The Contractor shall contact the Engineer a minimum of two (2) days prior to any requested closing.

Any construction activity within 250 feet of the centerline of an active runway or within 64.5 feet of the centerline of an active taxiway or apron requires the closure of the affected area. These safety areas are shown on the phasing plan.

The Engineer will arrange for an inspection prior to return to service of any facility, that has been closed for Work, on or adjacent thereto, or that has been used for a crossing point or haul route by the Contractor.

MARKING AND LIGHTING

102-4.1 Proper marking and lighting of areas on the airfield associated with the construction shall be the responsibility of the Contractor. This will include properly marking and lighting closed runways, taxiways, taxilanes, and aprons, the limits of construction, material storage areas, equipment storage areas, haul routes, parking areas and other areas defined as required for the Contractor's exclusive use. The Contractor shall erect and maintain around the perimeter of these areas suitable marking and warning devices visible for day and night use. Temporary barricades, flagging, and flashing warning lights shall be required at critical access points. The type and location of marking and warning devices will be approved by the Engineer.

Special emphasis shall be given to open trenches, excavations, heavy equipment marshaling areas, and stockpiled material located in the airport operations area, which shall be predominantly marked by the Contractor with flags and lighted by approved light units during hours of restricted visibility and darkness. All marking shall be in accordance with FAA Advisory Circular (AC) 150/5340-1K, latest edition.

TRAFFIC CONTROL

102-5.1 VEHICLE IDENTIFICATION. The Contractor shall establish and maintain a list of Contractor and subcontractor vehicles authorized to operate on the site. Contractor employee vehicles shall be restricted to the Contractor's staging area and are not allowed in the Airport Operations Area (AOA) at any time. To be authorized to operate on the airport, each Contractor or subcontractor's vehicle shall:

a. be marked/flagged for high daytime visibility and lighted for nighttime operations. Vehicles that are not marked and/or lighted shall be escorted by a vehicle appropriately marked and/or lighted. Vehicles requiring escort shall be identified on the list.

b. be identified with the name and/or logo of the Contractor and be of sufficient size to be identified at a distance. Vehicles needing intermittent identification could be marked with tape or with commercially available magnetically attached markers. Vehicles that are not appropriately identified shall be escorted by a vehicle that conforms to this requirement. Vehicles requiring escort shall be identified on the list.

c. be operated in a manner that does not compromise the safety of either landside or airside airport operations. If, in the opinion of the Engineer, any vehicle is operated in a manner not fully consistent with this requirement, the Engineer has the right to restrict operation of the vehicle or prohibit its use on the airport.

102-5.2 ACCESS TO THE SITE OF CONSTRUCTION. The Contractor's access to the site shall be as shown on the Contract Layout Plan. No other access points shall be allowed unless approved by the Engineer. All Contractor traffic authorized to enter the site shall be experienced in the route or guided by Contractor personnel. The Contractor shall be responsible for traffic control to and from the various construction areas on the site, and for the operation and security of the access gate to the site. A Contractor's flagman or traffic control person shall monitor and coordinate all Contractor traffic at the access gate with Airport Security. The Contractor shall not permit any unauthorized construction personnel or traffic on the site. Access gates to the site shall be locked and secured at all times when not attended by the Contractor. If the Contractor chooses to leave any access gate open, it shall be attended by Contractor personnel who are familiar with the requirements of the Airport Security Program. The Contractor is responsible for the immediate cleanup of any debris deposited along the access route as a result of his construction traffic. Directional signing from the access gate along the delivery route to the storage area, plant site or work site shall be as directed by the Engineer. In addition, the following requirements are applicable:

a. All Contractor traffic authorized to travel on the airport shall have been briefed as part of the Contractor's construction safety and security orientation program, be thoroughly familiar with the access procedures and route for travel or be escorted by personnel authorized by the Contractor Safety and Security Officer (CSSO).

b. The Contractor shall install work site identification signs at the authorized access point(s). If, in the opinion of the Engineer, directional signs are needed for clarity, they shall be installed along the route authorized for access to each construction site.

c. Under no circumstance will Contractor personnel be permitted to drive their individually owned vehicles to any construction site on the airport. All vehicles must be parked in the area designated for employee parking and out of secured airport property.

d. In addition to the inspection and cleanup required at the end of each shift, the Contractor is responsible for the immediate cleanup of any debris generated along the construction site access route(s) as a result of construction related traffic or operations whether or not created by Contractor personnel.

e. Where construction operations obstruct airport user activities, such as airport tenant access to hangar facilities, the Contractor shall sequence the work to accommodate tenant access to owned or leased facilities.

102-5.3 MATERIAL SUPPLIERS. All material suppliers, subcontractors and visitors to the work site are obligated to follow the same safety and security operating procedures as the prime Contractor. All material

suppliers shall make their deliveries using the same access points and routes as the Contractor and shall be advised of the appropriate delivery procedures at the time the materials order is placed. The Contractor shall not use the Airport address for any delivery but shall use the street address appropriate to the location of the entrance of the work site. If it is not practical to conform to the vehicle identification requirements of Section 102-5.1 and the safety and security operations program requirements of Section 102-2.2, the Contractor shall be prepared to escort all suppliers, subcontractors and visitors while they are on the airport.

102-5.4 PERSONNEL IDENTIFICATION. All employees, agents, vendors, invitees, etc. of the Contractor or subcontractors requiring access to the construction site shall, in accordance with the Brunswick Golden Isles Airport Security Program, be required to display issued identification or be under escort by properly badged personnel. These badges will be identified numerically and issued to individual employees with a permanent record maintained on each individual to whom a badge is issued. At the completion of the Contract, all badges will be returned to the Airport and a charge of $50 per badge will be assessed for all badges not returned. Identifiable hard hats or other identification shall also be worn at all times if required by Airport Operations. In addition, a $6.50 non-refundable processing fee will be required for each badge. This fee will be paid before badge is issued. No badge will be issued to any person until a review of the FAA required paperwork by Airport Security and all requirements are met. Paperwork shall be submitted a minimum of 24 hours before Issuance of a badge. The Contractor and its staff including any subcontractors is responsible for attending training and completing security badge applications, which include Air/Ground radio, taxiway, runway and airport familiarization. Estimated time for completion is 1 hour.

GENERAL SAFETY REQUIREMENTS

102-6.1 All Contractor vehicles that are authorized to operate on the airport outside of the designated construction area limits or haul routes as defined herein shall display in full view above the vehicle a flashing amber (yellow) dome-type light or a three-foot by three-foot, or larger, orange and white checkerboard flag, each checkerboard color being one-foot square. Vehicles must be under control of a Contractor Mobile (two-way) radio operator (flagmen) monitoring frequency 123.05. Vehicle operators must be vigilant for conflict with any aircraft and give way to any operating aircraft.

All Contractor vehicles that are required to operate outside of the construction area limits as defined herein and cross active runways, taxiways, aprons, or runway approach clear zones shall do so under the direct control of a flagman who is monitoring frequency 123.05. Flagmen and two-way radios shall be furnished by the Contractor. Flagmen shall be instructed in the use of two-way radios prior to use. All aircraft traffic on runways, taxiways and aprons shall have priority over Contractor's traffic.

Construction vehicles not in use for extended periods during the work day, or during nights and weekends (nonwork periods) shall be parked away from active runways, taxiways, and aprons in designated vehicle marshaling areas.

102-6.2 In order to protect all aircraft traffic, aviation related businesses, terminal apron areas, etc. from potential damage caused by foreign object debris (FOD) generated by construction activities, the Contractor shall provide a vacuum truck at the startup of construction to daily vacuum all pavements affected by construction. The vacuum truck shall remain on-site for the duration of the project and shall be available at the discretion of the Owner to vacuum pavement areas adjacent to the construction areas to ensure no FOD is present on pavements within 500 feet of any construction area. Protecting the aircraft, airport tenants, users, public, etc. against FOD is a critical safety issue therefore the cost of the vacuum truck will be included in the cost established for this specification item.

CONSTRUCTION CONTROL

102-7.1 A primary and alternate responsible Contractor's representative shall be designated by the

Contractor. The Contractor's representatives shall be available locally on a 24-hour basis. Names of the primary and alternate, including phone number, shall be made available to the Engineer by the Contractor. The Contractor shall insure that the names and phone numbers are kept current and made available to the Engineer.

CONSTRUCTION TECHNIQUES

102-8.1 Construction shall be planned and conducted throughout this project in such a manner as to allow the maintenance of completely safe airport operations. Every effort shall be made to reduce the impact of construction activity on overall airport operations. To this end the Contractor's activities shall be conducted in such a manner so as to preclude, except where absolutely required, open excavations, trenches, ditches and above ground obstacles such as booms on cranes or obstacle markers such as wooden saw horses. The primary responsibility for assuring that the safest possible construction techniques are followed rests with the Contractor Safety and Security Officer (CSSO).

METHOD OF MEASUREMENT

102-9.1 The item of Safety and Security shall be measured as a lump sum item when required and furnished for the life of the Contract.

BASIS OF PAYMENT

102-10.1 Payment shall be made for airport safety and security measures or personnel or materials related to this specification item and incidentally required to satisfy the specified objective(s) under item P-102-10.1, Safety and Security. This compensation shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

PARTIAL PAYMENTS. Partial payments will be made in accordance with the following:

Percentage of Original Contract Earned	Allowable Percent of the Lump Sum Price for the Item
5	15
15	20
25	25
50	50
75	75
100 (or Contract Completion)	100

Payment shall be made under:

Item P-102-10.1	Safety and Security -- Per Lump Sum

TESTING REQUIREMENTS

102-11.1 None.

END OF ITEM P-102

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ITEM P-104 PROJECT SURVEY AND STAKEOUT

DESCRIPTION

104-1.1 Under this item, the Contractor shall do all necessary surveying required to construct all elements of the Project as shown on the Contract Drawings and specified in the Proposal and Specifications. This shall include but not be limited to stakeout, layout and elevations for pavements, structures, forms and appurtenances as shown and required, consistent with the current practices and shall be performed by qualified personnel acceptable to the Engineer. The stakeout survey shall proceed immediately following the award of the Contract or as soon as authorized by the Owner and shall be expeditiously progressed to completion in a manner and at a rate satisfactory to the Engineer. The Contractor shall keep the Engineer fully informed as to the progress of the stakeout survey. All survey work shall be provided under the direction of a licensed land surveyor.

MATERIALS

104-2.1 All instruments, equipment, stakes and any other material necessary to perform the work satisfactorily shall be provided by the Contractor.

All stakes used shall be of a type approved by the Engineer. It shall be the Contractor's responsibility to maintain these stakes in their proper position and location at all times.

The Contractor shall supply to the Engineer a rod, level and tripod for his exclusive use during the entire project. The rod shall be 15 feet in length with hundredth-of-a-foot graduation. The level shall be self-leveling and have documentation demonstrating it has been calibrated within one month of the project's commencement. All provided equipment shall be in good working order and maintained by the Contractor throughout the course of the project.

CONSTRUCTION METHODS

104-3.1 The Contractor shall trim trees, brush and other interfering objects, not inconsistent with the Contract Drawings, from survey lines in advance of all survey work to permit accurate and unimpeded work by his stakeout survey crews.

The exact position of all work shall be established from control points, baseline transit points or other points of similar nature that are shown on the Contract Drawings and/or modified by the Engineer. Any error, apparent discrepancy or absence in or of data shown or required for accurately accomplishing the stakeout survey shall be referred to the Engineer for interpretation or furnishing when such is observed or required.

The Contractor shall place two offset stakes or references at each centerline station and at such intermediate locations as the Engineer may direct. From computations and measurements made by the Contractor, these stakes shall be clearly and legibly marked with the correct centerline station number, offset and cut or fill so as to permit the establishment of the exact centerline location and elevation during construction. If markings become faded or blurred for any reason, the markings shall be restored by the Contractor at the request of the Engineer. He shall locate and place all cut, fill, slope, fine grade or other stakes and points, as the Engineer may direct, for the proper progress of the work. All control points shall be properly guarded and flagged for easy identification.

Drainage structures shall be staked out by the Contractor at the locations and elevations shown on the Contract Drawings or specified by the Engineer.

Reference points, baselines, stakes and benchmarks for borrow pits shall be established by the Contractor.

Permanent survey marker locations shall be established and referenced by the Contractor.

The Contractor shall be responsible for the accuracy of his work and shall maintain all reference points, stakes, etc., throughout the life of the Project. Damaged or destroyed points, benchmarks or stakes, or any reference points made inaccessible by the progress of the construction, shall be replaced or transferred by the Contractor. Any of the above points which may be destroyed or damaged shall be transferred by the Contractor before they are damaged or destroyed. All control points shall be referenced by ties to acceptable objects and recorded. Any alterations or revisions in the ties shall be so noted and the information furnished to the Engineer immediately. All stakeout survey work shall be referenced to the centerlines shown on the Contract Drawings. All computations necessary to establish the exact position of the work from control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work, shall be neatly made. Such computations, survey notes and other records shall be made available to the Engineer upon request and shall become the property of the Owner and delivered to the Engineer not later than the date of acceptance of the Contract.

The Contractor shall furnish, at his expense, all horizontal and vertical control, all staking and layout of construction work called for on the plans and the Engineer and Owner shall not be responsible for such work. However, the Owner and Engineer reserve the right to check all said lines, grades, and measurements with their appointed surveyor. Should the Owner's surveyor detect errors in said lines, grades, and measurements, the contractor shall pay for all said surveying costs and subsequent surveying costs performed to verify correction of errors found in said lines, grades and measurements. Included in this are all blue top staking for subgrade and base course installation. Definition of an error shall be a discrepancy of 1/4" or more. In the case of a discrepancy between the technical specifications and this defined tolerance, this tolerance shall govern.

Prior to the final cross-section survey of the Project by the Contractor, the Contractor shall reestablish centerline or baseline points and stationing as required by the Engineer.

Prior to the final cross-section survey of any borrow pits, the Contractor shall reestablish the baseline points and stationing, as well as any necessary benchmarks as required by the Engineer.

During the progress of the construction work, the Contractor will be required to furnish all of the surveying and stakeout incidental to the proper location by line and grade for each phase of the work. For paving and any other operation requiring extreme accuracy, the Contractor will restake with pins or other acceptable hubs located directly adjacent to the work at a spacing directed by the Engineer.

Any existing stakes, iron pins, survey monuments or other markers defining property lines which may be disturbed during construction shall be properly tied into fixed reference points before being disturbed and accurately reset in their proper position upon completion of the work.

Just prior to completion of the Project, the Contractor shall reestablish, if necessary, and retie all control points as permanently as possible and to the satisfaction of the Engineer.

104-3.2 The Contractor shall be required to submit cross sectional data to the Engineer at monthly intervals prior to the Contractor submittal of the monthly application for payment so that the Engineer can verify the quantities of various earthwork and materials volumes for payment. All cross sectional data provided at any time will be in AutoCad Release 14 or higher format only. No other formats will be accepted. If the data is submitted in another format other than AutoCad, no earthwork or other materials volumes will be calculated and approved for payment. The earthwork shall include, but not be limited to, unclassified excavation, embankment, new or existing subbase courses, new or existing base courses, sand/asphalt subgrade, topsoil, etc.

METHOD OF MEASUREMENT

104-4.1 Payment will be made at the lump sum price bid for this item.

BASIS OF PAYMENT

104-5.1 The lump sum price bid shall include the cost of furnishing all labor, equipment, instruments and all other material necessary to satisfactorily complete the Project surveying and stakeout. Partial payments will be made at the discretion of the Engineer as the work progresses based generally on the percentage of actual work completed compared to the total construction cost.

Payment will be made under:

Item P-104-5.1	Project Survey and Stakeout -- Per Lump Sum.

TESTING REQUIREMENTS

104-6.1 None**.**

END OF ITEM P-104

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ITEM P-105 TEMPORARY CONSTRUCTION ITEMS

DESCRIPTION

105-1.1 This item consists of furnishing all labor, materials and equipment for temporary construction items necessary for the safe and proper execution of work and not otherwise included in other contract bid items. The Contractor will be expected to supply and utilize the items listed below and other items contained in the plans and specifications. Temporary construction items to be provided include, but are not limited to the following: flaggers, portable floodlighting, steel plates for temporary covering of excavations and structures as required, construction barricades, test pitting, and men and equipment as needed to keep all areas free of debris.

MATERIALS

105-2.1 CONSTRUCTION BARRICADES. Construction barricades shall be low profile type and constructed in accordance with the details shown in the plans and shall be placed in accordance with the phasing plans and phasing notes drawings.

105-2.2 PORTABLE FLOODLIGHTING. Portable floodlighting shall be provided, as required, for construction which must occur during nighttime operations. The Contractor shall provide sufficient units so that all work areas are illuminated to a level of 5 horizontal footcandles. The lighting levels shall be calculated and measured in accordance with the current standards of the Illumination Engineering Society.

105-2.3 STEEL PLATES. Steel plates of adequate size and thickness shall be furnished as necessary to cover temporary excavations, unfinished structures or surfaces requiring protection or for safety purposes. Plates shall be securely fastened down and shall be adequate to safely support any anticipated loadings to be imposed.

105-2.4 OTHER MISCELLANEOUS ITEMS. Any other items not listed herein but which are associated directly or indirectly with temporary construction related work shall, by reference, be included in the requirements of this specification. No additional payment will be made for any temporary construction related item not specifically listed herein. The Contractor shall be responsible for providing any and all items necessary to ensure a safe, secure and functioning project construction site.

CONSTRUCTION METHODS

105-3.1 CONSTRUCTION BARRICADES. Low profile barricades shall be placed around each phase of the work in accordance with the Phasing Plans and shall remain in place until completion of work in each phase.

105-3.2 FLAGGERS. Flaggers shall be provided, as necessary, to control the Contractor's traffic during the prosecution of work. All Contractor vehicles or equipment that are required to cross active airfield pavement or safety areas shall do so under the direct control of a competent flagger.

105-3.3 PORTABLE FLOODLIGHTING. Portable floodlighting is required for construction during periods of limited visibility (i.e., nighttime). Illumination requirements shall be those contained in Paragraph 105-2.2.

METHOD OF MEASUREMENT

105-4.1 No direct measurement will be made for this item. Payment will be made on a lump sum basis.

BASIS OF PAYMENT

105-5.1 Payment will be made at the lump sum bid price for "Temporary Construction Items." This payment shall be full compensation for furnishing all materials and labor for placing, moving and removing construction barricades and steel plates, providing flaggers, furnishing portable floodlighting, test pitting, and for any other labor, materials, equipment, tools and incidentals necessary for temporary items required for construction of this project.

Payment for these items will be made in installments. The first payment of 10 percent of the lump sum price will be included in the first progress estimate following the initiation of construction work. The remaining 90 percent of the lump sum price will be included as installments in subsequent progress estimates. Each such installment will be determined based on the ratio of the total work completed to date of the total contract amount.

Payment will be made under:

Item P-105-5.1	Temporary Construction Items -- Per Lump Sum.

TESTING REQUIREMENTS

105-6.1 As required.

END OF ITEM P-105

ITEM P-108 REMOVAL OF PAVEMENT MARKINGS

DESCRIPTION

108-1.1 This item shall consist of furnishing all labor, materials and equipment required for the removal of markings which are no longer appropriate, including the removal of painted pavement markings or preformed thermoplastic pavement markings, as directed by the RPR.

EQUIPMENT

108-2.1 Equipment, tools and machines used in the performance of the removal operation shall be safe and in satisfactory working condition at all times. The Contractor shall provide satisfactory evidence that the Contractor's equipment has been used in the performance of similar work.

108-2.2 The water blasting equipment shall be truck mounted and shall be capable of water pressures of 2,000 to 40,000 psi. The equipment shall be capable of adjusting the pressure to accomplish thermoplastic, paint, and seal coat removal without damaging the paving surface. The equipment shall be capable of following a straight line and be maneuverable to accommodate various pavement markings. The spray width must able to accommodate lines from 4” to 8” wide. If water blasting is used to remove lines on active airfield pavements, a vacuum system shall be provided to allow for timely remarking and the prevention of any debris being ingested into propellers or turbine engines once the water blasting equipment has exited the active pavements.

108-2.3 The Contractor shall submit the proposed water blasting equipment to the RPR as a formal submittal for his review and approval prior to use of the equipment on the project.

PERFORMANCE

108-3.1 This removal operation will be accomplished with high pressure water blasting. Milling, grinding and sandblasting are prohibited for the removal of either temporary or permanent markings on finished pavement surfaces. The use of chemicals will also not be permitted. The Contractor shall furnish all equipment, water trucks and labor for delivery of water to the job site. Water is available for the Contractor's use from hydrants on airport property. If the Contractor chooses to use water from this source, he shall provide and attach a water meter to the hydrant(s). The Contractor shall obtain any and all permits, pay any and all fees and provide to the RPR the written approval of the authority having jurisdiction over the water source that all requirements for its use have been met. The quantity of water used, as measured by the meter, shall be charged to the Contractor at the Owner’s prevailing rate.

108-3.2 The removal method applied to the surface shall not be damaging to pavement surfaces, joint sealing material or light fixtures. If it is deemed by the RPR that damage to any existing facility is caused by an operational error, such as permitting a pressure water jet to dwell in one location for an extensive time, the Contractor shall repair said damage without additional compensation from the Owner.

108-3.3 Pavement markings which are to be removed prior to being repainted in kind shall consist of 85% removal of the existing paint from the pavement surface. All other markings to be removed shall consist of 100% removal of paint from the pavement surface.

108-3.4 The water blasting method used shall not materially damage the structural integrity of the pavement. Any damage caused by the Contractor's operations shall be corrected at the Contractor's expense and in a manner approved by the RPR. The Contractor shall take precautions to protect the public from any damage due to his operations. Accumulation of sand, water, dust, or other residue resulting from the removal operation shall be removed as the work progresses and legally disposed of off airport property.

METHOD OF MEASUREMENT

108-4.1 The quantity of pavement marking removal paid shall be the square footage of pavement markings

removed in accordance with the specifications and accepted by the RPR.

BASIS OF PAYMENT

108-5.1 Payment shall be at the contract unit price per square foot for removal of pavement markings. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools and incidentals necessary to complete the item.

Payment will be made under:

Item P-108-5.1	Painted Pavement Marking Removal – per square foot

END OF ITEM P-108

Item P-151 Clearing and Grubbing

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

151-1.1 This item shall consist of ~~clearing or~~ clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the plans or as required by the Resident Project Representative (RPR).

~~**a. Clearing** shall consist of the cutting and removal of all trees, stumps, brush, logs, hedges, the removal of fences and other loose or projecting material from the designated areas. The grubbing of stumps and roots will not be required.~~

b. Clearing and grubbing shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the RPR is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations, and the disposal from the project of all spoil materials resulting from clearing and grubbing.

~~**c. Tree Removal.** Tree Removal shall consist of the cutting and removal~~ **and disposal** ~~of isolated single trees or isolated groups of trees, and the grubbing of stumps and roots. The removal of all the trees of this classification shall be in accordance with the requirements for the particular area being cleared.~~

CONSTRUCTION METHODS

151-2.1 General. The areas denoted on the plans to be cleared and grubbed shall be staked on the ground by the Contractor as indicated on the plans.

The removal **and disposal** of existing structures and utilities required to permit orderly progress of work shall be accomplished by local agencies, unless otherwise shown on the plans. Whenever a telephone pole, pipeline, conduit, sewer, roadway, or other utility is encountered and must be removed or relocated, the Contractor shall advise the RPR who will notify the proper local authority or owner to secure prompt action.

151-2.1.1 Disposal. All materials removed by ~~clearing or by~~ clearing and grubbing **and individual trees removed** shall be disposed of outside the Airport's limits at the Contractor's responsibility~~, except when otherwise directed by the RPR~~. ~~As far as practicable,~~ waste concrete and masonry shall be ~~placed on slopes of embankments or channels~~ **completely removed and disposed of by the Contractor. The Contractor may mulch materials removed onsite prior to removal and disposal. Mulching operations must be coordinated with the Airport in order to minimize impacts to the airfield**. When embankments are constructed of such material, this material shall be placed in accordance with requirements for formation of embankments. Any broken concrete or masonry that cannot be used in construction and all other materials not considered suitable for use elsewhere, shall be disposed of by the

Contractor. In no case, shall any discarded materials be left in windrows or piles adjacent to or within the airport limits. The manner and location of disposal of materials shall be subject to the approval of the RPR and shall not create an unsightly or objectionable view. When the Contractor is required to locate a disposal area outside the airport property limits, the Contractor shall obtain and file with the RPR permission in writing from the property owner for the use of private property for this purpose.

151-2.1.2 Blasting. Blasting shall not be allowed.

~~**151-2.2 Clearing.** The Contractor shall clear the staked or indicated area of all materials as indicated on the plans. Trees unavoidably falling outside the specified clearing limits must be cut up, removed, and disposed of in a satisfactory manner. To minimize damage to trees that are to be left standing, trees shall be felled toward the center of the area being cleared. The Contractor shall preserve and protect from injury all trees not to be removed. The trees, stumps, and brush shall be cut flush with the original ground surface. The grubbing of stumps and roots will not be required.~~

~~Fences shall be removed and disposed of as directed by the RPR. Fence wire shall be neatly rolled and the wire and posts stored on the airport if they are to be used again, or stored at a location designated by the RPR if the fence is to remain the property of a local owner or authority.~~

151-2.3 Clearing and grubbing. In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass, and other unsatisfactory materials as indicated on the plans, shall be removed **and disposed of**~~, except where embankments exceeding 3 1/2 feet (105 cm) in depth will be constructed outside of paved areas. For embankments constructed outside of paved areas, all unsatisfactory materials shall be removed, but sound trees, stumps, and brush can be cut off flush with the original ground and allowed to remain~~. Tap roots and other projections over 1-1/2 inches (38 mm) in diameter shall be grubbed out to a depth of at least 18 inches (0.5 m) below the finished subgrade or slope elevation.

~~Any buildings and miscellaneous structures that are shown on the plans to be removed shall be demolished or removed, and all materials shall be disposed of by removal from the site. The cost of removal is incidental to this item. The remaining or existing foundations, wells, cesspools, and like structures shall be destroyed by breaking down the materials of which the foundations, wells, cesspools, etc., are built to a depth at least 2 feet (60 cm) below the existing surrounding ground. Any broken concrete, blocks, or other objectionable material that cannot be used in backfill shall be removed and disposed of at the Contractor's expense. The holes or openings shall be backfilled with acceptable material and properly compacted.~~

All holes in embankment areas remaining after the grubbing operation shall have the sides of the holes flattened to facilitate filling with acceptable material and compacting as required in **FAA** Item P-152. The same procedure shall be applied to all holes remaining after grubbing in areas where the depth of holes exceeds the depth of the proposed excavation.

Grading must be performed where necessary to provide a neat, consistently-sloped, compacted appearance. Grading must be completed in accordance with FAA Item P-152, Excavation, Subgrade, and Embankment. There will be no separate payment for grading or any associated work. Grading operations will instead be considered incidental to clearing and grubbing operations. Dispose of all excess materials, waste, and/or spoil materials off the Airport in a licensed landfill in accordance with local laws and regulations. No materials may we wasted onsite unless approved by the RPR. The cost of removing and disposing of the material will not constitute a pay item and shall be considered incidental to clearing and grubbing operations.

METHOD OF MEASUREMENT

~~**151-3.1** The quantities of clearing as shown by the limits on the plans shall be the number of acres or fractions thereof, of land specifically cleared.~~

151-3.2 The quantities of clearing and grubbing as shown by the limits on the plans shall be the number of acres or fractions thereof of land specifically cleared and grubbed.

~~**151-3.3** The quantity of tree removal as shown on the plans shall be the number of individual trees specifically cleared.~~

BASIS OF PAYMENT

~~**151-4.1** Payment shall be made at the contract unit price per acre for clearing. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.~~

151-4.2 Payment shall be made at the contract unit price per acre for clearing and grubbing. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

~~**151-4.3** Payment shall be made at the contract unit price per each tree removed. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.~~

Payment will be made under:

~~Item P-151-4.1 Clearing - per acre~~

Item P-151-4.2 Clearing and grubbing - per acre

~~Item P-151-4.3 Tree Removal - per each~~

END OF ITEM P-151

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Item P-152 Excavation, Subgrade, and Embankment

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 Classification. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature. **Stockpiles of any material must not be placed in a manner to penetrate any approach surfaces. Coordinate with RPR for the allowable location and height of all stockpiles.**

b. Borrow excavation. Borrow excavation shall consist of approved material required for the construction of embankments or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from off-site sources and meet the specifications required by P-152.

c. Unsuitable excavation. Unsuitable material shall be disposed ~~in designated waste areas as shown on the plans~~ **of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner.** Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

CONSTRUCTION METHODS

152-2.1 General. Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed in accordance with **FAA** Item P-151.

The Contractor must 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 must observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching, and shoring are strictly adhered to.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of ~~in waste areas as shown on the plans~~ **off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the**

project. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the RPR.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per **FAA General Provisions,** Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services **at no additional cost to the Owner**. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

152-2.2 Excavation. No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

Digital terrain model (DTM) files of the existing surfaces, finished surfaces and other various surfaces were used to develop the design plans.

Existing grades of the DTM files were developed by computer interpolation from physically surveyed spot elevations. Prior to disturbing original grade, the Contractor must 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. The Contractor must recognize that, due to the interpolation process, the actual ground surface at any particular location may differ slightly from the interpolated surface of the DTM files. The Contractor's verification of original ground surface, however, will 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.) will be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If the Contractor's verification identifies discrepancies in the topographic map, the Contractor must notify the RPR in writing at least two (2) weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the surface of the DTM files. Disturbance of existing grade in any area will constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

Volumetric quantities were calculated by comparing DTM files of the applicable design surfaces using CAD-generated volume reports. Volumetric quantities were adjusted to exclude volumes of existing pavement sections being removed and proposed pavement sections being constructed, paid for under separate item(s). Volumetric quantities were additionally adjusted to exclude volumes of topsoil installed in non-paved areas, paid for under separate item(s). Volumetric quantities also do

not include any excavation or embankment related to electrical, drainage, or other structure removal or installations. Excavation and embankment for those items is incidental to the removal or installation of those specific items.

All volumetric quantities provided are unfactored.

Electronic copies of DTM files may be issued to the successful bidder upon request.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times. **When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the work. This is subsidiary to the various bid items of the project**.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be ~~used to grade the areas of ultimate development or~~ disposed ~~as directed by the RPR~~ **off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project**. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. Selective grading. When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. Undercutting. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed of **off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project**. 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.. Undercutting will be paid as unclassified excavation.

Material that is high in moisture content and which yields under proof rolling does not necessarily constitute an unsuitable material. The Contractor is required to manipulate and dry the material. If the material is classified as unsuitable material, then the Contractor must remove the material to the depth directed by the RPR. The backfill of such areas must not begin until the volume of the unsuitable excavation is determined by cross sections or other means acceptable to the RPR. If there is a deficit of suitable materials, the Contractor must provide borrow materials meeting AASHTO soil classification A-4. The backfill must be accomplished in accordance with the embankment requirements contained in this specification. The backfill material may consist of borrow excavation, unclassified excavation, or select backfill or other materials acceptable to the RPR.

c. Over-break. Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of ~~as directed by the RPR~~**off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project**. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. Removal of utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor as indicated on the plans. All existing foundations shall be excavated at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the material disposed of ~~as directed by the RPR~~ **off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project**. 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. There are no borrow sources within the boundaries of the airport property. The Contractor shall locate and obtain borrow sources, subject to the approval of the RPR. The Contractor shall notify the RPR at least 15 days prior to beginning the excavation so necessary measurements and tests can be made by the RPR. 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.

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, the top 12 inches (300 mm) of subgrade shall be compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM **D1557**. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 Preparation of embankment area. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 Control Strip. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the

materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

152-2.8 Formation of embankments. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches (150 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within ±2% of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The RPR will take samples of excavated materials which will be used in embankment for testing to obtain a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D 1557. A new Proctor shall be obtained for each soil type based on visual classification.

Density tests will be taken by the RPR **at a rate of one (1) test** for every 3,000 square yards**, with a minimum of two (2) tests per lift per day's production,** of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM **D1557**. Under all areas to be paved, the embankments shall be compacted to a depth of **12 inches** and to a density of not less than **100** percent of the maximum density as determined by ASTM

D1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches which shall be prepared for a seedbed **or sodbed** in accordance with **FAA** Item T-901 **or FAA Item T-904, as noted on the plans**.

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 RPR shall perform all density tests. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall ~~not~~ be disposed of ~~except at places and in the manner designated on the plans or by the RPR~~ **off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project**.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

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 **a**fter 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 150 psi in the presence of the RPR. Apply a minimum of **50%** coverage, or as specified by the RPR, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item.

Proof rolling will not be measured for separate payment but will instead be considered subsidiary to the various bid items of the project.

152-2.10 Compaction requirements. The subgrade under areas to be paved shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 100 percent of the maximum dry density as determined by ASTM D1557. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557.

The material to be compacted shall be within ±2% of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the ¾ inch (19.0 mm) sieve, follow the methods in ASTM D1557. Tests for moisture content and compaction will be taken at a minimum of **one (1) test per 3,000 square yards** of subgrade**, with a minimum of two (2) tests per lift per day's production**. All quality assurance testing shall be done by the RPR.

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.

Density tests will be taken by the the Contractor's laboratory in the RPR's presence **at a rate of one (1) test** for every **3,000** square yards of completed subgrade**, with a minimum of two (2) tests per lift per day's production**. If a nuclear gage is used for density determination, two random readings shall be made for each **3,000** square yards (meters).

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

152-2.11 Finishing and protection of subgrade. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 Haul. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining**,** ~~and~~ removing**, and disposing of** 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**, and disposing of** haul roads or routes.

152-2.13 Surface Tolerances. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/- 0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 Topsoil. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in **FAA** Item T-905. Topsoil shall be paid for as provided in **FAA** Item T-905. No direct payment will be made for topsoil under **FAA** Item P-152.

152-2.15 Materials Not Accepted for Use. Any materials not accepted by the RPR for use in the project or any excess materials not used by the Contractor must be removed and disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project.

METHOD OF MEASUREMENT

152-3.1 Measurement for payment specified by the cubic yard shall be computed by the the comparison of digital terrain model (DTM) surfaces for computation of neat line design quantities.

152-3.2 The quantity of unclassified excavation to be paid for shall be the number of cubic yards measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

152-3.3 The quantity of borrow excavation shall be the number of cubic yards measured in its final position.

152-3.4 Stockpiled material shall not be measured for payment.

152-3.5 The quantity of "Unsuitable Excavation" to be paid for will be the number of cubic yards of material excavated, as measured in its original position, as directed by the RPR in the field. Measurement will be the actual volume measured, completed and accepted. No payment will be made for materials excavated and replaced without prior authorization of the RPR.

BASIS OF PAYMENT

152-4.1 Unclassified excavation payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.2 For borrow excavation, payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.3 For unsuitable excavation, payment will be made at the contract unit price per cubic yard. This price will be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item

Payment will be made under:

Item P-152-4.1	Unclassified Excavation - per cubic yard
Item P-152-4.2	Unsuitable Excavation - per cubic yard
Item P-152-4.3	Borrow Excavation - per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software

Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66 Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

Item P-209 Crushed Aggregate Base Course

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregate base constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross-sections shown on the plans.

MATERIALS

209-2.1 Crushed aggregate base. Crushed aggregate shall consist of clean, sound, durable particles of crushed stone, crushed gravel, and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone, gravel, that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

(continued next page)

Crushed Aggregate Base Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 100% with at least one fractured face[1]	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles [2]	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

209-2.2 Gradation requirements. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

Gradation of Aggregate Base

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances[1] (Percent)
2 inch (50 mm)	100		0
1-1/2 inch (37.5 mm)	95-100		±5
1 inch (25.0 mm)	70-95		±8
3/4 inch (19.0 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40[2] (425 µm)	10-30		±5
No. 200[2] (75 µm)	0-10		±3

[1] The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

[2]The fraction of material passing the No 200 sieve shall not exceed two-thirds of 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 Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

209-2.4 Separation Geotextile. **Not used.**

CONSTRUCTION METHODS

209-3.1 Control strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

209-3.2 Preparing underlying subgrade and/or subbase. The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with **FAA** Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

209-3.3 Production. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 209-3.5, the approved material may be transported directly to the placement.

209-3.4 Placement. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests

verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

209-3.5 Compaction. Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within ±2 percentage points of the optimum moisture content as determined by ASTM D1557. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

209-3.6 Weather limitations. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

209-3.7 Maintenance. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

209-3.8 Surface tolerances. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

209-3.9 Acceptance sampling and testing. Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1,200 square yds. Sampling locations will be determined on a random basis per ASTM D3665.

a. Density. The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D1557. The in-place field density shall be determined per ASTM D1556. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be

followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. ~~Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base.~~ **Thickness verifications will be determined by survey on a survey grid not exceeding 50-foot by 50-foot. An evaluation of each surface will be performed by a licensed surveyor as approved by the RPR. The Contractor will pay for all costs of surveying as subsidiary to the cost of the item.** The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness ~~as determined by depth tests taken by the Contractor in the presence of the RPR for each area~~. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompacted to grade. ~~The Contractor shall replace, at his expense, base material where depth tests have been taken.~~

c. Materials not Accepted for Use. Any materials not accepted by the RPR for use in the project or any excess materials not used by the Contractor must be removed and disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project.

METHOD OF MEASUREMENT

209-4.1 The quantity of crushed aggregate base course will be determined by measurement of the number of square yards of material actually constructed **at the thicknesses identified** and accepted by the RPR as complying with the plans and specifications **and in conformity to the dimensions and typical sections shown in the plans**. Base materials shall not be included in any other excavation quantities.

BASIS OF PAYMENT

209-5.1 Payment shall be made at the contract unit price per square yard for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-209-5.1	Crushed Aggregate Base Course, 6” Thickness - per cubic yard
Item P-209-5.2	Crushed Aggregate Base Course, 8” Thickness - 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-µm (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis

American Association of State Highway and Transportation Officials (AASHTO)

M288	Standard Specification for Geosynthetic Specification for Highway Applications

END OF ITEM P-209

Item P-401 Asphalt Mix Pavement

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

401-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

MATERIALS

401-2.1 Aggregate. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) sieve**. Aggregates shall be tested and certified free of ferrous materials.**

a. Coarse aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds (27200 kg) or more: Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face[1]	ASTM D5821
	For pavements designed for aircraft gross weights less than 60,000 pounds (27200 kg): Minimum 50% by weight of particles with at least two fractured faces and 65% with at least one fractured face[1]	
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 [2]	ASTM D4791
Bulk density of slag [3]	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29.

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

[3] Only required if slag is specified.

b. Fine aggregate. Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the fine aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0% to15% 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) **75-22**.

Asphalt Binder PG Plus Test Requirements

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084

401-2.4 Anti-stripping agent. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

COMPOSITION

401-3.1 Composition of mixture(s). The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 Job mix formula (JMF) laboratory. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Resident Project Representative (RPR) prior to start of construction.

401-3.3 Job mix formula (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the RPR for review and accepted in writing. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.

The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition**.** Samples shall be prepared and compacted using a Marshall compactor in accordance with ASTM D6926.

Should a change in sources of materials be made, a new JMF must be submitted to the RPR for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the RPR and a new or modified JMF is required for whatever reason, the subsequent cost of the new or modified JMF, including a new control strip when required by the RPR, will be borne by the Contractor.

The RPR may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

The JMF shall be submitted in writing by the Contractor at least **30** days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 401-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 401-2.4.
- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 401-2.1.
- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the JMF.
- Specific Gravity and absorption of each coarse and fine aggregate.
- Percent natural sand.
- Percent fractured faces.
- Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- Percent of asphalt.
- Number of blows or gyrations
- Laboratory mixing and compaction temperatures.
- Supplier-recommended field mixing and compaction temperatures.
- Plot of the combined gradation on a 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.
- Percentage and properties (asphalt content, asphalt binder properties, and aggregate properties) of reclaimed asphalt mix pavement (RAP) in accordance with paragraph 401-3.4.

Table 1. Asphalt Design Criteria

Test Property	Value	Test Method
Number of blows or gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR)[1]	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA)[2]	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

[1] Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

[2] AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieves		
	Gradation 1	**Gradation 2**	**Gradation 3[1]**
1 inch (25.0 mm)	100	--	--
3/4 inch (19.0 mm)	90-100	100	--
1/2 inch (12.5 mm)	68-88	90-100	100
3/8 inch (9.5 mm)	60-82	72-88	90-100
No. 4 (4.75 mm)	45-67	53-73	58-78
No. 8 (2.36 mm)	32-54	38-60	40-60
No. 16 (1.18 mm)	22-44	26-48	28-48
No. 30 (600 µm)	15-35	18-38	18-38
No. 50 (300 µm)	9-25	11-27	11-27
No. 100 (150 µm)	6-18	6-18	6-18
No. 200 (75 µm)	3-6	3-6	3-6
Minimum Voids in Mineral Aggregate (VMA)	**14.0**	**15.0**	**16.0**
Asphalt percent by total weight of mixture:			
Stone or gravel	4.5-7.0	5.0-7.5	5.5-8.0
Slag	5.0-7.5	6.5-9.5	7.0-10.5
Recommended Minimum Construction Lift Thickness	3 inch	2 inch	1 1/2 inch

[1] Gradation 3 is intended for leveling courses. FAA approval is required for use in other locations.

[2] 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). Reclaimed asphalt shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP size shall not exceed one inch (25 mm). The reclaimed asphalt pavement mix shall be designed using procedures contained in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D2172 using the appropriate dust correction procedure. The JMF shall meet the requirements of paragraph 401-3.3. RAP shall only be used for shoulder surface course mixes and for any intermediate courses. The amount of RAP shall be limited to **30%** percent. In addition to the requirements of paragraph 401-3.3, the JMF shall indicate the percent of reclaimed asphalt pavement and the percent and grade of new asphalt binder. For the PG graded asphalt binder selected in 401-2.3, adjust as follows:

a. For 0-20% RAP, there is no change in virgin asphalt binder content.

b. For >20 to 30% RAP, select asphalt binder one grade softer, i.e., PG 64-22 would soften to PG 58-28.

RAP containing Coal Tar shall not be used. Coal Tar surface treatments must be removed prior to recycling underlying asphalt material.

Recycled asphalt shingles (RAS) shall not be used.

401-3.5 Control Strip. Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the RPR**.** The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 401-5.1, has been accepted, in writing, by the RPR.

The control strip will consist of at least 250 tons (227 metric tons) or 1/2 sublot, whichever is greater. The control strip shall be placed in two lanes of the same width and depth to be used in production with a longitudinal cold joint. The cold joint must be cut back in accordance with paragraph 401-4.14 using the same procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F (71°C). The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip will be considered acceptable by the RPR if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 401-5.5a; and Mat density, 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 RPR, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum)	
	°F	°C
3 inches (7.5 cm) or greater	40	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

401-4.2 Asphalt plant. Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items.

a. Inspection of plant. The RPR, or RPR's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

b. Storage bins and surge bins. The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the RPR determines there is an excessive heat loss, segregation, or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

401-4.3 Aggregate stockpile management. Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

401-4.4 Hauling equipment. Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the RPR. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

401-4.4.1 Material transfer vehicle (MTV). Material transfer vehicles used to transfer the material from the hauling equipment to the paver, shall use a self-propelled, material transfer vehicle with a swing conveyor that can deliver material to the paver without making contact with the paver. The MTV shall be able to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. The Material Transfer Vehicle will have remixing and storage capability to prevent physical and thermal segregation.

401-4.5 Asphalt pavers. Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

If the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.12.

401-4.6 Rollers. The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

401-4.7 Density device. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings

for all new asphalt. These densities shall be supplied to the RPR upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

401-4.8 Preparation of asphalt binder. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

401-4.9 Preparation of mineral aggregate. The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

401-4.10 Preparation of Asphalt mixture. The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

401-4.11 Application of Prime and Tack Coat. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A prime coat in accordance with Item P-602 shall be applied to aggregate base prior to placing the asphalt mixture.

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 each lift of asphalt mixture.

401-4.12 Laydown plan, transporting, placing, and finishing. Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the RPR.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to RPR that every lot of each lift meets the grade tolerances of paragraph 401-6.2d before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the RPR. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of **12.5** feet (m) except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot (30 cm); however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet (3 m) from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m).On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The RPR may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated asphalt mixture. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the RPR, and if it can be demonstrated in the laboratory, in the presence of the RPR, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the RPR, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet (3 m) long.

401-4.13 Compaction of asphalt mixture. After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

401-4.14 Joints. The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a

straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

401-4.15 Saw-cut grooving. If shown on the plans saw-cut grooves shall be provided as specified in Item P-621.

401-4.16 Diamond grinding. When required, diamond grinding shall be completed prior to pavement grooving. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that cause ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. Contractor shall demonstrate to the RPR that the grinding equipment will produce satisfactory results prior to making corrections to surfaces.Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

401-4.17 Nighttime paving requirements. The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the RPR prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

CONTRACTOR QUALITY CONTROL (CQC)

401-5.1 General. The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

401-5.2 Contractor quality control (QC) facilities. The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

401-5.3 Contractor QC testing. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt

content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

a. Asphalt content. A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

b. Gradation. Aggregate gradations shall be determined a minimum of twice per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136, and ASTM C117.

c. Moisture content of aggregate. The moisture content of aggregate used for production shall be determined a minimum of once per day in accordance with ASTM C566.

d. Moisture content of asphalt. The moisture content shall be determined once per day in accordance with AASHTO T329 or ASTM D1461.

e. Temperatures. Temperatures shall be checked, at least four times per day, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

f. In-place density monitoring. The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.

g. Smoothness for Contractor Quality Control.

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot (3.7 m) straightedge or a rolling inclinometer meeting the requirements of ASTM E2133. 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 is used, the data may be evaluated using the FAA profile program, ProFAA, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet (15 m) or more often as determined by the RPR. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

h. Grade. Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet (30 mm) laterally. The documentation will be provided by the Contractor to the RPR by the end of the following working day.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 401-4.16.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus ½ inch and replacing with new material. Skin patching is not allowed.

401-5.4 Sampling. When directed by the RPR, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

401-5.5 Control charts. The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the RPR and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the RPR may suspend production or acceptance of the material.

a. Individual measurements. Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

Control Chart Limits for Individual Measurements

Sieve	Action Limit	Suspension Limit
3/4 inch (19.0 mm)	±6%	±9%
1/2 inch (12.5 mm)	±6%	±9%
3/8 inch (9.5 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (300 µm)	±3%	±4.5%
No. 200 (75 µm)	±2%	±3%
Asphalt Content	±0.45%	±0.70%
Minimum VMA	-0.5%	-1.0%

b. Range. Control charts shall be established to control gradation process variability. The range shall be plotted as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of n = 2. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for n = 3 and by 1.27 for n = 4.

Control Chart Limits Based on Range

Sieve	Suspension Limit
1/2 inch (12.5 mm)	11%
3/8 inch (9.5 mm)	11%
No. 4 (4.75 mm)	11%
No. 16 (1.18 mm)	9%
No. 50 (300 µm)	6%
No. 200 (75 µm)	3.5%
Asphalt Content	0.8%

c. Corrective Action. The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

(1) One point falls outside the Suspension Limit line for individual measurements or range; or

(2) Two points in a row fall outside the Action Limit line for individual measurements.

401-5.6 QC reports. The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with Item C-100.

MATERIAL ACCEPTANCE

401-6.1 Acceptance sampling and testing. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the RPR at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

a. Quality assurance (QA) testing laboratory. The QA testing laboratory performing these acceptance tests will be accredited in accordance with ASTM D3666. The QA laboratory accreditation will be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing will be listed on the lab accreditation.

b. Lot size. A standard lot will be equal to one day's production divided into approximately equal sublots of between 400 to 600 tons. When only one or two sublots are produced in a day's production, the sublots will be combined with the production lot from the previous or next day.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant.

c. Asphalt air voids. Plant-produced asphalt will be tested for air voids on a sublot basis.

(1) Sampling. Material from each sublot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes to maintain the material at or above the compaction temperature as specified in the JMF.

(2) Testing. Air voids will be determined for each sublot in accordance with ASTM D3203 for a set of compacted specimens prepared in accordance with ASTM D6926.

d. In-place asphalt mat and joint density. Each sublot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).

(1) Sampling. The Contractor will cut minimum 5 inch (125 mm) diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the RPR.

(2) Bond. Each lift of asphalt shall be bonded to the underlying layer. If cores reveal that the surface is not bonded, additional cores shall be taken as directed by the RPR to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the RPR.

(3) Thickness. Thickness of each lift of surface course will be evaluated by the RPR for compliance to the requirements shown on the plans after any necessary corrections for grade. Measurements of thickness will be made using the cores extracted for each sublot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch (6 mm) less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or sublot shall be corrected by the Contractor at his expense by removing the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the RPR to circumscribe the deficient area.

(4) Mat density. One core shall be taken from each sublot. Core locations will be determined by the RPR in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each sublot sample by the TMD for that sublot.

(5) Joint density. One core centered over the longitudinal joint shall be taken for each sublot that has a longitudinal joint. Core locations will be determined by the RPR in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

401-6.2 Acceptance criteria.

a. General. Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, **and** grade**.**

b. Air Voids and Mat density. Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

c. Joint density. Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

d. Grade. The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot (15-m) longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline, ± 10 feet of centerline, and edge of pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the sublot shall not be more than 95%.

e. Profilograph roughness for QA Acceptance. Not used.

401-6.3 Percentage of material within specification limits (PWL). The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

Table 5. Acceptance Limits for Air Voids and Density

Test Property	Pavements Specification Tolerance Limits	
	L	**U**
Air Voids Total Mix (%)	2.0	5.0
Surface Course Mat Density (%)	92.8	-
Base Course Mat Density (%)	91.8	-
Joint density (%)	90.5	--

a. Outliers. All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.20; Base Course Mat Density (%), 1.55; Joint Density (%), 1.8.

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% with 1.20% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 93.5% with 1.8% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 91% with 1.8% or less variability.

401-6.4 Resampling pavement for mat density.

a. General. Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the RPR. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-6.2b. Only one resampling per lot will be permitted.

(1) A redefined PWL will be calculated for the resampled lot. The number of tests used to calculate the redefined PWL will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

b. Payment for resampled lots. The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%.

~~**401-6.5 Leveling course**. The leveling course is the first variable thickness lift placed to correct surface irregularities prior to placement of subsequent courses. The leveling course shall meet the aggregate gradation in Table 2, paragraph 401-3.3. The leveling course shall meet the requirements of paragraph 401-3.3, 401-6.2b for air voids, but shall not be subject to the density requirements of paragraph 401-6.2b for mat density and 401-6.2c for joint density. The leveling course shall be compacted with the same effort used to achieve density of the control strip. The leveling course shall not exceed the maximum lift thickness associated with each gradation in Table 2, paragraph 401-3.3.~~

METHOD OF MEASUREMENT

401-7.1 Measurement. Asphalt shall be measured by the number of tons of asphalt used in the accepted work. Batch weights or truck scale weights will be used to determine the basis for the tonnage.

BASIS OF PAYMENT

401-8.1 Payment. Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

a. The total project payment for plant mix asphalt pavement shall not exceed **100** percent of the product of the contract unit price and the total number of tons of asphalt used in the accepted work.

b. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

c. Basis of adjusted payment. The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for

both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1a. Payment in excess of 100% for accepted lots of asphalt shall be used to offset payment for accepted lots of asphalt pavement that achieve a lot pay factor less than 100%.

Payment for sublots which do not meet grade in accordance with paragraph 401-6.2d after correction for over 25% of the sublot shall be reduced by 5%.

Table 6. Price adjustment schedule[1]

Percentage of material within specification limits (PWL)	Lot pay factor (percent of contract unit price)
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject [2]

[1] Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401-8.1a.

[2] The lot shall be removed and replaced. However, the RPR may decide to allow the rejected lot to remain. In that case, if the RPR and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

d. Profilograph Roughness. Not used.

401-8.1 Payment.

Payment will be made under:

Item P-401-8.1 Asphalt Surface Course - per ton

Item P-401-8.2 Asphalt Base Course - per ton

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29 Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate

ASTM C88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

ASTM C117 Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C127 Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate

ASTM C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Asphalt Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Asphalt Paving Mixtures
ASTM D1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor.
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E950	Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
ASTM E2133	Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
AASHTO T324	Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures
AASHTO T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

Asphalt Institute (AI)

Asphalt Institute Handbook MS-26, Asphalt Binder

Asphalt Institute MS-2 Mix Design Manual, 7th Edition

AI State Binder Specification Database

Federal Highway Administration (FHWA)

Long Term Pavement Performance Binder Program

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

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Item P-602 Emulsified Asphalt Prime Coat

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

602-1.1 This item shall consist of an application of emulsified asphalt material on the prepared base course in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

602-2.1 Emulsified Asphalt material. The emulsified asphalt material shall be as specified in ASTM D3628 for use as a prime coat appropriate to local conditions. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt material. The COA shall be provided to and approved by the Resident Project Representative (RPR) before the emulsified asphalt material is applied. The furnishing of the COA for the emulsified 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

602-3.1 Weather limitations. The emulsified asphalt prime coat shall be applied only when the existing surface is dry; the atmospheric temperature is 50°F (10°C) or above, and 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.

602-3.2 Equipment. The equipment shall include a self-powered pressure asphalt material distributor and equipment for heating asphalt material.

Provide a distributor with pneumatic tires of such size and number that the load produced on the base surface does not exceed 65.0 psi (4.5 kg/sq cm) of tire width to prevent rutting, shoving or otherwise damaging the base, surface or other layers in the pavement structure. Design and equip the distributor to spray the asphalt material in a uniform coverage at the specified temperature, at readily determined and controlled rates from 0.05 to 1.0 gallons per square yard (0.23 to 4.5 L/square meter), with a pressure range of 25 to 75 psi (172.4 to 517.1 kPa) and with an allowable variation from the specified rate of not more than ±5%, and at variable widths. Include with the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying asphalt material manually to areas inaccessible to the distributor. Equip the distributor to circulate and agitate the asphalt material during the heating process. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

A power broom and power blower suitable for cleaning the surfaces to which the asphalt coat is to be applied shall be provided.

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.

602-3.3 Application of emulsified asphalt material. Immediately before applying the prime coat, the full width of the surface to be primed shall be swept with a power broom to remove all loose dirt and other objectionable material.

The asphalt emulsion material shall be uniformly applied with an asphalt distributor at the rate of 0.15 to 0.30 gallons per square yard (0.68 to 1.36 liters per square meter) depending on the base course surface texture. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Following application of the emulsified asphalt material and prior to application of the succeeding layer of pavement, allow the asphalt coat to cure and to obtain evaporation of any volatiles or moisture. Maintain the coated surface until the succeeding layer of pavement is placed, by protecting the surface against damage and by repairing and recoating deficient areas. Allow the prime coat to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course. Furnish and spread sand to effectively blot up and cure excess asphalt material. The Contractor shall remove **and dispose of** blotting sand prior to asphalt concrete lay down operations at no additional expense to the Owner. Keep traffic off surfaces freshly treated with asphalt material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

602-3.4 Trial application rates. The Contractor shall apply a minimum of three lengths of at least 100 feet (30 m) for the full width of the distributor bar to evaluate the amount of emulsified asphalt material that can be satisfactorily applied with the equipment. Apply three different application rates of emulsified asphalt materials within the application range specified in paragraph 602-3.3. Other trial applications can be made using various amounts of material as directed by the RPR. The trial application is to demonstrate the equipment can uniformly apply the emulsified asphalt material within the rates specified and determine the application rate for the project.

602-3.5 Freight and waybills. The Contractor shall submit waybills and delivery tickets during the progress of the work. Before the final estimate 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.

602-3.6 Materials Not Accepted for Use. Any materials not accepted by the RPR for use in the project or any excess materials not used by the Contractor must be removed and disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project.

METHOD OF MEASUREMENT

602-4.1 The emulsified asphalt material for prime coat shall be measured by the gallon. Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D4311. 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

602-5.1 Payment shall be made at the contract unit price per gallon for emulsified asphalt prime coat. This price shall be full compensation for furnishing all materials and for all preparation, delivering, and applying the materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item P-602-5.1	Emulsified Asphalt Prime 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 D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

END OF ITEM P-602

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Item P-603 Emulsified Asphalt Tack Coat

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

603-2.1 Asphalt materials. The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Resident Project Representative (RPR) before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

CONSTRUCTION METHODS

603-3.1 Weather limitations. The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

603-3.2 Equipment. The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot (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)	.0.06-0.12 (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.

603-3.5 Materials Not Accepted for Use. Any materials not accepted by the RPR for use in the project or any excess materials not used by the Contractor must be removed and disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project.

METHOD OF MEASUREMENT

603-4.1 The emulsified asphalt material for tack coat shall be measured by the gallon. Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D1250. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

BASIS OF PAYMENT

603.5-1 Payment shall be made at the contract unit price per gallon of emulsified asphalt material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-603-5.1	Emulsified Asphalt Tack Coat - per gallon

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

END ITEM P-603

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Item P-605 Joint Sealants for Pavements

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and cracks in existing pavement.

MATERIALS

605-2.1 Joint sealants. Joint sealant materials shall meet the requirements ~~of~~ **as follows:**

a. Joints in new concrete pavement must be sealed with ASTM D5893, self-leveling material, capable of bonding to concrete pavement joints.

b. Concrete-to-asphalt joints where concrete pavement abuts an asphalt shoulder must be sealed with poured hot-applied joint sealant per ASTM D6690.

c. New light fixtures installed in new or existing concrete or asphalt pavement must be sealed per FAA Item P-606.

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.2 Backer rod. The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be 25% ± 5 % larger in diameter than the nominal width of the joint.

605-2.3 Bond breaking tapes. Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive-backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

CONSTRUCTION METHODS

605-3.1 Time of application. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint.

605-3.2 Equipment. Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, 10 days prior to use on the project.

~~**a. Tractor-mounted routing tool**. Provide a routing tool, used for removing old sealant from the joints, of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V-shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.~~

b. Concrete saw. Provide a self-propelled power saw, with water-cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.

~~**c. Sandblasting equipment. [** Sandblasting is not allowed. **] [** The Contractor must demonstrate sandblasting equipment including the air compressor, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the Resident Project Representative (RPR), that the method cleans the joint and does not damage the joint.~~

d. Waterblasting equipment. The Contractor must demonstrate waterblasting equipment including the pumps, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

e. Hand tools. Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.

f. Hot-poured sealing equipment. The unit applicators used for heating and installing ASTM D6690 joint sealant materials shall be mobile and shall be equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the joint to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. The applicator unit shall be designed so that the sealant will circulate through the delivery hose and return to the inner kettle when not in use.

g. Cold-applied, single-component sealing equipment. The equipment for installing ASTM D5893 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top. Maintain the initially approved equipment in good working condition, serviced in accordance with the supplier's instructions, and unaltered in any way without obtaining prior approval. Small hand-held air-powered equipment (i.e., caulking guns) may be used for small applications.

605-3.3 Preparation of joints. Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint. **All materials removed from existing joints must be disposed of by the Contractor at no additional cost to the Owner.**

a. Sawing. All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.

b. Sealing. Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by concrete saw and waterblaster as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be sandblasted clean. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

c. Backer Rod. When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

d. Bond-breaking tape. Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-sided adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

605-3.4 Installation of sealants. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to **1/4 inch – 3/8 inch** below the top of pavement surface; or bottom of groove for grooved pavement. Remove and ~~discard~~ **and dispose of** excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

605-3.5 Inspection. The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

605-3.6 Clean-up. Upon completion of the project, remove **and dispose of** all unused materials from the site and leave the pavement in a clean condition.

605-3.7 Materials Not Accepted for Use. Any materials not accepted by the RPR for use in the project or any excess materials not used by the Contractor must be removed and disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project.

METHOD OF MEASUREMENT

605-4.1 No separate measurement shall be made for sealing of joints in new pavements. This work shall be considered subsidiary to the various pavement bid items of the specifications. This shall include all material, labor, and equipment used in the preparation and sealing of the joints.

BASIS OF PAYMENT

605-5.1 No separate measurement shall be made for sealing of joints in new pavements. This work shall be considered subsidiary to the various pavement bid items of the specifications. This shall include all material, labor, and equipment used in the preparation and sealing of the joints.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D5893	Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt
ASTM D7116	Standard Specification for Joint Sealants, Hot Applied, Jet Fuel Resistant Types for Portland Cement Concrete Pavements

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids

END ITEM P-605

Item P-610 Concrete for Miscellaneous Structures

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

610-1.1 This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

MATERIALS

610-2.1 General. Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Resident Project Representative (RPR) before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

a. Reactivity. Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the RPR. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash~~, or between 40% and 55% of slag cement~~ shall be used in the concrete mix.

If the expansion is greater than 0.20% the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation.

610-2.2 Coarse aggregate. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
~~1 1/2 inch (37.5 mm)~~	~~467 or 4 and 67~~
1 inch (25 mm)	57
~~¾ inch (19 mm)~~	~~67~~
~~½ inch (12.5 mm)~~	~~7~~

610-2.2.1 Coarse Aggregate susceptibility to durability (D) cracking. Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

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 **FAA** Item P-501.

610-2.3 Fine aggregate. The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33. **Blending will be permitted, if necessary, to meet the gradation requirements for fine aggregate.**

610-2.4 Cement. Cement shall conform to the requirements of **ASTM C150** Type **I or 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 RPR.

b. Slag cement (ground granulated blast furnace (GGBF)). GGBF slag shall not be used. ~~Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.~~

610-2.6 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

610-2.7 Admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the RPR may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the

requirements of the cited specifications. Subsequent tests may be made of samples taken by the RPR from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

b. Water-reducing admixtures. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

c. Other chemical admixtures. The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 Premolded joint material. Premolded joint material for expansion joints shall meet the requirements of ASTM **D1752.**

610-2.9 Joint filler. The filler for joints shall meet the requirements of **FAA** Item P-605, unless otherwise specified.

610-2.10 Steel reinforcement. Reinforcing shall consist of **materials** conforming to the requirements **as shown on the plans. When noted, the following ASTM designations will apply**:

Reinforcing Steel	**ASTM A615, ASTM A706, ASTM A775, ASTM A934**
Welded Steel Wire Fabric	**ASTM A1064, ASTM A884**
Welded Deformed Steel Fabric	**ASTM A1064**
Bar Mats	**ASTM A184 or ASTM A704**

610-2.11 Materials for curing concrete. Curing materials shall conform to **ASTM C309**.

CONSTRUCTION METHODS

610-3.1 General. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

610-3.2 Concrete Mixture. The concrete shall develop a compressive strength of **4,000** 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 (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

610-3.3 Mixing. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the RPR's approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be

placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 Forms. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the RPR. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

610-3.5 Placing reinforcement. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

610-3.6 Embedded items. Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items. The embedding of wood shall not be allowed.

610-3.7 Concrete Consistency. The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

610-3.8 Placing concrete. All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the RPR. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

610-3.9 Vibration. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 Joints. Joints shall be constructed as indicated on the plans.

610-3.11 Finishing. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 Curing and protection. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

610-3.13 Cold weather placing. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 Hot weather placing. When concrete is placed in hot weather greater than 85ºF (30 ºC), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

QUALITY ASSURANCE (QA)

610-4.1 Quality Assurance sampling and testing. Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The RPR will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; test air content in accordance with ASTM C231; make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

610-4.2 Defective work. Any defective work that cannot be satisfactorily repaired as determined by the , 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. **Any materials not accepted by the RPR for use in the project or any excess materials not used by the Contractor must be removed and disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project.**

METHOD OF MEASUREMENT

610-5.1 Concrete shall be considered incidental for the structure in which it is placed and no separate measurement shall be made.

No separate payment will be made for reinforcing steel, but the price shall be considered subsidiary to the unit price for the structure in which it is placed.

BASIS OF PAYMENT

610-6.1 Concrete and reinforcing steel for all structures shall not be measured for separate payment, but the price shall be considered subsidiary to the unit price for the structure in which it is placed.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184 Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing

ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

END OF ITEM P-610

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Item P-620 Runway and Taxiway Marking

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

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, **and other pavements** in accordance with these specifications and at the locations shown on the plans, or as directed by the . The terms "paint" and "marking material" as well as "painting" and "application of markings" are interchangeable throughout this specification.

MATERIALS

620-2.1 Materials acceptance. The Contractor shall furnish manufacturer's certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer's surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

620-2.2 Marking materials.

Table 1. Marking Materials

Paint[1]				Glass Beads[2]	
Type	**Color**	**Fed Std. 595 Number**	**Application Rate Maximum**	**Type**	**Application Rate Minimum**
III	White	37925	55 ft^2/gal (1.4 m^2/l)	III	6 lb/gal (0.8 kg/l)
III	Yellow	33528 33655	55 ft^2/gal (1.4 m^2/l)	III	6 lb/gal (0.8 kg/l)
III	Black	37038	55 ft^2/gal (1.4 m^2/l))	None	None

[1] See paragraph 620-2.2a

[2] See paragraph 620-2.2b

a. Paint. Paint shall be in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type III. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis. The acrylic resin used for Type III shall be 100% cross linking acrylic as evidenced by infrared peaks at wavelengths 1568, 1624, and 1672 cm-l with intensities equal to those produced by an acrylic resin known to be 100% cross linking.

All waterborne paint shall contain a microbicide that provides microbial efficacy for a period of not less than three (3) years. The microbicide shall be blended homogeneously with the paint under high speed dispersion during the production by the supplier/manufacturer. The final homogeneous blend of microbicide treated paint shall conform to the same viscosity stability standards as specified in TT-P-1952E.

A. Dow (formally Rohm and Hass) Rocima 63 microbicide (or other approved equivalent) shall be added at a rate of 10 pounds per 100 gallons of paint.

B. Other products that may be available that meet or exceed these specifications.

b. Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D III.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black paint.

CONSTRUCTION METHODS

620-3.1 Weather limitations. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

620-3.2 Equipment. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 Preparation of surfaces. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminates that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

a. Preparation of new pavement surfaces. The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

b. Preparation of pavement to remove existing markings. Existing pavement markings shall be removed by ~~rotary grinding,~~ water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings.

c. Preparation of pavement markings prior to remarking. Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

620-3.4 Layout of markings. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

620-3.5 Application. A period of **30** days shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

Marking Dimensions and Spacing Tolerance

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass 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 RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and

evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 Retro-reflectance. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 reading shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

Minimum Retro-Reflectance Values

Material	Retro-reflectance mcd/m^2/lux		
	White	**Yellow**	
Initial Type I	300	175	
Initial Type III	600	300	
Initial Thermoplastic	225	100	
All materials, remark when less than[1]	100	75	

[1] Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

620-3.9 Protection and cleanup. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

620-3.10 Materials Not Accepted for Use. Any materials not accepted by the RPR for use in the project or any excess materials not used by the Contractor must be removed and disposed of off the Airport property in accordance with local laws and regulations, unless otherwise noted. No material may be wasted on the Airport site unless approved by the Owner. This is subsidiary to the various bid items of the project.

METHOD OF MEASUREMENT

620-4.1a ~~The quantity of existing markings to be removed will be measured by the square foot, including additional area required to eliminate ghost markings~~. The quantity of surface preparation for all new markings will not be measured for separate payment but will instead be considered subsidiary to the installation of the new markings.

620-4.1b The quantity of new markings will be paid for shall be measured by the number of square feet of painting completed **or each unit as specified**~~, regardless of color~~**.**

620-4.1c Reflective media will not be measured for separate payment, but the price will be considered subsidiary to the installation of markings.

620-4.1d Temporary markings not required.

BASIS OF PAYMENT

620-5.1 This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

~~**620-5.1a** Payment removal of existing markings will be measured by the square foot, including additional area required to eliminate ghost markings.~~

620-5.1b Payment for surface preparation for all new markings will not be measured for separate payment but will instead be considered subsidiary to the installation of the new markings.

620-5.1c Payment for new markings shall be made at the contract price for the number of square feet of painting completed **or as each unit as specified**~~, regardless of color~~.

620-5.1d Reflective media will not be paid for separately, but the price shall be considered subsidiary to the installation of markings.

620-5.1e Temporary markings are not required.

Payment will be made under:

Item P-620-5.1	Airfield Pavement Marking, White, with Type III Reflective Media – per square foot
Item P-620-5.3	Airfield Pavement Marking, Yellow, with Type III Reflective Media - per square foot
Item P-620-5.3	Airfield Pavement Marking, Black, without Reflective Media – per square foot
Item P-620-5.4	Airfield Pavement Marking, “X” Marking, White with Type III Reflective Media, with Black Outline – per each
Item P-620-5.5	Airfield Pavement Marking, “STOP” Text, White with Type III Reflective Media on Black Field– per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester

ASTM E1710 Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer

ASTM E2302 Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer

ASTM G154 Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24
Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings

29 CFR Part 1910.1200 Hazard Communication

Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D Beads (Glass Spheres) Retro-Reflective

FED SPEC TT-P-1952F Paint, Traffic and Airfield Marking, Waterborne

FED STD 595 Colors used in Government Procurement

Commercial Item Description

A-A-2886B Paint, Traffic, Solvent Based

Advisory Circulars (AC)

AC 150/5340-1 Standards for Airport Markings

AC 150/5320-12 Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF ITEM P-620

Item T-901 Seeding

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding**, fertilizing, and liming** the areas shown on the plans or as directed by the RPR in accordance with these specifications.

MATERIALS

901-2.1 Seed. The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows:

Seed Properties and Rate of Application

Seed	Minimum Seed Purity (Percent)	Minimum Germination (Percent)	Rate of Application lb/acre (or lb/1,000 S.F.)
Permanent Seeding (Warm Season): Argentine Bahia	95%	85%	150 lbs per acre
Temporary Seeding (Cool Season): Annual Rye or Winter Quick Growing Type	95%	90%	80 lbs per acre

The Contractor must certify that no species of grass submitted for use is a wildlife attractant, or is identified by Georgia Exotic Pet Plant Council as a noxious weed.

901-2.2 Lime. Lime shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 (850 μm) mesh sieve and 50% will pass

through a No. 100 (150 μm) mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the special provisions on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate **as specified by the local agricultural extension agent**. All liming materials shall conform to the requirements of ASTM C602.

This item will not be measured for separate payment but will instead be considered subsidiary to the cost of seed application.

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.

Caked, damaged, or otherwise unsuitable fertilizer will not be accepted. Fertilizers shall be **10-10-10** commercial fertilizer and shall be spread at the rate of **400 pounds per acre**.

This item will not be measured for separate payment but will instead be considered subsidiary to the cost of seed application.

901-2.4 Soil for repairs. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

This item will not be measured for separate payment but will instead be considered subsidiary to the cost of seed application.

901-2.6 Water. The water must be sufficiently free from oil, acid, alkali, salt, or other harmful materials that would inhibit the growth of grass.

This item will not be measured for separate payment but will instead be considered subsidiary to the cost of seed application.

CONSTRUCTION METHODS

901-3.1 Advance preparation and cleanup. All areas disturbed by Contractor operations must be topsoiled in accordance with FAA Item T-905, Topsoiling, prior to seeding or sodding. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 Dry application method.

a. Liming. Lime**, if required,** 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 (75 mm) of soil after which the seedbed shall again be properly graded and dressed to a smooth finish.

b. Fertilizing. Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

c. Seeding. Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing. The fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

901-3.3 Wet application method.

a. General. The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. Spraying equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees

above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the RPR all sources of water at least two (2) weeks prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed or they shall be wasted and disposed of at approved locations.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.3a Watering. Adequate water and watering equipment must be on hand before seeding begins, and seed must be watered until it has become established and its continued growth assured. In all cases, watering must be completed in a manner that will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface. The Contractor must submit a watering plan to Airport Operations prior to application of any seed materials. The watering plan

must detail the Contractor's proposed method of watering and proposed watering schedule. The proposed method of watering must not require the closure of any active pavements

901-3.3b Establishing Turf.

a. General. The Contractor must provide general care for the seeded areas as soon as the seed has been placed and must continue until final inspection and acceptance of the work.

b. Protection. All seeded areas must be protected against traffic or other use by warning signs or barricades approved by the RPR.

901-3.4 Maintenance of seeded areas. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the RPR. A grass stand shall be considered adequate when bare spots are one square foot (0.01 sq m) or less, randomly dispersed, and do not exceed 3% of the area seeded.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of **acres** measured on the ground surface, completed and accepted.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Any areas disturbed by the Contractor's operations outside the grading limits shown on the plans (such as access roads, haul routes, staging areas, etc.) will not be measured for payment, but must be seeded in accordance with this specification, at no additional cost to the Owner. Payment for this work along access roads, haul routes, and/or staging areas will be considered subsidiary to the various bid items of the project.

Payment will be made under:

Item 901-5.1 Seeding - per acre

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C602 Standard Specification for Agricultural Liming Materials

Federal Specifications (FED SPEC)

FED SPEC JJJ-S-181, Federal Specification, Seeds, Agricultural

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-901

Item T-904 Sodding

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

904-1.1 This item shall consist of furnishing, hauling, and placing approved live sod on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR.

MATERIALS

904-2.1 Sod. Sod furnished by the Contractor shall have a good cover of living or growing grass. This shall be interpreted to include grass that is seasonally dormant during the cold or dry seasons and capable of renewing growth after the dormant period. All sod shall be obtained from areas where the soil is reasonably fertile and contains a high percentage of loamy topsoil. Sod shall be cut or stripped from living, thickly matted turf relatively free of weeds or other undesirable foreign plants, large stones, roots, or other materials that might be detrimental to the development of the sod or to future maintenance. At least 70% of the plants in the cut sod shall be composed of the species stated in the special provisions, and any vegetation more than 6 inches (150 mm) in height shall be mowed to a height of 3 inches (75 mm) or less before sod is lifted. Sod, including the soil containing the roots and the plant growth showing above, shall be cut uniformly to a thickness ~~not less than that stated in the special provisions~~ **recommended by the sod supplier for optimal growth. Thickness must be coordinated with the Contractor's grading operations to provide the specified pavement edge drop off.**

Sod furnished must be block sod or rolled sod free from noxious weeds or any matter deleterious to the growth and substance of the sod.

Sod species must be Argentine Bahia, or some hybrid of an approved species. The Contractor must certify that no species of grass submitted for use is a wildlife attractant.

904-2.2 Lime. Lime shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 (850 μm) mesh sieve and 50% will pass through a No. 100 (150 μm) mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the special provisions on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate **as specified by the local agricultural extension agent**. All liming materials shall conform to the requirements of ASTM C602.

This item will not be measured for separate payment but will instead be considered subsidiary to the cost of sod application.

904-2.3 Fertilizer. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws.

They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;

b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

c. A granular or pellet form suitable for application by blower equipment.

Caked, damaged, or otherwise unsuitable fertilizer will not be accepted. Fertilizers shall be **10-10-10** commercial fertilizer and shall be spread at the rate of **400 pounds per acre**.

This item will not be measured for separate payment but will instead be considered subsidiary to the cost of sod application.

904-2.4 Water. The water shall be sufficiently free from oil, acid, alkali, salt, or other harmful materials that would inhibit the growth of grass.

This item will not be measured for separate payment but will instead be considered subsidiary to the cost of sod application.

904-2.5 Soil for repairs. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

This item will not be measured for separate payment but will instead be considered subsidiary to the cost of sod application.

CONSTRUCTION METHODS

904-3.1 General. Areas to be solid, strip, or spot sodded shall be shown on the plans. Areas requiring special ground surface preparation such as tilling and those areas in a satisfactory condition that are to remain undisturbed shall also be shown on the plans.

Suitable equipment necessary for proper preparation of the ground surface and for the handling and placing of all required materials shall be on hand, in good condition, and shall be approved by the RPR before the various operations are started. The Contractor shall demonstrate to the RPR before starting the various operations that the application of required materials will be made at the specified rates.

904-3.2 Preparing the ground surface. All areas disturbed by Contractor operations must be topsoiled in accordance with FAA Item T-905, Topsoiling, prior to seeding or sodding. After grading of areas has been completed and before applying fertilizer and limestone, areas to be sodded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris which might interfere with sodding, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes occurs after grading of areas and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

904-3.3 Applying fertilizer and ground limestone. Following ground surface preparation, fertilizer shall be uniformly spread at a rate which will provide not less than the minimum quantity of each fertilizer ingredient, as stated in the special provisions. If use of ground limestone is required, it shall then be spread at a rate that will provide not less than the minimum quantity stated in the special provisions. These materials shall be incorporated into the soil to a depth of not less than 2 inches (50 mm) by discing, raking,

or other suitable methods. Any stones larger than 2 inches (50 mm) in any diameter, large clods, roots, and other litter brought to the surface by this operation shall be removed.

904-3.4 Obtaining and delivering sod. After inspection and approval of the source of sod by the RPR, the sod shall be cut with approved sod cutters to such a thickness that after it has been transported and placed on the prepared bed, but before it has been compacted, it shall have a uniform thickness of not less than 2 inches (50 mm). Sod sections or strips shall be cut in uniform widths, not less than 10 inches (250 mm), and in lengths of not less than 18 inches (0.5 m), but of such length as may be readily lifted without breaking, tearing, or loss of soil. Where strips are required, the sod must be rolled without damage with the grass folded inside. The Contractor may be required to mow high grass before cutting sod.

The sod shall be transplanted within 24 hours from the time it is stripped, unless circumstances beyond the Contractor's control make storing necessary. In such cases, sod shall be stacked, kept moist, and protected from exposure to the air and sun and shall be kept from freezing. Sod shall be cut and moved only when the soil moisture conditions are such that favorable results can be expected. Where the soil is too dry, approval to cut sod may be granted only after it has been watered sufficiently to moisten the soil to the depth the sod is to be cut.

904-3.5 Laying sod. Sodding shall be performed only during the seasons when satisfactory results can be expected. Frozen sod shall not be used and sod shall not be placed upon frozen soil. Sod may be transplanted during periods of drought with the approval of the RPR, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches (100 mm) immediately prior to laying the sod.

The sod shall be moist and shall be placed on a moist earth bed. Pitch forks shall not be used to handle sod, and dumping from vehicles shall not be permitted. The sod shall be carefully placed by hand, edge to edge and with staggered joints, in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward. The sod shall immediately be pressed firmly into contact with the sod bed by tamping or rolling with approved equipment to provide a true and even surface, and ensure knitting without displacement of the sod or deformation of the surfaces of sodded areas. Where the sod may be displaced during sodding operations, the workmen, when replacing it, shall work from ladders or treaded planks to prevent further displacement. Screened soil of good quality shall be used to fill all cracks between sods. The quantity of the fill soil shall not cause smothering of the grass. Where the grades are such that the flow of water will be from paved surfaces across sodded areas, the surface of the soil in the sod after compaction shall be set approximately one inch (25 mm) below the pavement edge. Where the flow will be over the sodded areas and onto the paved surfaces around manholes and inlets, the surface of the soil in the sod after compaction shall be placed flush with pavement edges.

On slopes steeper than one (1) vertical to 2-1/2 horizontal and in v-shaped or flat-bottom ditches or gutters, the sod shall be pegged with wooden pegs not less than 12 inches (300 mm) in length and have a cross-sectional area of not less than 3/4 sq inch (18 sq mm). The pegs shall be driven flush with the surface of the sod.

904-3.6 Watering. Adequate water and watering equipment must be on hand before sodding begins, and sod shall be kept moist until it has become established and its continued growth assured. In all cases, watering shall be done in a manner that will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface.

The Contractor must submit a watering plan to the RPR prior to application of any sod materials. The watering plan must detail the Contractor's proposed method of watering and proposed watering schedule. The proposed method of watering must not require the closure of any active pavements.

904-3.7 Establishing turf. The Contractor shall provide general care for the sodded areas as soon as the sod has been laid and shall continue until final inspection and acceptance of the work. All sodded areas shall be protected against traffic or other use by warning signs or barricades approved by the RPR. The

Contractor shall mow the sodded areas with approved mowing equipment, depending upon climatic and growth conditions and the needs for mowing specific areas **until final inspection and acceptance of all work.** Weeds or other undesirable vegetation shall be mowed and the clippings raked and removed from the area.

Maintenance and protection of all sodded areas will remain the responsibility of the Contractor until final inspection and acceptance of all work.

904-3.8 Repairing. When the surface has become gullied or otherwise damaged during the period covered by this contract, the affected areas shall be repaired to re-establish the grade and the condition of the soil, as directed by the RPR, and shall then be sodded as specified in paragraph 904-3.5.

904-3.9 Maintenance of Sodded Areas. The Contractor must protect sodded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged following sodding must be repaired by regrading and resodding as directed. The Contractor must mow, water as directed, and otherwise maintain sodded areas to the conditions as specified herein until final inspection and acceptance of the work.

METHOD OF MEASUREMENT

904-4.1 This item shall be measured on the basis of the area in square yards of the surface covered with sod and accepted.

BASIS OF PAYMENT

904-5.1 This item will be paid for on the basis of the contract unit price per square yard for sodding, which price shall be full compensation for all labor, equipment, material, staking, and incidentals necessary to satisfactorily complete the items as specified.

Full payment for sodding will not be made until it is evident the sod has become established and its continued growth is assured. Half of the payment will be made the month following the application of the sodding and the other half will be made after it is evident the sod has become established and its continued growth is assured.

Payment will be made under:

Item T-904-5.1 Sodding - per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C602 Standard Specification for Agricultural Liming Materials

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-904

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Item T-905 Topsoil

Note: Where portions of text have been lined through (~~example~~), this text has been deleted and does not apply to this project. Where portions of text have been bolded and shaded gray (**example**), this text has been added and is binding to this project. This process is utilized throughout the FAA specifications.

DESCRIPTION

905-1.1 This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR.

MATERIALS

905-2.1 Topsoil. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches (50 mm) or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed, but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (75 µm) sieve as determined by the wash test in accordance with ASTM C117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

905-2.2 Inspection and tests. Within 10 days following acceptance of the bid, the RPR shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in paragraph 905-2.1.

CONSTRUCTION METHODS

905-3.1 General. ~~Areas to be topsoiled shall be shown on the plans.~~ **All areas disturbed by Contractor operations must be topsoiled prior to seeding or sodding.** 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.

All areas to be disturbed by Contractor operations must first be stripped of the top four inches (4") of topsoil and stockpiled. No direct payment will be made for the removal of topsoil.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the RPR before the various operations are started.

905-3.2 Preparing the ground surface. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the RPR, to a minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

905-3.3 Obtaining topsoil. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the RPR. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the RPR. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the RPR. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoil purposes, shall be removed and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding **or sodding**.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the RPR. The Contractor shall notify the RPR sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

905-3.4 Placing topsoil. The topsoil shall be evenly spread on the prepared areas to a uniform depth of ~~2 inches (50 mm)~~ **four inches (4")** 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 (50 mm) or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. after spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the RPR. The compacted topsoil surface shall conform to the required lines, grades, and cross-sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

METHOD OF MEASUREMENT

905-4.1 Topsoil obtained on the site shall be measured by the number of square 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 off the site shall be measured by the number of square yards of topsoil measured in its final position. Topsoil shall be measured by area in square yards.

BASIS OF PAYMENT

905-5.1 Payment will be made at the contract unit price per square 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 square yard for topsoil (obtained off 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.

Payment will be made under:

~~Item T-905-5.1 Topsoil (Obtained on Site) per cubic yard~~

Item T-905-5.2 Topsoil, 4” Thickness (Furnished from Off-Site Sources) - 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 C117 Materials Finer than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-905

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Item T-908 Mulching

DESCRIPTION

908-1.1 This item shall consist of furnishing, hauling, placing, and securing mulch on surfaces indicated on the plans or designated by the RPR.

MATERIALS

908-2.1 Mulch material. Acceptable mulch shall be the materials listed below or any approved locally available material that is similar to those specified. Mulch shall be free from noxious weeds, mold, and other deleterious materials. Mulch materials, which contain matured seed of species that would volunteer and be detrimental to the proposed overseeding, or to surrounding farm land, will not be acceptable. Straw or other mulch material which is fresh and/or excessively brittle, or which is in such an advanced stage of decomposition as to smother or retard the planted grass, will not be acceptable.

a. Hay. 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 RPR. 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 conform to the requirements of ASTM D977, Type SS-1 or RS-1.

908-2.2 Inspection. The RPR shall be notified of sources and quantities of mulch materials available and the Contractor shall furnish him with representative samples of the materials to be used 30 days before delivery to the project. These samples may be used as standards with the approval of the RPR and any materials brought on the site that do not meet these standards shall be rejected.

CONSTRUCTION METHODS

908-3.1 Mulching. Before spreading mulch, all large clods, stumps, stones, brush, roots, and other foreign material shall be removed from the area to be mulched. Mulch shall be applied immediately after seeding. The spreading of the mulch 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 RPR. Straw or hay shall be spread over the surface to a uniform thickness at the rate of 2 to 3 tons per acre (1800 - 2700 kg per acre) to provide a loose depth of not less than 1-1/2 inches (38 cm) nor more than 3 inches (75 mm). Other organic material shall be spread at the rate directed by the RPR. Mulch may be blown on the slopes and the use of cutters in the equipment for this purpose will be permitted to the extent that at least 95% of the mulch in place on the slope shall be 6 inches (150 mm) or more in length. When mulches applied by the blowing method are cut, the loose depth in place shall be not less than one inch (25 mm) nor more than 2 inches (50 mm).

908-3.2 Securing mulch. The mulch shall be held in place by light discing, a very thin covering of topsoil, pins, stakes, wire mesh, asphalt binder, or other adhesive material approved by the RPR. Where mulches have been secured by either of the asphalt binder methods, it will not be permissible to walk on the slopes after the binder has been applied. When an application of asphalt binder material is used to secure the mulch, the Contractor must take every precaution to guard against damaging or disfiguring structures or property on or adjacent to the areas worked and will be held responsible for any such damage resulting from the operation.

If the "peg and string" method is used, the mulch shall be secured by the use of stakes or wire pins driven into the ground on 5-foot (1.5-m) centers or less. Binder twine shall be strung between adjacent stakes in straight lines and crisscrossed diagonally over the mulch, after which the stakes shall be firmly driven nearly flush to the ground to draw the twine down tight onto the mulch.

908-3.3 Care and repair.

a. The Contractor shall care for the mulched areas until final acceptance of the project. Care shall consist of providing protection against traffic or other use by placing warning signs, as approved by the RPR, and erecting any barricades that may be shown on the plans before or immediately after mulching has been completed on the designated areas.

b. The Contractor shall be required to repair or replace any mulch that is defective or becomes damaged until the project is finally accepted. When, in the judgment of the RPR, such defects or damages are the result of poor workmanship or failure to meet the requirements of the specifications, the cost of the necessary repairs or replacement shall be borne by the Contractor.

c. If the "asphalt spray" method is used, all mulched surfaces shall be sprayed with asphalt binder material so that the surface has a uniform appearance. The binder shall be uniformly applied to the mulch at the rate of approximately 8 gallons (32 liters) per 1,000 square feet (100 sq m), or as directed by the RPR, with a minimum of 6 gallons (24 liters) and a maximum of 10 gallons (40 liters) per 1,000 square feet (100 sq m) depending on the type of mulch and the effectiveness of the binder securing it. Asphalt binder material may be sprayed on the mulched slope areas from either the top or the bottom of the slope. An approved spray nozzle shall be used. The nozzle shall be operated at a distance of not less than 4 feet (1.2 m) from the surface of the mulch and uniform distribution of the asphalt material shall be required. A pump or an air compressor of adequate capacity shall be used to ensure uniform distribution of the asphalt material.

d. If the "asphalt mix" method is used, the mulch shall be applied by blowing, and the asphalt binder material shall be sprayed into the mulch as it leaves the blower. The binder shall be uniformly applied to the mulch at the rate of approximately 8 gallons (32 liters) per 1,000 square feet (100 sq m) or as directed by the RPR, with a minimum of 6 gallons (24 liters) and a maximum of 10 gallons (40 liters) per 1,000 square feet (100 sq m) depending on the type of mulch and the effectiveness of the binder securing it.

METHOD OF MEASUREMENT

908-4.1 Mulching shall be measured in square yards ~~(square meters)~~ on the basis of the actual surface area acceptably mulched.

BASIS OF PAYMENT

908-5.1 Payment will be made at the contract unit price per square yard ~~(square meter)~~ for mulching. The price shall be full compensation for furnishing all materials and for placing and anchoring the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item T-908-5.1 Mulching - per 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 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

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ITEM F-162 CHAIN-LINK FENCES

DESCRIPTION

162-1.1 This item shall consist of furnishing and erecting a chain-link fence in accordance with these specifications and 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 polyvinyl chloride (PVC)-coated steel wire in a 2-inch mesh and shall meet the requirements of ASTM F668. Polyvinyl chloride-coated fencing shall be green. Specific colors may vary by manufacturer.

162-2.2 BARBED WIRE. Not used.

162-2.3 POSTS, RAILS AND BRACES. Line posts, rails, and braces shall conform to the requirements of ASTM F-1043 or ASTM F 1083 as follows:

Vinyl or polyester coated steel shall conform to the requirements of ASTM F 1043, Paragraph 7.3 Optional Supplemental Color Coating.

Posts, rails, and braces furnished for use in conjunction with aluminum alloy fabric shall be aluminum alloy or composite.

Posts, rails, and braces, with the exception of galvanized steel conforming to F 1043 or ASTM F 1083, Group 1A, Type A, or aluminum alloy, shall demonstrate the ability to withstand testing in salt spray in accordance with ASTM B 117 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 Fed. Spec. RR-F-191/3.

162-2.4 GATES AND OPERATORS. Gate frames shall consist of polymer-coated 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. Gate type as indicated.

Where indicated on the plans, provide automatic gate operator and control system, complete. Gate and operator system shall comply with UL 325. Provide goose-neck access control panel suitable for operation from within a vehicle. Access control system shall include key pad and HID proximity card reader. Provide knox box for emergency access. Provide vehicle detector and safety loops with safety closure. Provide 500 spare HID proximity cards. All equipment shall be fully compatible with existing equipment.

Gate operator shall be commercial/industrial model rated for continuous duty, sized to accommodate the indicated gate. Provide concrete foundation and housekeeping pad. Provide power supply as required from existing cables. All enclosures shall be weather proof.

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 A 824.

All material shall conform to Fed. Spec. RR-F-191/4.

162-6 MISCELLANEOUS FITTINGS AND HARDWARE. Miscellaneous steel fittings and hardware for use with polymer-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.

162-2.7 CONCRETE. Concrete shall be of a commercial grade with a minimum 28-day compressive strength of 2,500 psi (17 240 kPa) meeting the requirements of P-610 Structural Portland Cement Concrete.

162-2.8 MARKING. Each roll of fabric shall carry a tag showing the kind of base metal (steel, aluminum, or aluminum alloy number), kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal (steel, aluminum, or aluminum alloy number), and kind of coating.

162-2.9 CERTIFICATION. All fencing materials and components shall be certified by the manufacturer as compliant with FAA's Buy American Preference, BABA and Made in America laws, including 49 U.S.C. § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA.

162-2.10 REFLECTORS. Install 2" diameter circular reflectors at 10'-0" on center on the public side of all line fencing. Provide 2 reflectors on each side of each leaf of swing gates and cantilever gates. Reflector shall be red in color, and shall be visible throughout a 180-degree arc. Reflectors shall be permanently affixed at a uniform height, as directed by Airport Operations or the RPR.

CONSTRUCTION METHODS

162-3.1 CLEARING FENCE LINE. All trees, brush, stumps, logs, and other debris which would interfere with the proper construction of the fence in the required location shall be removed a minimum width of 2-feet (61 cm) on each side of the fence centerline before starting fencing operations. The cost of removing and disposing of the material shall not constitute a pay item and shall be considered incidental to fence construction.

162-3.2 INSTALLING POSTS. All posts shall be set in concrete at the required dimension and depth and at the spacing shown on the plans.

The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within 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 (50 mm) larger than the greatest dimension of the posts shall be drilled to a depth of 12-inches (300 mm). 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.

162-3.3 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.

162-3.4 INSTALLING BRACES. Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

162-3.5 INSTALLING FABRIC. The wire fabric shall be firmly attached to the posts and braced in the manner 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-inch (25 mm) or more than 4-inches (100 mm) 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 thereon to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6-inches (150 mm) or less.

162-3.6 ELECTRICAL GROUNDS. Electrical grounds shall be constructed where a power line passes over the fence and at intervals not to exceed 250-feet. The ground shall be installed directly below the point of crossing. The ground shall be accomplished with a copper clad rod 10-feet long and a minimum of 3/4-inch in diameter driven vertically until the top is 6-inches (150 mm) 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.

METHOD OF MEASUREMENT

162-4.1 Chain-link fence will be measured for payment by the linear foot. Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

Gates will be measured as complete units.

Gates with operators and access control systems will be measured as a unit, complete and fully functional, including all incidental equipment and service connections.

Demolition will be measured for payment by the linear foot, including fencing and gates.

BASIS OF PAYMENT

162-5.1 Payment for chain-link fence will be made at the contract unit price per linear foot (meter).

Payment for driveway or walkway gates will be made at the contract unit price for each gate.

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. Reflectors shall be incidental to the price of the line fencing.

Payment will be made under:

Item F-162-5.1 Chain Link Fence, 6’ High, 9 gage, Vinyl Coated, without Barbed Wire -- per Linear Foot

Item F-162-5.2 Cantilever Gate, 6’ High by 24’ Wide w/Operator & Access Control System, Vinyl Coated, Complete – per Each

Item F-162-5.3 Remove Existing Fencing and Gates -- per Linear Foot

Item F-162-5.4 Remove Existing Electronic Gate -- per Each

MATERIAL REQUIREMENTS

ASTM A 121 Zinc-Coated (Galvanized) Steel Barbed Wire

ASTM A 123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A 392 Zinc-Coated Steel Chain-Link Fence Fabric

ASTM A 491 Aluminum-Coated Steel Chain-Link Fence Fabric

ASTM A 572 High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Steel Quality

ASTM A 653 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A 824 Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence

ASTM A 1011 Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

ASTM B 117 Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM B 221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire Shapes and Tubes

ASTM B 429 Aluminum-Alloy Extruded Structural Pipe and Tube

ASTM F 668 Poly(vinyl Chloride)(PVC) and other Organic Polymer-Coated Steel Chain-Link Fence Fabric

ASTM F 1043 Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework

ASTM F 1083 Pipe, Steel, Hot-Dipped Zinc-coated (galvanized) Welded, for Fence Structures

ASTM F 1183 Aluminum Alloy Chain Link Fence Fabric

ASTM F 1345 Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Chain Link Fence Fabric

ASTM G 152 Operating Open Flame (Carbon-Arc) Light Apparatus for Exposure of Nonmetallic Materials

ASTM G 153 Operating Enclosed Carbon-Arc Light Apparatus for Exposure of Nonmetallic Materials

ASTM G 154 Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

ASTM G 155	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)

END OF ITEM F-162

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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 Engineer.

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.

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

r. 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 project 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 Engineer for examination at any time during the project duration.

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.

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 Engineer 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 Engineer. 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 and/or 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, on scaffold systems or platforms and at trenches more than 5-feet deep that will remain open for more than a few days and where the Contractor is working in close proximity to 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 Engineer. No fasteners shall pierce any structure until approved by the Engineer.

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 Engineer, 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 areas of new construction in order to maintain continuity of existing circuitry. Existing conduits 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 re-routing 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 Engineer 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 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 Contractor’s bid shall include all removal and relocation required for completion of any alterations and the new construction.

If any difference is discovered between the existing conditions and the drawings or specifications, the Engineer shall be notified in writing immediately.

100-2.6 WORK SEQUENCE

a. Install Work to accommodate Airport's present 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 Engineer and Owner. 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 unit price bids. Requests for additional compensation for this work after award of contract will be refused.

d. Coordinate all work with all other contractors and subcontractors.

100-2.7 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 work. Explain the provisions of the warranty to the Owner at the "Demonstration of Completed System."

100-2.8 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 Engineer for approval one (1) week before the request for substantial completion of the work.

The Contractor shall demonstrate the function of any equipment and system as requested. In the event that any equipment or system does not function correctly, the Contractor shall perform any tests and provide test equipment required to ascertain the cause and shall correct the malfunctions to the satisfaction of the Owner so that the equipment or system operates as designed and specified.

100-2.9 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.

100-2.10 CONTRACTORS RESPONSIBILITIES. Provide necessary layout, 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, Engineer’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 his 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 Engineer, 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 Engineer.

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 other 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 Engineer.

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 Engineer, 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.

100-2.11 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 Engineer 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.

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, structural, mechanical, electrical, civil, fire protection and any other 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 Engineer 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 Engineer. 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-iches 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 be bare. 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 equivalent between the mounting surface and the equipment at each mounting point. Equipment as listed above, mounted on Unistrut or approved equivalent shall have Unistrut P-1060 series square washer or approved equivalent installed between the Unistrut channel or approved equivalent 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 THWN-2 600 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 THWN-2 600 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 Engineer 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 Engineer. The Owner and the Engineer 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 Engineer.

c. Coordinate required facility shutdowns through the Engineer.

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

Engineer.

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 or as otherwise established by the Owner. On-site generators will be necessary in areas where facilities are out of service for more than 1/2 hour. All switching and change-overs will be performed by the Contractor and witnessed by the Engineer. Coordination of all service interruptions will be performed by the Engineer.

f. The Contractor shall perform all work involving service interruptions at times designated by the Engineer 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 Engineer. Repair, replacement or both shall be at the discretion of the Engineer and at the expense of the Contractor.

h. The Contractor shall note that the Airport shall be occupied and in use during the construction period. The Contractor shall not disturb continuity of service to any area without the written approval and agreement as to time and duration of such interruption. The Contractor shall perform any of this work at any time without extra cost to Owner.

i. The Contractor shall fully examine all areas of demolition in this contract. The Contractor shall identify all services related to its trades. The Contractor shall provide protection of such service to prevent disruption of service. The Contractor shall reroute all services to remain as required at approved locations without extra cost to the Owner.

100-3.5 TEMPORARY SERVICES. The Contractor shall provide temporary electrical services throughout the entire work area where required whether indicated or not. Existing roadway lighting circuit integrity shall remain until new traffic patterns are established. Coordinate with all contractors and subcontractors. The Contractor shall revise temporary services as many times as necessary for all contractors and subcontractors work to occur through the completion of the project.

100-3.6 CODES AND FEES. Install all work 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 various utilities companies. Where a conflict in code requirements occurs the most stringent requirement shall govern. The Contractor shall be responsible and pay all required permits, licenses, services, fees and inspections including meter installation fee. The cost for such shall be included in the various bid prices provided in the Contractor’s bid.

Deliver to the Owner and Engineer, prior to the start of construction, a copy of all permits and licenses required for the work. At the completion of the work, secure and deliver to the Owner and Engineer all certificates of compliance of authorities having jurisdiction.

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 Contractor's convenience.

100-3.7 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 Engineer that equipment meets or exceeds available standards. All listed, labeled or approved material shall be used only for the intended purpose.

100-3.8 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 various bid prices.

100-3.9 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 Engineer and prior to the connection of the grounding conductors.

Perform such tests as required by any authorities having jurisdiction over the site. Refer to specification L-131 Demonstrations, Tests and Performance Verification.

Testing methods shall be acceptable to the Engineer and shall be submitted to the Engineer for review, a minimum of thirty (30) days prior to the scheduled test.

The Contractor shall supply all labor, materials, instruments and miscellaneous equipment for any examination of work or tests as required. All test results shall be recorded and submitted to the Engineer.

100-3.10 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 1/2-inch lettering. If equipment is smaller than 10-inches by 6-inches, 1/4-inch lettering may be used. Smaller lettering may be used with permission of the Engineer.

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 equivalent may be used with permission of the Engineer.

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 with 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 1/2-inch high letters on all panels, switches, pull boxes and junction boxes.

100-3.11 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 30-feet in between identifying the voltage level (Example: "480 VOLTS"). If the conduit is less than 10-feet 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 equivalent with 1/2-inch letters.

The markers shall be suitable for the environmental conditions encountered.

100-3.12 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:

Color Code for Junction Boxes	Krylon Color & Paint # Or Approved equivalent	
Normal Power 480/277 Volt	Brown	2501-6
Normal Power 208/120 Volt	Black	1601-6

100-3.13 CONCRETE WORK. Concrete bases and pads for all equipment furnished by the Contractor

shall be the responsibility of the Contractor unless noted otherwise. All concrete used shall meet the requirements of P-610 Structural Portland Cement Concrete specification.

The Contractor shall furnish all equipment anchor bolts and shall be responsible for their proper installation and accurate location.

100-3.14 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 Engineer.

Roots shall be removed to a level of 18-inches 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 6-inches 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.

100-3.15 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-inch 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 Engineer 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 Engineer'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 Engineer, the Contractor shall furnish a certificate that the product complies with the referenced standard. Upon request of the Engineer, the Contractor shall submit supporting test data to substantiate compliance.

The Engineer 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 Engineer 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 Engineer. 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 Engineer 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 Engineer.

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 various Contractor bid prices. 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 Engineer'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 equivalent.

All threaded conduit joints shall use T&B Kopr-shield or Aluma-Shield or approved equivalent 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

RS&H, Inc

To: _____ **RFI - 000**

From: _____ Date: _____

Project: _____ AEP File No: 000-0000-000

_____

Reference:

Contract Drawing: _____

Shop Drawing: _____

Specification: _____

Other: _____

Subject:

Description:

By: _____

Reply:

Answered By: _____
Date

Project Manager

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 Engineer 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 Engineer 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 Engineer. The Engineer 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 fire fighting equipment and fire prevention methods and, before operations begin, clear all welding and cutting operations with the Engineer.

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 Engineer and not proceed until clearance is obtained in writing. The Engineer 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 Engineer.

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 Engineer, 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 Engineer, 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 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 Engineer, 72 hours prior to the start of excavation work or surface penetration, to enable the Engineer 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 Engineer 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 Engineer. 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 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 Engineer 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 Engineer.

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 Engineer, 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 Engineer.

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 Engineer 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. 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.

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 Engineer'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 Engineer. 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.

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 Engineer 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 Engineer. Should bad weather cause poor visibility, the Engineer 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 Engineer. 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 Engineer. 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 Engineer.

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 Engineer.

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 Engineer.

METHOD OF MEASUREMENT

104-5.1 The items described in this section are incidental to other sections and shall not be measured for payment.

BASIS OF PAYMENT

104-6.1 No direct payment shall be made for the work described in this section. The work described in this section and temporary airfield lighting is incidental to the demolition pay item.

END OF ITEM L-104

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Item L-105 Modification, Removal, and Demolition of Airfield Lighting Systems

GENERAL

105-1.1 Definitions.

a. Modification shall mean any change or rearrangement in the component parts, including structural, mechanical, electrical systems, or internal or external arrangements of existing equipment or structures.

b. Removal shall mean the dismantling of existing materials, components, equipment, and utilities. Removal of existing equipment, etc., shall be performed carefully to prevent damage to existing equipment. Removed items not to be reinstalled shall be delivered and turned over to airport maintenance, unless otherwise directed by the Engineer, in which case these items shall be disposed of off airport property at the Contractor's expense.

c. 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.

105-1.2 General. 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 Engineer and/or the Owner.

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 Engineer. 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.

105-1.3 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 conduit, cable, fixtures or other items in the existing systems which must be removed or relocated in order to perform the modification work. All conduit, wiring, boxes, etc., that do not comply with the contract documents shall be removed or corrected to comply with the contract documents. 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 modifications and the new construction.

105-1.4 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.

As a minimum, work place safety shall comply with NFPA 70E, OSHA, federal, state and local requirements. Where a conflict occurs, the most stringent requirement shall govern.

The Contractor shall comply with the Construction Safety and Phasing Plan (CSPP).

105-1.5 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.

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.

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.

105-1.6 Temporary Protection. The Contractor shall provide and maintain the following requirements:

a. Protection of persons and property shall be provided throughout the progress of the work in accordance with the contract documents.

EXECUTION

105-2.1 Disconnecting Utilities. Prior to the start of work, the necessary utilities serving each area of modification, removal, or demolition 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 airport approved procedures.

Prior to the disconnection, interruption or removal of any circuit supplying power to an FAA owned and maintained facility, the Contractor must notify the local FAA or authorized representative 48 hours in advance and be granted permission.

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 Temporary Airport Lighting Systems. The Contractor shall maintain the airport lighting systems during the various phases of the work as shown on the phasing plan(s) or as directed by the Engineer. The Contractor shall be responsible for all temporary connections in the field or at the regulator necessary for operation of the circuits during construction. All existing electrical equipment and lighting systems shall be kept in operation, unless prior approval of the Engineer has been received and as otherwise specified below and on the Drawings. The Contractor may use salvaged materials for temporary construction where required. The permission for temporary work and using salvaged materials shall be obtained from the Engineer. Lighting for active runway and taxiway surfaces shall be maintained at all times. Temporary electrical fixtures and conductors are allowable when necessary, but shall be installed as follows:

a. 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. Conduit shall comply with Item L-110.

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.

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 Engineer'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 Engineer. 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. Cable shall comply with Item L-108.

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 Engineer 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 Engineer. Should bad weather cause poor visibility, the Engineer 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 Engineer. This test shall be performed in accordance with paragraph L-108-2.1f and L-108-2.11 prior to any activity affecting the respective circuit. The Contractor shall record

the results. When the circuit is returned to its final condition, the circuit's insulation resistance shall be checked again in the presence of the Engineer. The Contractor shall record the results. 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 (O&M) Manual.

105-2.4 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.

105-2.5 Backfilling for Removal of Light Bases and Equipment Foundations. After a light base or equipment foundation has been removed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the Engineer.

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.

Where light bases or equipment foundations have been removed from existing pavement to remain, the void shall be filled with P-610 concrete.

105-2.6 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.

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 from the Owner.

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 OSHA, 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 Disposal of Debris. Materials classified as debris shall be transported from Owner property and legally disposed of at no additional cost to the Owner. Permits and fees for disposal shall be paid by the Contractor.

MODIFICATION WORK

105-5.1 General. Cutting, patching, repairing, and other modifications work shall be done by tradesman skilled in the particular trade or work required.

Where required to patch or extend existing construction, or both, such modifications shall match existing exposed surface materials in finish, color, texture, and pattern.

Salvaged items for reuse shall be as approved by the Engineer and Owner.

METHOD OF MEASUREMENT

105-6.1 Measurement for removal of airfield lights will be per each for the quantity removed. Measurement for this item will also include the removal of the light base and foundation.

105-6.2 Temporary airport lighting systems will be measured for payment on a lump sum basis. Work for this item shall include temporary equipment, cables, conduit, and connections required to keep the airfield lighting systems operational during construction. This item shall also include the removal of the items when no longer needed and restoration to original conditions.

BASIS OF PAYMENT

105-7.1 Payment will be made at the contract unit price for each airfield light removed. This price shall be full compensation for the disconnection from the electrical system, removing and disposing of all materials, site restoration, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications. This payment shall also include the transportation of salvaged materials to the Owner's designated location.

105-7.2 Payment will be made at the contract lump sum price for Temporary Airport Lighting Systems. This price shall be full compensation for temporary jumpers, connections, conduit, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and

intent of the plans and specifications.

Payment will be made under:

Item L-105-7.1	Remove Taxiway Edge Light, Isolation Transformer, and Base Can - per each
Item L-105-7.2	Remove Existing Taxiway Edge Light Cable and Condit, Complete - per linear foot
Item L-105-7.3	Maintenance of Airport Lighting Systems – per lump sum

END OF ITEM L-105

Item L-108 Underground Power Cable for Airports

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or installing power cables within conduit or duct banks per these specifications at the locations shown on the plans. It includes excavation and backfill of trench for direct-buried cables only. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the RPR. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities.

EQUIPMENT AND MATERIALS

108-2.1 General.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format. The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation

resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, *Maintenance Airport Visual Aid Facilities*, paragraph 5.1.3.1, Insulation Resistance Test.

108-2.2 Cable. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type THWN-2, 75°C for installation in conduit and RHW-2, 75°C for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, THWN-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of THWN-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

108-2.3 Bare copper wire (counterpoise, bare copper wire ground and ground rods). Wire for counterpoise or ground installations for airfield lighting systems shall be No.6 AWG bare solid copper wire for counterpoise and/or No. 6 AWG insulated stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire**.** For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be copper-clad steel**.** 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 an approved equivalent, used for potting the splice is acceptable.

b. The field-attached plug-in splice. Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish

appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.

c. The factory-molded plug-in splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

d. The taped or heat-shrink splice. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

108-2.5 Splicer qualifications. Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

108-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

108-2.7 Flowable backfill. Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

108-2.8 Cable identification tags. Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

108-2.9 Tape. Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

108-2.10 Electrical coating. Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

108-2.11 Existing circuits. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the

first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

108-2.12 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

CONSTRUCTION METHODS

108-3.1 General. The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

108-3.2 Installation in duct banks or conduits. This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to

installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

108-3.3 Installation of direct-buried cable in trenches. Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

a. Trenching. Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches (0.5 m) below finished grade per NEC Table 300.5, except as follows:

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.

- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill material may alternatively be used.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.

(2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

b. Backfilling. After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables ; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8 inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557**.**

Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turfing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

c. Restoration. Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the topsoiling**,** fertilizing**,** seeding, mulching as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557**.** Restoration shall be considered incidental to the pay item of which it is a component part.

108-3.4 Cable markers for direct-buried cable. The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch (10 - 15 cm) thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

108-3.5 Splicing. Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

a. Cast splices. These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

b. Field-attached plug-in splices. These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

c. Factory-molded plug-in splices. These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

d. Taped or heat-shrink splices. A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. The manufacturer's recommendation for stretching tape during splicing shall be followed. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately one inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer’s instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminates prior to application.

e. Assembly. Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer’s recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

108-3.6 Bare counterpoise wire installation for lightning protection and grounding. If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

a. Equipotential. The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc – all components - are bonded together and bonded to the vault power system ground loop/electrode.

Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. The counterpoise is centered over the cable/conduit/duct to be protected.

The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:

(1) The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.

(2) The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90 degree angle).

The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.

All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.

All components rise and fall at the same potential; with no potential difference, no damaging arcing and no damaging current flow.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Equipotential Method of lightning protection.

Reference FAA STD-019E, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment, Part 4.1.1.7.

b. Isolation. not used

c. Common Installation requirements. When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

When a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made electrode-grounding system. The connections shall be made as shown on the plans and in the specifications.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

d. Parallel Voltage Systems. Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

108-3.7 Counterpoise installation above multiple conduits and duct banks. Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of counterpoise wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

108-3.8 Counterpoise installation at existing duct banks. When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

108-3.9 Exothermic bonding. Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the RPR, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

a. All slag shall be removed from welds.

b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.

c. If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3M™ Scotchkote™, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

108-3.10 Testing. The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

a. Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.

b. Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

c. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

d. That all affected circuits (existing and new) are free from unspecified grounds.

e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than 1000 megohms. Verify continuity of all series airfield lighting circuits prior to energization.

f. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms.

g. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

h. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.

i. That the impedance to ground of each ground rod does not exceed 25 ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved "repair" procedures for items that have failed testing other than complete replacement.

METHOD OF MEASUREMENT

108-4.1 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 include additional quantities required for slack.

108-4.3 No separate payment will be made for ground rods.

BASIS OF PAYMENT

108-5.1 Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench (direct-buried), or cable and equipment ground installed in duct bank or conduit, in place by the Contractor and accepted by the RPR. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L-108-5.1	No. 8 AWG, 5kV, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit – per linear foot
Item L-108-5.2	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Connections/Terminations and Ground Rods - per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems

American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Federal Aviation Administration Standard

FAA STD-019E	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment

END OF ITEM L-108

Item L-110 Airport Underground Electrical Duct Banks and Conduits

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits and removal of existing duct banks. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 General.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

110-2.2 Steel conduit. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth.

110-2.3 Plastic conduit. Plastic conduit and fittings-shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I–Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II–Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 Split conduit. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 Conduit spacers. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

110-2.7 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 Flowable backfill. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with

continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

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 be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill may alternatively be used.

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables) cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 Duct banks. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base

course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

110-3.3 Conduits without concrete encasement. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and lot less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

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.

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 the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period's construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.7 Restoration. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include topsoiling**,** fertilizing**,** seeding**,** mulching shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 Ownership of removed cable. Removed cable shall become the property of the contractor and legally disposed off site.

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 restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110-5.1	1-Way, 2-Inch PVC Conduit, Schedule 40 – per linear foot
Item L-110-5.2	1-Way, 2-Inch PVC Conduit, Schedule 40, Concrete Encased – per linear foot
Item L-110-5.3	Remove Existing Conduit – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit - Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 1242	Electrical Intermediate Metal Conduit Steel
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

Item L-125 Installation of Airport Lighting Systems

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

125-2.1 General.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not performs as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR’s opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

All LED light fixtures, with the exception of obstruction lighting (AC 150/5345-43) must be warranted by the manufacturer for a minimum of 4 years after date of installation inclusive of all electronics. Obstruction lighting warranty is set by the individual manufacturer.

EQUIPMENT AND MATERIALS

125-2.2 Conduit/Duct. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 Cable and Counterpoise. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 Tape. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.5 Cable Connections. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 Retroreflective Markers. Retroreflective markers shall be type L-853 and shall conform to the requirements of AC 150/5345-39.

125-2.7 Runway and Taxiway Lights. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

Lights

Type	Class	Mode	Style	Option	Base	Filter	Transformer	Notes
L-861T(L)	2	1	N/A	4	L-867B	Blue	10/15W	14” Height

125-2.8 Runway and Taxiway Signs. Not used.

125-2.9 Runway End Identifier Light (REIL). Not required.

125-2.10 Precision Approach Path Indicator (PAPI). Not required.

125-2.11 Circuit Selector Cabinet. Not Used

125-2.12 Light Base and Transformer Housings. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867, Class 1A, Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

125-2.13 Isolation Transformers. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

INSTALLATION

125-3.1 Installation. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

125-3.2 Testing. All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

125-3.3 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.4 Elevated and In-pavement Lights. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

METHOD OF MEASUREMENT

125-4.1 Reflective markers will be measured by the number installed as completed units in place, ready for operation, and accepted by the RPR. Taxiway lights will be measured by the number 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 taxiway light or reflective marker 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-125-5.1	L-861T(L) Taxiway Edge Light and Isolation Transformer on New L-867B Base Can - per each
Item L-125-5.2	L-853 Elevated Taxiway Edge Retroreflective Marker, Omni-Directional, 30" Height, Blue – per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

END OF ITEM L-125

GDOT SPECIFICATIONS

GDOT SPECIFICATIONS

Section 300—General Specifications for Base and Subbase Courses

300.1 General Description

This Specification applies to all base and subbase courses, except asphaltic concrete. Additional requirements for each type of base and subbase are described in the appropriate Sections for specific base and subbase type construction.

300.1.01 Definitions

General Provisions 101 through 150.

300.1.02 Related References

A. Standard Specifications

Section 106—Control of Materials

Section 107—Legal Regulations and Responsibility to the Public

Section 109—Measurement and Payment

Section 150—Traffic Control

Section 152—Field Laboratory Building

Section 160—Reclamation of Material Pits and Waste Areas

Section 205—Roadway Excavation

Section 206—Borrow Excavation

Section 209—Subgrade Construction

Section 301—Soil-Cement Construction

Section 302—Sand-Bituminous Stabilized Base Course

Section 310—Graded Aggregate Construction

Section 316—Cement Stabilized Graded Aggregate Construction

Section 412—Bituminous Prime

Section 831—Admixtures

B. Referenced Documents

Form OMR-TM-141 Daily Truck Weights

Form 474 Tally Sheet

300.1.03 Submittals

General Provisions 101 through 150.

300.2 Materials

Find the Specifications for materials to be used and the references for them under the appropriate Section for each base and subbase type construction.

Ensure that each material meets the requirements for the type specified. Incorporate only materials that meet the Engineer's approval.

Admixtures meeting the requirements of Subsection 831.2.03 and approved for use in stabilized bases or subbases shall be governed by the requirements as outlined in Laboratory Standard Operating Procedure No. 5, Quality Control of Portland Cement and Blended Hydraulic Cements and Quality Control of Fly Ash and Granulated Blast-Furnace Slag.

A. Selecting Local Materials at the Source

The Engineer has the authority to classify materials at the source and require the materials to be excavated in the proper sequence so that each kind will reach its destination at the best location for that material in the finished work. The Engineer has the authority to reject any unsuitable materials.

B. Sources of Local Materials Outside the Right-of-Way

Follow the provisions of Subsection 106.10, "Local Material Sources" to obtain materials from local sources outside the right-of-way.

300.2.01 Delivery, Storage, and Handling

A. Storing at Central Mix Plants

Store material at a plant site with enough space for separate stockpiles, bins, or stalls for each size of aggregate. Keep aggregates separated until delivery to the plant feeders for proportioning. Keep the storage yard neat and the stockpiles, bins, and stalls accessible for obtaining samples.

300.3 Construction Requirements

300.3.01 Personnel

Supply all personnel and equipment necessary for obtaining samples from base plants and delivering them to the plant laboratory.

300.3.02 Equipment

Ensure that all equipment for constructing base and subbase courses is of an approved design and in satisfactory condition before construction begins. The equipment required for each type of base or subbase will be determined according to the construction method used.

A. Central Mix Plants

The central mixing plant will not be approved for proportioning, batching, or mixing unless a field laboratory meeting the requirements of Section 152 is available for the exclusive use of the Engineer or Inspector.

Design, coordinate, and operate plants so that the mixture is produced within the specified tolerances. The requirements are as follows.

1. Scales

   Before any mixture is delivered to the Project, check all scales with standard weights for accuracy and for agreement with each other.

   If weight proportioning is used, provide accurate scales so all ingredients of the mixture can be weighed separately. Use scales that are accurate to within 0.5 percent of the measured load. Support scales with rigid supports so that vibration from the plant does not interfere with accurate readings.

   a. Weight Box and Hopper Scales

      Use springless dial scales of a standard make and design for weight boxes and hopper. Inspect and seal scales when the Engineer determines it necessary to assure accuracy. Ensure that at least ten 50 lb. (25 kg) weights are available for testing the scales.

   b. Motor Truck Scales

With each plant, include a motor truck scale with a platform large enough to accommodate the entire length of any vehicle used. Ensure that the scale is certified according to Section 109 and is large enough to weigh the largest anticipated load. Do not measure weights greater than the rated capacity of the scales.

Ensure that the weights of the aggregate batches in the truck before delivery to the Project are within two percent of the sum of the weights of the batch ingredients.

Complete Forms OMR-TM-141 (Daily Truck Weights) and Form 474 (Tally Sheet) for each day's production and submit them to the Engineer.

2. Mixer

Equip each central mix plant with an approved mixer.

If Portland cement is required, begin mixing immediately after the cement is added to the coarse aggregate and soil mortar. Continue mixing until a homogeneous and uniform mixture is produced.

If the equipment does not produce a homogeneous and uniform mixture that meets these Specifications, the Engineer will require the Contractor to make the changes necessary to accomplish this result.

Any adjustments made to the charge in a batch mixer or the rate of feed to a continuous mixer must ensure a complete mix of all of the material.

Correct dead areas in the mixer where the material does not move or is not sufficiently agitated, by reducing the volume of material or by making other adjustments.

3. Mixture Proportioning

Add Portland cement, bituminous materials, aggregates, or other ingredients in such a manner that they are uniformly distributed throughout the mixture during the mixing operation.

4. Water Proportioning

In all plants, proportion water by weight. Provide a means for the Engineer to verify the amount of water per batch or the rate of flow for continuous mixing.

Use spray bars to evenly distribute moisture throughout the mixture.

5. Sampling

Use sampling equipment approved by the Engineer to obtain samples before combining them with other ingredients or introducing them into the mixer.

Use sampling equipment to provide an accurate representation of the furnished material.

6. Additional Requirements for Continuous-Mixing Plants

a. Feeder System

Continuous mixing plants shall use a feeder system that accurately proportions aggregate from each bin by weight.

Equip each feeder with a device that can change the quantity of material being fed. Use a feeder with adjustments that can be securely fastened.

Ensure that the plant has an interlocking system of feeders and conveyors that can be synchronized to supply a continuous flow of aggregate, including a positive flow of dry and liquid additives for mixing.

Provide an electronic belt-weighing device to monitor the combined aggregates. Ensure that there are meters for maintaining the aggregates and additives at varying production rates.

Use an electronic control package capable of tracking which accepts a signal from the belt-weighing device and signals to continuously vary the dry and liquid additive feeder speed and maintain the feed rate.

Proportion dry additives with a gravimetric (depleting weight) system meeting the following requirements:

- The dry additive gravimetric (depleting weight) system includes an isolation vessel supported by load cells independent of the fines silo.
- Use load cells in conjunction with an electronic scale package having remote digital display and the necessary controls. Continuously weigh the material being metered with a positive displacement feeder mounted on the discharge of the isolation vessel.

b. Control System

Use a control package that has a plant interlock shutdown capability. Plants must be able to shut down if actual flow rates differ from desired flow rates excessively. If the flow rate deviates excessively, an alarm shall sound at any of the aggregate, dry additive, or liquid additive metering devices.

Provide a monitoring station to control the entire operation that shows continuous quantitative data on the production and proportioning of the mix ingredients.

a. Portable Power Units

Equip plants that use portable electric power generators with a frequency meter (graduated and accurate to one hertz) and a voltmeter (graduated and accurate to two volts), installed in the power circuit.

b. Mixer

Use a mixer equipped with enough paddles or blades to produce a uniform and homogeneous mixture. Replace paddle blades that show more than 25 percent wear in the face area. Use paddles that can be adjusted to angular positions on the shafts and that can be reversed to retard the flow of the mix. Keep the mixer level.

c. Surge Hopper

Equip the mixer with a surge hopper. Use a surge hopper that automatically discharges the mixture when it reaches a predetermined level.

7. Additional Requirements For Batch-Mixing Plants

a. Weigh Box or Hopper

Use weigh boxes and hoppers that are suspended on scales, large enough to hold a full batch without spilling or needing hand raking, and equipped with a device for accurately weighing each size of aggregate.
Provide a convenient and accurate means of obtaining samples of aggregates from each bin before the material enters the mixing chamber. Equip each bin compartment with a bin level indicator that automatically stops weighing when a bin is empty.

b. Mixer

Include an approved, leak-proof batch mixer in the plant. Use a mixer fast enough or equipped with enough paddles or blades to produce a properly and uniformly mixed batch. Replace paddles and blades that show more than 25 percent wear in the face area.

a. Weighing Cement

Weigh cement on scales separate from the aggregate batching scales. Ensure that all scales meet the requirements of Section 109.

d. Proportioning Bituminous

Introduce bituminous material into the mixer through spray bars and weigh it on scales separate from the aggregate batching scales.

e. Control of Mixing Time

Use a time-locking device that automatically limits mixing time. Do not mix materials less than 30 seconds.

B. In-Place Mixers

For in-place mixing operations, use mixers that meet the following requirements:

1. Multiple Pass Mixers

   Use approved rotary-type multiple pass mixers with sufficient tines that mix cement, soil or soil-aggregate, and water uniformly for the full depth of the course.

2. Traveling Plant Mixers

   Use approved traveling mixing plants to pick up the aggregate, soil, or other materials from the windrow or roadway. Use plants equipped with a bottom shell or pan that pick up and mix the material while it is separated from the foundation material during at least 50 percent of the mixing cycle.

   Use plants that mix the material for the full depth of the section. Ensure that travelling plants move forward with successive increments the length and width of the roadbed so that the roadbed is compacted and finished in one operation. Ensure that none of the materials being mixed are lost or segregated.

   Use plants mounted on wheels or crawler tracks wide enough so that they will not rut or damage the mixed surface when loaded to capacity.

   Use plants with a pressurized metering device that introduces water during mixing.

   Ensure that devices for proportioning water and materials to be mixed accurately measures the specified amounts while the machine is in motion.

   For bituminous stabilization, use plants equipped with a metering device that accurately measures the bituminous material into the mixer within the tolerances specified in Section 302.3.05.B. Ensure that the meter indicator dial has a scale with divisions indicating gallons (liters).

   If mixing equipment does not produce a homogeneous and uniform mixture, make the changes necessary to produce this result, as required by the Engineer.

C. Mechanical Cement Spreader

When the material is to be mixed in-place, use an approved mechanical cement spreader to uniformly and accurately spread the cement. Do not use pneumatic tubes to transfer the cement from the tanker to the material to be stabilized.

D. Mixture Spreader

Use an approved mechanical spreader that meets the following requirements to uniformly spread the mixture:

- A height-adjustable strike-off plate to obtain the specified thickness of the finished base
- A self-propelled spreader with rollers to contact the truck tires and push the truck without skewing the spreader or truck
- A hopper large enough to prevent spilling or wasting the material

E. Static Rollers

Use static rollers that meet the following requirements. Use self-propelled static rollers on cement stabilized base.

1. Trench Roller

   In this context, “roller” describes a wheel made of a flat metal surface; “wheel” describes a rubber wheel of the automotive type.

   When base widening is specified, use at least one trench roller. Use a trench roller that has a guiding roller or wheel that operates in tandem with the compression roller on the area to be compacted or with the auxiliary wheel or roller.

   Ensure that the trench roller is equipped with an auxiliary wheel or roller, mounted on a height-adjustable axle. The contact surface of the auxiliary wheel or roller must be adjustable to at least 10 in (250 mm) above and 2 in (50 mm) below the rolling plane of the compression roller. If this adjustment is not sufficient to compact the subgrade to the Plan elevation, adjust the contact surface the necessary amount.

   If the steering roller or wheel operates in tandem with the auxiliary wheel or roller, it does not need to be height-adjustable.

Ensure that the auxiliary wheel or roller operates on the surface of the pavement adjacent to the area to be compacted, and at a distance from the edge of the pavement that no damage occurs. Keep the height adjustment of the auxiliary wheel or roller such that the compression roller will develop a smooth, compacted surface true to crown.

Use gas-propelled trench rollers equipped with reversing, smooth operating friction clutches. Ensure that friction clutches have smooth operating brakes of ample capacity. Use either hand-powered or power-operated steering devices.

The compression per inch (25 mm) width of compression roller shall not be less than 300 lbs (545 kg) and not greater than 365 lbs (660 kg). If necessary, use a hollow compression roller and secure the minimum weight with liquid ballast. The trench roller must compact a minimum width of at least 15 in (375 mm).

Fit rollers with adjustable spring scrapers that can scrape in both directions.

2. Steel-Wheel Rollers

   Use three-wheel or tandem steel-wheel rollers. Use self-propelled rollers equipped with cleaning devices to prevent material from adhering to the wheels.

   For base or subbase materials, use 3-wheel rollers on base or subbase materials that have a minimum weight of 10 tons (9 Mg) and a minimum compression of 325 pounds per inch (580 kg/100 mm) of width for the rear wheels.

   Use steel wheel tandem rollers with a minimum weight of 10 tons (9 Mg) and a minimum compression of 225 pounds per inch (400 kg/100 mm) of width for the rear drum.

3. Pneumatic-Tire Rollers

   Use pneumatic-tire rollers with a minimum contact pressure of 50 psi (345 kPa) per wheel.

   Equip rollers to uniformly distribute the load between all wheels.

   Use multiple axle, multiple wheel rollers with wheels staggered on the axles and spaces between each wheel to provide uniform compaction for the full compacting width of roller.

   Ensure that the air pressure of any tire does not vary more than 5 psi (35 kPa) from the established pressure.

   Operate rollers between 3 mph (5 kph) and 8 mph (13 kph), unless otherwise directed by the Engineer.

4. Sheepsfoot Rollers

   Use vibratory or static compaction sheepsfoot rollers of sufficient size and weight to obtain the desired compaction.

F. Vibratory Rollers

Use an approved vibratory roller designed to activate the frequency of vibration and the roller movement separately. Ensure that the weight and amplitude of the roller can compact the surface to Specifications with a minimum number of passes.

G. Bituminous Sampling Valve

Use bituminous transfer pumps that include a valve for sampling bituminous materials.

H. Fine Grading Machine

Specifications for the Fine Grading Machine are included in either a Special Provision or a Supplemental Specification in the Proposal or in the current Supplemental Specification book.

300.3.03 Preparation

A. Alternate Methods

When alternate methods of construction are provided without restriction, the Contractor may select these alternate methods at will, provided the equipment and organization are suited to the method selected. Before starting construction, discuss the proposed method with the Engineer. The method selected must:

- Spread base or subbase material uniformly without damaging the subgrade, subbase, or the material being placed
- Mix the materials until they are homogeneous
- Use the specified water and cement or bitumen content
- Compact throughout the depth of the course to the density specified
- Complete the work within the specified time limits

Organize the work and equipment so that spreading, compacting, and finishing the base or subbase is a continuous operation. Do not exceed minimum or maximum time limits where the detailed Specifications require them, except in unusual cases where permitted by the Engineer.

B. Preparing the Pit Site

Remove grass, weeds, roots, and other debris from local materials pits. Adhere to the requirements of Subsection 107.23, "Environmental Considerations" when performing this work. Include the cost in the prices bid for the pertinent Pay Items. This work is not considered as clearing and grubbing.

C. Preparing the Subgrade

If the subgrade does not meet the requirements of Section 209 for surface, compaction, and stability, repair all defective portions until it meets the requirements of that Section. Remove unsuitable materials and replace with acceptable material, if necessary. Compact the subgrade as specified in Section 209.

Have enough prepared subgrade meeting the requirements of Section 209 for at least one day of base construction before beginning work.

D. Preparing the Subbase

If a subbase is required, prepare it according to the requirements for surface and compaction. Ensure that it is stable enough to support the equipment that will place the base material without rutting or pumping. Repair all defective portions and replace any unsuitable material with acceptable material, if the subbase does not meet the requirements of the Specifications.

300.3.04 Fabrication

General Provisions 101 through 150.

300.3.05 Construction

A. Draining and Leaving Materials Pits

Keep materials pits well drained while materials are being removed from them. After removing materials, leave pits in the condition required by Section 106 and Section 160.

B. Mining and Mixing in a Pit

Mine all local materials pits within the pit boundaries and grid depths established by the Engineer.

Mine all materials from top to bottom. Mix materials in the pit before hauling to the roadbed or plant.

Place materials in windrows or stockpiles with a dragline or backhoe. Blend the gradation and moisture strata from each pit to a uniform mixture.

When a rim ditch is required and its depth exceeds the specified grid depth of soil-cement material, include only the material above the grid depth as base material. Use this material for the windrow or stockpile of material to be used for soil-cement base unless the Engineer determines that below-the-grid material is satisfactory.

Only use ladder pans and scrapers for stockpiling and windrowing in pits that are less than 18 in (450 mm) deep.

After the preliminary mixing, prevent the coarse materials from segregating from the fine materials with loading equipment that continues to blend the material.

C. Placing Materials

1. Mixture Control

   The Engineer will determine the proportions of the materials to be used in compounding the base or subbase. The Engineer will determine the analysis basis of the components.

   Change the mix, if required by the Engineer, to ensure that the finished base meets the requirements of these Specifications.

2. Moisture Control

   Control the moisture content according to the specified requirements for each type of base or subbase.

   Add water uniformly, allow it to evaporate or aerate, and roll the materials as often as necessary, to control the moisture content within the limits specified.

3. Number of Courses

   Because the maximum thickness of base or subbase materials to be mixed or spread in one course varies with the equipment used, it is subject to the Engineer's approval. Ensure that the thickness meets the requirements of Subsection 300.3.05.C.5, "Compaction."

4. Widening Work

   Ensure that widening work conforms to Section 150.

   When widening in traffic areas, excavate an area that can be completed in the same day.

   When widening pavement on which there is traffic on both sides, stagger operations to keep the widening trench open in one lane of traffic at a time.

5. Compaction

   Compact the entire thickness of all bases and subbases to the specified maximum dry weight per cubic foot (meter), as determined by the method specified in the Section for each base or subbase.

   If any base or subbase is more than 6 in (150 mm) thick, construct according to the following table for layer thickness:

Material	Layer Thickness
Topsoil, Sand-Clay, or Chert	Two equal layers, or one layer not to exceed 8 in (200 mm)
Graded Aggregate	Two equal layers, or one layer not to exceed 8 in (200 mm)
Cement Stabilized Graded Aggregate	Two equal layers, or one layer not to exceed 8 in (200 mm)
Cement Stabilized Soil Aggregate	Two equal layers, or one layer not to exceed 8 in (200 mm)
Sand Bituminous	Two equal layers, or one layer not to exceed 8 in (200 mm)
Soil-Cement	One layer not to exceed 8 in (200 mm)

D. Meeting Surface Requirements

Produce a smooth, uniform surface that complies with these Specifications.

Rebuild any areas that do not meet the requirements or remove or add material to the area until the Engineer approves of the Work.

300.3.06 Quality Acceptance

A. Monitoring Quality Control

Ensure that the mixture and the materials used meet the following quality controls:

- Before producing any mixture for the Project, calibrate the electronic sensors, devices, or settings for proportioning all mixture ingredients by scale weight. Calibrate in the presence of the Engineer, the proportioning of every ingredient for all rates of production.
- Maintain a dated, written record of the most recent calibration. Post the calibration at the base plant and make the record available for the Engineer's inspection at all times. Format records as graphs, tables, charts, or mechanically prepared data. If the material changes, the rate of production changes by more than +/- 20%, the plant is not producing base material for more than two weeks, or if a component affecting the ingredient proportions has been repaired, replaced, or adjusted, check and recalibrate the proportions.
- Verify the moisture of the mixture being produced. Perform checks on ingredient proportioning and verify truck weight as directed by the Engineer.

  Provide quality control personnel and all necessary equipment to perform and document moisture tests. Perform moisture tests at a frequency of at least one test per hour of base plant production.

B. Repairing Defects

During construction: If materials that do not meet these Specifications are placed on the roadway at any time during construction, remove and replace them with acceptable materials as a part of the Pay Item for the base or subbase being constructed.

After construction: Promptly correct defects discovered in the surface finish, thickness, or compaction of the completed base or subbase before The Work is accepted.

- If the base, subbase, or shoulders are deficient in thickness and it is determined that the subgrade elevation is high, remove the materials, lower the subgrade, and reconstruct the course, according to these Specifications at no cost to the Department.
- If job conditions permit and the Engineer mandates, correct areas deficient in thickness by raising the elevation of the surface or adding material to the course.
- In other cases, the Engineer may determine that the defective portions must be entirely removed. Add, mix, spread, and compact new material according to the Specifications and at no cost to the Department.
- If a surface is less than 3 in (75 mm) deep, scarify the area to a depth of at least 3 in (75 mm), except in the case of stabilized bases or subbases. Mix and compact the new and old materials.
- Repair stabilized bases or subbases according to Section 301, Section 302, Section 310, or Section 316, whichever is applicable.

300.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

300.4 Measurement

Base and Subbase courses will be measured in accordance with the Specification Section for the item.

Bituminous prime will not be measured for separate payment.

300.4.01 Limits

General Provisions 101 through 150.

300.5 Payment

Base and Subbase courses will be paid for in accordance with the Specification Section for the item. Include the cost of furnishing and applying bituminous prime in the Unit Price Bid for each individual Base Item according to the applicable provisions of Section 412.

No separate payment will be made for adding water or for aerating or rolling for the purpose of adding water. Include the cost of controlling moisture content in the prices bid for the pertinent Pay Items.

Separate payment will be made only for clearing and grubbing listed in the Proposal or required in the Plans and designated a Pay Item by the Engineer.

No separate payment will be made for stripping excavation unless shown on the Plans and included in the Proposal as a Pay Item.

300.5.01 Adjustments

If the Contractor for the subbase or base is responsible for the subgrade under another Pay Item, no additional payment will be made for any repairs made to the subgrade, except as provided in Section 209.

If another party (not the Contractor) is responsible for the subgrade, removing unsuitable materials will be paid for according to the Earthwork Item in the Contract.

Include compaction, scarification, and any other preparation necessary for the subgrade in the Unit Price Bid for the pertinent base course.

Section 310—Graded Aggregate Construction

310.1 General Description

This work includes constructing a base, subbase or shoulder course composed of mineral aggregates. Construct according to these Specifications and to the lines, grades, thickness, and typical cross-sections shown on the Plans or established by the Engineer.

The provisions of Section 300 apply to this work.

310.1.01 Definitions

General Provisions 101 through 150.

310.1.02 Related References

A. Standard Specifications

Section 105—Control of Work

Section 300—General Specifications for Base and Subbase Courses

Section 412—Bituminous Prime

Section 815—Graded Aggregate

Section 821—Cutback Asphalt

Section 823—Cutback Asphalt Emulsion

B. Referenced Documents

AASHTO T 180

GDT 21

GDT 59

310.1.03 Submittals

General Provisions 101 through 150.

310.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Graded aggregate	815
Cutback asphalt, RC-30, RC-70, RC-250 or MC-30, MC-70, MC-250	821.2.01
Cutback Asphalt Emulsion, CBAE-2	823.2.01
Blotter material (sand)	412.3.05.G.3

310.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

310.3 Construction Requirements

310.3.01 Personnel

General Provisions 101 through 150.

310.3.02 Equipment

Provide equipment in satisfactory condition for proper construction of the base, subbase or shoulder course. Use any applicable equipment specified in Subsection 412.3.02, "Equipment" for Bituminous Prime.

310.3.03 Preparation

Prepare the subgrade or subbase as specified in Subsection 300.3.03.C, "Preparing the Subgrade" or Subsection 300.3.03.D, "Preparing the Subbase." Place graded aggregate materials only on dry, thawed subgrade or subbase.

310.3.04 Fabrication

General Provisions 101 through 150.

310.3.05 Construction

A. Placing Material

Use the central plant mix method unless producing aggregates (from an approved source or deposit) that conform to the requirements of Section 815.

Use the following steps to mix base and spread subbase or shoulder course.

1. Mixing

   When blending two sizes of aggregate, proportion the aggregate and water, if needed, into the central plant. Mix until producing a homogeneous and uniform mixture.

2. Spreading

   To obtain the specified thickness, uniformly spread materials to the proper depth with a mixture spreader. Do not use materials containing frost or frozen particles.

   a. One-Course Construction

      Lay one course to a maximum thickness of 8 in (200 mm) compacted.

   b. Multiple-Course Construction

      If the thickness of the base, subbase or shoulder course exceeds 8 in (200 mm), construct it in 2 or more courses of equal thickness.

B. Compacting Material

Use the following steps to compact and finish a base, subbase, or shoulder course.

1. Moisture Content

   Ensure that the moisture content of materials is uniformly distributed and allows compaction to the specified density.

   Unless approved by the Office of Materials and Research, no graded aggregate will be shipped to a project when the moisture content of the material exceeds two percent of optimum moisture.

2. Compaction

   After shaping the spread material to line, grade, and cross-section, roll to uniformly compact the course. If using Group 1 aggregate, roll to at least 98 percent of maximum dry density. If using Group 2 aggregate, roll to at least 100 percent of the maximum dry density.

   If using graded aggregate mixtures composed of either group as base for paved shoulders 6 ft (1.8 m) wide or less, compact to at least 96 percent of the maximum dry density.

   Regardless of compaction, ensure that the compacted base is sufficiently stable to support construction equipment without pumping. If the base material is unstable from too much moisture, dry and rework the base material. Dry and rework the underlying subgrade, if necessary.

   a. One-Course Construction

1) After compaction, shape to the required grade, line, and cross- section.
2) Add water as necessary to develop the proper moisture content.
3) Roll until the surface is smooth, closely knit, and free of cracks.
4) Correct all defects according to Subsection 300.3.06.B, "Repairing Defects."

b. Multiple-Course Construction

1) After compacting the first course, shape the surface again to line, grade, and cross section.
2) Add water as necessary to develop the proper moisture content.
3) Spread and compact the second and any succeeding courses without rolling the first course again.
4) Finish the surface according to the procedure specified for one-course construction.

c. Irregular Areas

In places inaccessible to the roller, obtain the required compaction with mechanical tampers approved by the Engineer. Apply the same density requirements as stated above in Subsection 310.3.05.B.

C. Finishing

Finish the surface of the subbase for Portland cement concrete pavement or the base of asphaltic concrete pavement with automatically controlled screed equipment when required by Subsection 300.3.02.H, "Fine Grading Machine" of the Specifications. Furnish, install, and maintain the sensing wires needed to control the finish operation as a part of the Pay Item. When automatically controlled screed equipment is not required, fine grading with motor graders is permitted.

Finish immediately after the placing and compacting operations. After finishing, compact the subbase again, according to Subsection 310.3.05.B, "Compacting Material."

D. Protecting the Base, Subbase or Shoulders

Maintain the course until the Engineer determines that it has cured sufficiently and is ready to prime. Maintain by additional wetting, rolling, and blading as necessary. Repair any defects according to Subsection 300.3.06.B, "Repairing Defects."

These protection measures do not relieve the Contractor of maintaining the Work until final acceptance as specified in Section 105.

E. Priming the Base

Apply bituminous prime according to Section 412 unless using:

- Graded aggregate base under Portland cement concrete pavement
- Graded aggregate base under asphaltic concrete 5 in (125 mm) or more in total thickness

310.3.06 Quality Acceptance

A. Compaction Tests

1. Determine the maximum dry density from representative samples of compacted material, according to AASHTO T180, Method D.
2. Determine the in-place density of finished courses according to GDT 21 or GDT 59 , where applicable.

B. Finished Surface

Check the finished surface of the base, subbase, or shoulder course as follows:

1. Check the longitudinal surface using a 15 ft (4.5 m) straightedge parallel to the centerline.
2. Check the transverse surface by using one of the following tools:
   - A template, cut true to the required cross-section and set with a spirit level on non-superelevated sections

- A system of ordinates, measured from a stringline
- A surveyor's level

3. Ensure that ordinates measured from the bottom of the template, stringline, or straightedge, to the surface do not exceed 1/4 in (6 mm) at any point. Rod readings shall not deviate more than 0.02 ft (6 mm) from required readings.
4. Correct any variations from these requirements immediately according to Subsection 300.3.06.B, "Repairing Defects."

C. Thickness Tolerances

1. Thickness Measurements
   a. Thickness requirements apply to shoulder construction where the Plans specify a uniform thickness, or where the shoulders will be surfaced.
   b. Determine the thickness of the base, subbase, or shoulder course, by making as many checks as necessary to determine the average thickness.
2. Deficient Thickness
   a. If any measurement is deficient in thickness more than 1/2 in (13 mm), make additional measurements to determine the deficient area.
   b. Correct any area deficient between 1/2 in (13 mm) and 1 in (25 mm) to the design thickness by using one of the following methods according to these Specifications:
      - Add additional quantities of the same materials and reconstruct to the required thickness
      - Leave in place and accept payment for the materials and area at ½ the Contract Unit Price for the deficient area.
   c. Correct any area deficient in thickness by more than 1 inch (25 mm) by adding additional quantities of the same material and reconstructing to the required thickness in accordance with these Specifications.
   d. If payment is made by the ton (megagram), payment for additional material to correct deficiencies will be made at the Contract Unit Price with no additional cost to the Department for scarification, mixing or compaction.
   e. If payment is made by the square yard (meter), no payment will be made for additional material required to correct deficiencies or for reconstructing deficient work.
3. Average Thickness
   a. The average thickness per linear mile (kilometer) is determined from all measurements within the mile (kilometer) increments except the areas deficient by more than 1/2 in (13 mm) and not corrected.
   b. The average thickness shall not exceed the specified thickness by more than 1/2 in (13 mm).
   c. If the basis of payment is per ton (megagram), and the average thickness for any mile (kilometer) increment exceeds the allowable 1/2 in (13 mm) tolerance, the excess quantity in that increment will be deducted from the Contractor's payments.
   d. The excess quantity is calculated by multiplying the average thickness that exceeds the allowable 1/2 in (13 mm) tolerance by the surface area of the base, subbase, or shoulder.
   e. If the basis of payment is per square yard (meter), no deduction will be made for excess thickness.

310.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

310.4 Measurement

A. Graded Aggregate

Where specified for payment by the ton (megagram), graded aggregate base, subbase or shoulder materials are measured in tons (megagrams), mixed and accepted. When hauling material to the roadway, the actual weight of each loaded vehicle is determined with an approved motor truck scale.

Where specified for payment by the square yard (meter) for a certain thickness, the surface length is measured along the centerline, and the width is specified on the Plans. Measure irregular areas, such as turnouts and intersections, by the square yard (meter).

B. Bituminous Prime

Bituminous prime is not measured for separate payment.

310.4.01 Limits

General Provisions 101 through 150.

310.5 Payment

A. Graded Aggregate

Graded aggregate base, subbase, or shoulder course will be paid for at the Contract Unit Price per ton (megagram) or per square yard (meter), complete, in place, and accepted. This payment shall be full compensation for:

- Materials
- Shaping and compacting the existing roadbed
- Loading, hauling, and unloading
- Crushing and processing
- Mixing
- Spreading
- Watering
- Compacting and shaping
- Maintenance
- Priming, when required
- All incidentals necessary to complete The Work

Payment will be made under:

Item No. 310	Graded aggregate (base, subbase, shoulder course)—including material	Per ton (megagram) or square yard (meter)
Item No. 310	Graded aggregate base and shoulder course— including material	Per ton (megagram) or square yard (meter)

310.5.01 Adjustments

General Provisions 101 through 150.

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SECTION 310 (MODIFICATION)
GRADED AGGREGATE CONSTRUCTION

310.1 GENERAL DESCRIPTION
RETAIN Section as written.

310.2 MATERIALS
RETAIN Section as written.

310.3 CONSTRUCTION REQUIREMENTS
RETAIN Section as written except as noted below.

ADD the following paragraph:

The Contractor shall perform Quality Control testing necessary to demonstrate that all material and workmanship complies with the requirements of the construction documents. All Quality Control testing performed by the Contractor shall incidental to the cost of the associated payment item. The Owner may perform representative Quality Acceptance testing of areas of work completed by the Contractor. Failing Quality Acceptance testing costs will be at Contractor expense.

310.4 MEASUREMENT
RETAIN Section as written.

310.5 PAYMENT
REPLACE Section in entirety, and replace with the following:

A. Graded Aggregate

Graded aggregate base, subbase, or shoulder course will be paid for at the Contract Unit Price per square yard, complete, in place, and accepted. This payment will be full compensation for:

- Materials
- Shaping and compacting the existing subgrade
- Loading, hauling, and unloading
- Crushing and processing
- Mixing
- Spreading
- Watering
- Compacting and shaping
- Maintenance
- Priming, when required
- All incidentals necessary to complete The Work

Payment will be made only under the following items:

Item GDOT 310-1	Graded Aggregate Base Course, 6” Depth – Per Square Yard.

These items will not be subject to price adjustment.

END OF SECTION 310 (MODIFICATION).

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(On System) Revised: July 11, 2014

DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

SUPPLEMENTAL SPECIFICATION

Section 400—Hot Mix Asphaltic Concrete Construction

Delete Section 400 and substitute the following:

400.1 General Description

This work includes constructing one or more courses of bituminous plant mixture on the prepared foundation or existing roadway surface. Ensure the mixture conforms with lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer.

This section includes the requirements for all bituminous plant mixtures regardless of the gradation of the aggregates, type and amount of bituminous material, or pavement use.

Acceptance of work is on a lot-to-lot basis according to the requirements of this Section and Section 106.

400.1.01 Definitions

Segregated Mixture: Mixture lacking homogeneity in HMA constituents of such magnitude there is a reasonable expectation of accelerated pavement distress or performance problems. May be quantified by measurable changes in temperature, gradation, asphalt content, air voids, or surface texture.

New Construction: A roadway section more than 0.5 mile (800 m) long that is not longitudinally adjacent to the existing roadway. If one or more lanes are added longitudinally adjacent to the existing lane, the lane(s) shall be tested under the criteria for a resurfacing project. If work is performed on the existing roadway including leveling, grade changes, widening and/or resurfacing then that lane shall be tested under the criteria for a resurfacing project.

Trench Widening: Widening no more than 4 ft. (1.2 m) in width.

Comparison sample: Opposite quarters of material sampled by the Contractor.

Independent Sample (Quality Assurance Sample): A sample taken by the Department to verify an acceptance decision without regard to any other sample that may also have been taken to represent the material in question.

Referee sample: A sample of the material retained during the quartering process which is used for evaluation if a comparison of Contractor and Departmental split sample test results is outside allowable tolerances.

400.1.02 Related References

A. Standard Specifications

Section 106—Control of Materials

Section 109—Measurement and Payment

Section 152—Field Laboratory Building

Section 413—Bituminous Tack Coat

Section 424—Bituminous Surface Treatment

Section 802—Coarse Aggregate for Asphaltic Concrete

Section 828—Hot Mix Asphaltic Concrete Mixtures

B. Referenced Documents

AASHTO T 315

AASHTO T 209

AASHTO T 202

AASHTO T 49

Department of Transportation Standard Operating Procedure (SOP) 15

Department of Transportation Standard Operating Procedure (SOP) 27

Department of Transportation Standard Operating Procedure (SOP) 40

GDT 38

GDT 73

GDT 78

GDT 83

GDT 119

GDT 125

GDT 126

GDT 134

GSP 15

GSP 21

QPL 1

QPL 2

QPL 7

QPL 26

QPL 30

QPL 39

QPL 41

QPL 45

QPL 65

QPL 67

QPL 70

QPL 77

400.1.03 Submittals

A. Invoices

Furnish formal written invoices from a supplier for all materials used in production of HMA when requested by the Department. Show the following on the Bill of Lading:

- Date shipped
- Quantity in tons (megagrams)
- Included with or without additives (for asphalt cement)

Purchase asphaltic cement directly from a supplier listed on Qualified Products List 7 and provide copies of Bill of Lading at the Department's request.

B. Paving Plan

Before starting asphaltic concrete construction, submit a written paving plan to the Engineer for approval. Include the following on the paving plan:

- Proposed starting date
- Location of plant(s)
- Rate of production
- Average haul distance(s)
- Number of haul trucks
- Paver speed feet (meter)/minute for each placement operation
- Mat width for each placement operation
- Number and type of rollers for each placement operation
- Sketch of the typical section showing the paving sequence for each placement operation
- Electronic controls used for each placement operation
- Temporary pavement marking plan

If staged construction is designated in the Plans or contract, provide a paving plan for each construction stage.

If segregation is detected, submit a written plan of measures and actions to prevent segregation. Work will not continue until the plan is submitted to and approved by the Department.

C. Job Mix Formula

Submit to the Engineer a written job mix formula proposed for each mixture type to be used based on an approved mix design. Furnish the following information for each mix:

- Specific project for which the mixture will be used
- Source and description of the materials to be used
- Mixture I.D. Number
- Proportions of the raw materials to be combined in the paving mixture
- Single percentage of the combined mineral aggregates passing each specified sieve
- Single percentage of asphalt by weight of the total mix to be incorporated in the completed mixture
- Single temperature at which to discharge the mixture from the plant
- Theoretical specific gravity of the mixture at the designated asphalt content
- Name of the person or agency responsible for quality control of the mixture during production

Do the following to have the formulas approved in accordance with SOP 40 "Approval of Contractor Job Mix Formulas" and to ensure their quality:

1. Submit proposed job mix formulas for review at least two weeks before beginning the mixing operations.
2. Do not start hot mix asphaltic concrete work until the Engineer has approved a job mix formula for the mixture to be used. No mixture will be accepted until the Engineer has given approval.
3. Provide mix designs for all SMA, Superpave and 4.75 mm mixes to be used. The Department will provide mix design results for other mixes to be used.
4. After a job mix formula has been approved, assume responsibility for the quality control of the mixtures supplied to the Department according to Subsection 106.01, "Source of Supply and Quantity of Materials."

D. Quality Control Program

Submit a Quality Control Plan to the Office of Materials and Testing for approval. The Quality Control Program will be included as part of the certification in the annual plant inspection report.

400.2 Materials

Ensure materials comply with the specifications listed in Table 1.

Table 1—Materials Specifications

Material	Subsection
Asphalt Cement, Grade Specified	820.2
Coarse Aggregates for Asphaltic Concrete	802.2.02
Fine Aggregates for Asphaltic Concrete	802.2.01
Mineral Filler	883.1
Heat Stable Anti-Stripping Additive	831.2.04
Hydrated Lime	882.2.03
Silicone Fluid (When approved by the Office of Materials and Testing)	831.2.05
Bituminous Tack Coat: PG 58-22, PG 64-22, PG 67-22	820.2
Hot Mix Asphaltic Concrete Mixtures	828
Fiber Stabilizing Additives	819

When approved by the Office of Materials and Testing and required in the Contract, provide Uintaite material, hereafter referred to by the common trade name Gilsonite, as a reinforcing agent for bituminous mixtures. Supply a manufacturer's certification that the Gilsonite is a granular solid which meets the following requirements:

Softening Point (AASHTO: T-53)	300-350 °F (150-175 °C)
Specific Gravity, 77 °F (25 °C) (AASHTO: T-228)	1.04 ± 0.02
Flash Point, COC (AASHTO: T-48)	550 °F (290 °C) Min.
Ash Content (AASHTO: T-111)	1.0% Max.
Penetration, 77 °F (25 °C), 100 gm., 5 sec. (AASHTO: T-49)	0

400.2.01 Delivery, Storage, and Handling

Storage of material is allowed in a properly sealed and insulated system for up to 24 hours. Ensure Stone Matrix Asphalt (SMA), Open-Graded Friction Course (OGFC), or Porous European Mix (PEM) mixtures are not stored more than 12 hours. Mixtures other than SMA, OGFC, or PEM may be stored up to 72 hours in a sealed and insulated system, equipped with an auxiliary inert gas system, with the Engineer's approval. Segregation, lumpiness, drain-down, or stiffness of stored mixture is cause for rejection of the mixture. The Engineer will not approve using a storage or surge bin if the mixture segregates, loses excessive heat, or oxidizes during storage.

The Engineer may obtain mixture samples or recover asphalt cement according to GDT 119. AASHTO T315, AASHTO T 202 and AASHTO T 49 will be used to perform viscosity and penetration tests to determine how much asphalt hardening has occurred.

A. Vehicles for Transporting and Delivering Mixtures

Ensure trucks used for hauling bituminous mixtures have tight, clean, smooth beds.

Follow these guidelines when preparing vehicles to transport bituminous mixtures:

1. Use an approved releasing agent from QPL 39 in the transporting vehicle beds, if necessary, to prevent the mixture from sticking to the bed. Ensure the releasing agent is not detrimental to the mixture. When applying the agent, drain the excess agent from the bed before loading. Remove from the project any transporting vehicles determined to contain unapproved releasing agents.
2. Protect the mixture with a waterproof cover large enough to extend over the sides and ends of the bed. Securely fasten the waterproof cover before the vehicle begins moving.
3. Insulate the front end and sides of each bed with an insulating material with the following specifications:
    - Consists of builders insulating board or equivalent
    - Has a minimum "R" value of 4.0
    - Can withstand approximately 400 °F (200 °C) temperatures

    Install the insulating material so it is protected from loss and contamination. A "Heat Dump Body" may be used in lieu of insulation of the bed. "Heat Dump Body" refers to any approved transport vehicle ~~is~~ capable of diverting engine exhaust and transmitting heat evenly throughout the dump body to keep asphalt at required temperature. Mark the "Heat Dump Body" clearly with "OPEN" and "CLOSE" position at the exhaust diverter. Install a padlock and lock it in the "OPEN" position when the "Heat Dump Body" is used to transport bituminous mixtures.
4. Mark each transporting vehicle with a clearly visible identification number.
5. Create a hole in each side of the bed so the temperature of the loaded mixture can be checked. Ensure the placement of these holes are located to assure the thermometer is being placed in the hot mix asphaltic concrete mixtures.

Ensure the mixture is delivered to the roadway at a temperature within ± 20 °F (± 11 °C) of the temperature on the job mix formula.

If the Engineer determines a truck may be hazardous to the Project or adversely affect the quality of the work, remove the truck from the project.

B. Containers for Transporting, Conveying, and Storing Bituminous Material

To transport, convey, and store bituminous material, use containers free of foreign material and equipped with sample valves. Bituminous material will not be accepted from conveying vehicles if material has leaked or spilled from the containers.

400.3 Construction Requirements

400.3. 01 Personnel

General Provisions 101 through 150.

400.3.02 Equipment

Hot mix asphaltic concrete plants producing mix for Department use are governed by Quality Assurance for Hot Mix Asphaltic Concrete Plants in Georgia, Laboratory Standard Operating Procedure No. 27.

The Engineer will approve the equipment used to transport and construct hot mix asphaltic concrete. Ensure the equipment is in satisfactory mechanical condition and can function properly during production and placement operations. Place the following equipment at the plant or project site:

A. Field Laboratory

Provide a field laboratory according to Section 152.

B. Plant Equipment

1. Scales

   Provide scales as follows:

   a. Furnish (at the Contractor's expense) scales to weigh bituminous plant mixtures, regardless of the measurement method for payment.

   b. Ensure the weight measuring devices provide documentation complying with Subsection 109.01, "Measurement and Quantities."

   c. Provide weight devices recording the mixture net weights delivered to the truck when not using platform scales. A net weight system will include, but is not limited to:

      - Hopper or batcher-type weight systems delivering asphaltic mixture directly to the truck
      - Fully automatic batching equipment with a digital recording device

   d. Use a net weight printing system only with automatic batching and mixing systems approved by the Engineer.

   e. Ensure the net weight scale mechanism or device manufacturer, installation, performance, and operation meets the requirements in Subsection 109.01, "Measurement and Quantities"

   f. Provide information on the Project tickets according to Department of Transportation SOP-15.

2. Time-Locking Devices

   Furnish batch type asphalt plants with automatic time-locking devices controlling the mixing time automatically. Construct these devices to ensure the operator cannot shorten or eliminate any portion of the mixing cycle.

3. Surge- and Storage-Systems

   Provide surge and storage bins as follows:

   a. Ensure bins for mixture storage are insulated and have a working seal, top and bottom, to prevent outside air infiltration and to maintain an inert atmosphere during storage. Bins not intended as storage bins may be used as surge bins to hold hot mixtures for part of the working day. However, empty these surge bins completely at the end of the working day.

   b. Ensure surge and storage bins can retain a predetermined minimum level of mixture in the bin when the trucks are loaded.

   c. Ensure surge and storage systems do not contribute to mix segregation, lumpiness, drain-down, or stiffness.

   d. Ensure the scale mechanism or device manufacture, installation, performance, and operation meets the requirements in Subsection 109.01"Measurement and Quantities".

4. Controls for Dust Collector Fines

   Control dust collection as follows:

   a. When collecting airborne aggregate particles and returning them to the mixture, have the return system meter all or part of the collected dust uniformly into the aggregate mixture and waste the excess. The collected dust percentage returned to the mixture is subject to the Engineer's approval.

   b. When the collected dust is returned directly to the hot aggregate flow, interlock the dust feeder with the hot aggregate flow and meter the flow to maintain a constant, proportioned and uniform flow.

5. Mineral Filler Supply System

   When mineral filler is required as a mixture ingredient:

   a. Use a separate bin and feed system to store and proportion the required quantity into the mixture with uniform distribution.

   b. Control the feeder system with a proportioning device meeting these specifications:

      - Is accurate to within ± 10 percent of the filler required
      - Has a convenient and accurate means of calibration
      - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes

   c. Provide flow indicators or sensing devices for the mineral filler system and interlock them with the plant controls to interrupt the mixture production if mineral filler introduction fails to meet the required target value after no longer than 60 seconds.

   d. Add mineral filler to the mixture as follows, according to the plant type:

      - Batch Type Asphalt Plant. Add mineral filler to the mixture in the weigh hopper.
      - Continuous Plant Using Pugmill Mixers. Feed the mineral filler into the hot aggregate before it is introduced into the mixer to ensure dry mixing is accomplished before the bituminous material is added.
      - Continuous Plants Using the Drier-Drum Mixers. Add the mineral filler to ensure dry mixing is accomplished before the bituminous material is added and ensure the filler does not become entrained into the air stream of the drier.

6. Hydrated Lime Treatment System

   When hydrated lime is required as a mixture ingredient:

   a. Use a separate bin and feed system to store and proportion the required quantity into the mixture.

   b. Ensure the aggregate is uniformly coated with hydrated lime aggregate before adding the bituminous material to the mixture. Ensure the addition of hydrated lime will not become entrained in the exhaust system of the drier or plant.

   c. Control the feeder system with a proportioning device meeting these specifications:

      - Is accurate to within ± 10 percent of the amount required
      - Has a convenient and accurate means of calibration
      - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes and to ensure mixture produced is properly treated with lime

   d. Provide flow indicators or sensing devices for the hydrated lime system and interlock them with the plant controls to interrupt mixture production if hydrated lime introduction fails to meet the required target value after no longer than 60 seconds.

7. Net Weight Weighing Mechanisms

Certify the accuracy of the net weight weighing mechanisms by an approved registered scale serviceperson at least once every 6 months. Check the accuracy of net weight weighing mechanisms at the beginning of Project production and thereafter as directed by the Engineer. Check mechanism accuracy as follows:

a. Weigh a load on a set of certified commercial truck scales. Ensure the difference between the printed total net weight and weight obtained from the commercial scales is no greater than 4 lbs/1,000 lbs (4 kg/Mg) of load.

   Check the accuracy of the bitumen scales as follows:

   - Use standard test weights.
   - If the checks indicate printed weights are out of tolerance, have a registered scale serviceperson check the batch scales and certify the accuracy of the printer.
   - While the printer system is out of tolerance and before its adjustment, continue production only if using a set of certified truck scales to determine the truck weights.

b. Ensure plants using batch scales maintain ten 50 lb (25 kg) standard test weights at the plant site to check batching scale accuracy.

c. Ensure plant scales used only to proportion mixture ingredients, and not to determine pay quantities, are within two percent throughout the range.

8. Fiber Supply System

   When stabilizing fiber is required as a mixture ingredient:

   a. Use a separate feed system to store and proportion by weight the required quantity into the mixture with uniform distribution.

   b. Control the feeder system with a proportioning device meeting these Specifications:

      - Is accurate to within ± 10 percent of the amount required. Automatically adjusts the feed rate to maintain the material within this tolerance at all times
      - Has a convenient and accurate means of calibration
      - Provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds (kg) per minute, to verify feed rate
      - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes

   c. Provide flow indicators or sensing devices for the fiber system and interlock them with the plant controls to interrupt the mixture production if fiber introduction fails or if the output rate is not within the tolerances given above.

   d. Introduce the fiber as follows:

      - When a batch type plant is used, add the fiber to the aggregate in the weigh hopper. Increase the batch dry mixing time by 8 to 12 seconds from the time the aggregate is completely emptied into the mixer to ensure the fibers are uniformly distributed prior to the injection of asphalt cement into the mixer.
      - When a continuous or drier-drum type plant is used, add the fiber to the aggregate and uniformly disperse prior to the injection of asphalt cement. Ensure the fibers will not become entrained in the exhaust system of the drier or plant.

9. Crumb Rubber Modifier Supply System

   When specified, crumb rubber modifier may be substituted at the Contractor's discretion to produce a PG 76-22 asphaltic cement at the production facility in accordance with Section 820:

   a. Use a separate feed system to store and proportion by weight of the total asphaltic cement, the required percentage of crumb rubber into the mixture.

   b. Control the feeder system with a proportioning device meeting these Specifications:

- Is accurate to within ± 6 percent of the amount required. Automatically adjusts the feed rate to maintain the material within this tolerance at all times.
- Has a convenient and accurate means of calibration.
- Provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds per minute, to verify feed rate. Ensure the supply system reports the feed in 1 lb (454 gr.) increments using load cells enabling the user to monitor the depletion of the modifier. Monitoring the system volumetrically will not be allowed.
- Interlocks with the aggregate weigh system and asphaltic cement pump to maintain the correct proportions for all rates of production and batch sizes.

c. Provide flow indicators or sensing devices for the system and interlock them with the plant controls to interrupt the mixture production if the crumb rubber introduction output rate is not within the ± 6 percent tolerance given above. This interlock will immediately notify the operator if the targeted rate exceeds introduction tolerances. All plant production will cease if the introduction rate is not brought back within tolerance after 30 seconds. When the interlock system interrupts production and the plant has to be restarted, upon restarting operations; ensure the modifier system runs until a uniform feed can be observed on the output display. Ensure all mix produced prior to obtaining a uniform feed is rejected.

d. Introduce the crumb rubber modifier as follows:

- When a batch type plant is used, add the rubber to the aggregate in the weigh hopper. Increase the batch dry mixing time by 15 to 20 seconds from the time the aggregate is completely emptied into the mixer to ensure the modifiers are uniformly distributed prior to the injection of asphalt cement into the mixer. Increase the batch wet mix time by 15 to 20 seconds to ensure the crumb rubber modifier is uniformly blended with the asphaltic cement.
- When a continuous or drier-drum type plant is used, add the rubber to the aggregate and uniformly disperse prior to the injection of asphalt cement. The point of introduction in the drum mixer will be approved by the Engineer prior to production. Ensure the crumb rubber modifier will not become entrained in the exhaust system of the drier or plant and will not be exposed to the drier flame at any point after induction.

e. No separate measurement and payment will be made if Contractor elects to utilize crumb rubber.

C. Equipment at Project Site

1. Cleaning Equipment

   Provide sufficient hand tools and power equipment to clean the roadway surface before placing the bituminous tack coat. Use power equipment compling with Subsection 424.3.02.F, “Power Broom and Power Blower.”

2. Pressure Distributor

   To apply the bituminous tack coat, use a pressure distributor complying with Subsection 424.3.02.B, “Pressure Distributor.”

3. Bituminous Pavers

   To place hot mix asphaltic concrete, use bituminous pavers that can spread and finish courses that are:

   - As wide and deep as indicated on the Plans
   - True to line, grade, and cross section
   - Smooth
   - Uniform in density and texture

a. Continuous Line and Grade Reference Control. Furnish, place, and maintain the supports, wires, devices, and materials required to provide continuous line and grade reference control to the automatic paver control system.

b. Automatic Screed Control System. Equip the bituminous pavers with an automatic screed control system actuated from sensor-directed mechanisms or devices that will maintain the paver screed at a pre-determined transverse slope and elevation to obtain the required surface.

c. Transverse Slope Controller. Use a transverse slope controller capable of maintaining the screed at the desired slope within ± 0.1 percent. Do not use continuous paving set-ups resulting in unbalanced screed widths or off-center breaks in the main screed cross section unless approved by the Engineer.

d. Screed Control. Equip the paver to permit the following four modes of screed control. Ensure the method used is approved by the Engineer.

- Automatic grade sensing and slope control
- Automatic dual grade sensing
- Combination automatic and manual control
- Total manual control

Ensure the controls are referenced with a taut string or wire set to grade, or with a ski-type device or mobile reference at least 30 ft (9 m) long when using a conventional ski. Approved non-contacting laser or sonar-type skis listed on QPL 91 "Georgia's List of Approved Non-contacting Laser and Sonar-type Electronic Grade and Slope Controls" may be used in lieu of conventional 30 ft (9m) skis. Under limited conditions, a short ski or shoe may be substituted for a long ski on the second paver operating in tandem, or when the reference plane is a newly placed adjacent lane.

Automatic screed control is required on all Projects; however, when the Engineer determines that Project conditions prohibit the use of such controls, the Engineer may waive the grade control, or slope control requirements, or both.

e. Paver Screed Extension. When the laydown width requires a paver screed extension, use bolt-on screed extensions to extend the screeds, or use an approved mechanical screed extension device. When the screed is extended, add auger extensions to assure a length of no more than 18 inches (0.5 m) from the auger to the end gate of the paver. Auger extensions may be omitted when paving variable widths. Ensure the paver is equipped with tunnel extensions when the screed and augers are extended.

NOTE: Do not use extendible strike-off devices instead of approved screed extensions. Only use a strike-off device in areas that would normally be luted in by hand labor.

4. Compaction Equipment

Ensure that the compaction equipment is in good mechanical condition and can compact the mixture to the required density. The compaction equipment number, type, size, operation, and condition is subject to the Engineer's approval

5. Materials Transfer Vehicle (MTV)

a. Use a Materials Transfer Vehicle (MTV) when placing asphaltic concrete mixtures on Projects on the state route system with the following conditions. If a project fails to meet any one of the following conditions, the MTV's use is not required other than during the placement of SMA, PEM and OGFC mixtures. MTVs are required during the placement of SMA, PEM and OGFC mixtures regardless of ADT, project length and mixture tonnage unless waived at the discretion of the Office of Materials and Testing.

1) When to use:

- The ADT is equal to or greater than 6000

- The project length is equal to or greater than 3000 linear feet (915 linear meters)
- The total tonnage (megagrams) of all asphaltic concrete mixtures is greater than 2000 tons (1815 Mg)

2) Where to use:

- Mainline of the traveled way
- Collector/distributor (C/D) lanes on Interstates and limited access roadways
- Leveling courses at the Engineer's discretion

3) Do not use the MTV for the following conditions:

- A resurfacing project that only 9.5 mm mix is required.
- A project with lane width that is equal or less than 11 feet (3.4 m).
- A passing lane only project.
- When noted on the plans.

b. Ensure the MTV and conventional paving equipment meet the following requirements:

1) MTV

- Has a truck unloading system which receives mixture from the hauling equipment and independently deliver mixtures from the hauling equipment to the paving equipment.
- Has mixture remixing capability approved by the Office of Materials and Testing and is listed on QPL 88 "Georgia's List of Approved Materials Transfer Vehicles".
- Provides to the paver a homogeneous, non-segregated mixture of uniform temperature with no more than 20 °F(11 °C) difference between the highest and lowest temperatures when measured transversely across the width of the mat in a straight line at a distance of one foot to twenty-five feet (0.3 m to 7.6 m) from the screed while the paver is operating. Ensure that the MTV is capable of providing the paver a consistent material flow that is sufficient to prevent the paver from stopping between truck exchanges.

2) Conventional Paving Equipment

- Has a paver hopper insert with a minimum capacity of 14 tons (13 Mg) installed in the hopper of conventional paving equipment when an MTV is used.

c. If the MTV malfunctions during spreading operations, discontinue placement of hot mix asphaltic concrete after there is sufficient mix placed to maintain traffic in a safe manner. However, placement of hot mix asphaltic concrete in a lift not exceeding 2 in. (50 mm) may continue until any additional hot mix in transit at the time of the malfunction has been placed. Cease spreading operations thereafter until the MTV is operational.

d. Ensure the MTV is empty when crossing a bridge and is moved across without any other Contractor vehicles or equipment on the bridge. Move the MTV across a bridge in a travel lane and not on the shoulder. Ensure the speed of the MTV is no greater than 5 mph (8 kph) without any acceleration or deceleration while crossing a bridge.

400.3.03 Preparation

A. Prepare Existing Surface

Prepare the existing surface as follows:

1. Clean the Existing Surface. Before applying hot mix asphaltic concrete pavement, clean the existing surface to the Engineer's satisfaction.
2. Patch and Repair Minor Defects

   Before placing leveling course:

a. Correct potholes and broken areas requiring patching in the existing surface and base as directed by the Engineer.

b. Cut out, trim to vertical sides, and remove loose material from the areas to be patched.

c. Prime or tack coat the area after being cleaned. Compact patches to the Engineer's satisfaction. Material for patches does not require a job mix formula, but must meet the gradation range shown in Section 828. The Engineer must approve the asphalt content to be used.

3. Apply Bituminous Tack Coat

Apply the tack coat according to Section 413. The Engineer will determine the application rate, which must be within the limitations Table 2.

Table 2—Application Rates for Bituminous Tack, gal/yd² (L/m²)

	Minimum	Maximum
Under OGFC and PEM Mixes	0.06 (0.270)	0.08 (0.360)
All Other Mixes	0.04 (0.180)	0.06(0.270)
*On thin leveling courses and freshly placed asphaltic concrete mixes, reduce the application rate to 0.02 to 0.04 gal/yd² (0.09 to 0.18 L/m²).		

B. Place Patching and Leveling Course

1. When the existing surface is irregular, bring the surface area to the proper cross section and grade with a leveling course of hot mix asphaltic concrete materials.
2. Place leveling at the locations and in the amounts directed by the Engineer.
3. Use leveling course mixtures meeting the requirements of the job mix formulas defined in:
   - Subsection 400.3.05.A, "Observe Composition of Mixtures"
   - Section 828
   - Leveling acceptance schedules in Subsection 400.3.06.A, "Acceptance Plans for Gradation and Asphalt Cement Content"
4. If the leveling and patching mix type is undesignated, determine the mix type by the thickness or spread rate according to Table 3, but do not use 4.75 mm mix on interstate projects.

Table 3—Leveling and Patching Mix Types

Thickness	Rate of Spread	Type of Mix
Up to 0.75 in (19 mm)	Up to 85 lbs/yd² (45 kg/m²)	4.75 mm Mix or 9.5 mm Superpave Type 1
0.75 to 1.5 in (19 to 38 mm)	85 to 165 lbs/yd²(45 to 90 kg/m²)	9.5 mm Superpave Type 2
1.5 to 2 in (38 to 50 mm)	165 to 220 lbs/yd² (90 to 120 kg/m²)	12.5 mm Superpave *
2 to 2.5 in (50 to 64 mm)	220 to 275 lbs/yd² (120 to 150 kg/m²)	19 mm Superpave *
Over 2.5 in (64 mm)	Over 275 lbs/yd² (150 kg/m²)	25 mm Superpave

* These mixtures may be used for isolated patches no more than 6 in. (150 mm) deep and no more than 4 ft. (1.2 m) in diameter or length.

400.3.04 Fabrication

General Provisions 101 through 150.

400.3.05 Construction

Provide the Engineer at least one day's notice prior to beginning construction, or prior to resuming production if operations have been temporarily suspended.

A. Observe Composition of Mixtures

1. Calibration of plant equipment

   If the material changes, or if a component affecting the ingredient proportions has been repaired, replaced, or adjusted, check and recalibrate the proportions.

   Calibrate as follows:

   a. Before producing mixture for the Project, calibrate by scale weight the electronic sensors or settings for proportioning mixture ingredients.
   b. Calibrate ingredient proportioning for all rates of production.

2. Mixture control

   Compose hot mix asphaltic concrete from a uniform mixture of aggregates, bituminous material, and if required, hydrated lime, mineral filler, or other approved additive.

   Ensure the constituents proportional to produce mixtures meeting the requirements in Section 828. The general composition limits prescribed are extreme ranges within which the job mix formula must be established. Base mixtures on a design analysis that meets the requirements of Section 828.

   Ensure the field performance of the in-place mixtures meet the requirements of Subsection 828.2B for Permeability, Moisture Susceptibility, Rutting Susceptibility and Fatigue. In-place mix may be evaluated for compliance with Subsection 828.2.B at the discretion of the State Bituminous Construction Engineer under the following conditions:

   - Deviates greater than 10 percent on gradation for mixture control sieves from the approved Job Mix Formula based on Acceptance or Independent Samples.
   - Deviates greater than 0.7 percent in asphalt cement content from the approved Job Mix Formula based on Acceptance or Independent Samples.
   - The calculated mean pavement air voids result in an adjusted pay factor less than 0.80 or any single sub lot result in mean pavement air voids exceeding 10.5 percent.
   - Mix produced not using an approved mix design and/or job mix formula.

   Remove and replace any material determined to not meet the requirements established in Section 828.2.B at the Contractor's expense.

   If control test results show the characteristic tested does not conform to the job mix formula control tolerances given in Section 828, take immediate action to ensure that the quality control methods are effective.

   Control the materials to ensure extreme variations do not occur. Maintain the gradation within the composition limits in Section 828.

B. Prepare Bituminous Material

Uniformly heat the bituminous material to the temperature specified in the job mix formula with a tolerance of ± 20 °F (± 11 °C).

C. Prepare the Aggregate

Prepare the aggregate as follows:

1. Heat the aggregate for the mixture, and ensure a mix temperature within the limits of the job mix formula.
2. Do not contaminate the aggregate with fuel during heating.
3. Reduce the absorbed moisture in the aggregate until the asphalt does not separate from the aggregate in the prepared mixture. If this problem occurs, the Engineer will establish a maximum limit for moisture content in the aggregates. When this limit is established, maintain the moisture content below this limit.

D. Prepare the Mixture

Proportion the mixture ingredients as necessary to meet the required job mix formula. Mix until a homogenous mixture is produced.

1. Add Mineral Filler

   When mineral filler is used, introduce it in the proper proportions and as specified in Subsection 400.3.02.B.5, "Mineral Filler Supply System."

2. Add Hydrated Lime

   When hydrated lime is included in the mixture, add it at a rate specified in Section 828 and the job mix formula. Use methods and equipment for adding hydrated lime according to Subsection 400.3.02.B.6, "Hydrated Lime Treatment System."

   Add hydrated lime to the aggregate by using Method A or B as follows:

   Method A—Dry Form—Add hydrated lime in its dry form to the mixture as follows, according to the type of plant:

   a. Batch Type Asphalt Plant: Add hydrated lime to the mixture in the weigh hopper or as approved and directed by the Engineer.
   b. Continuous Plant Using Pugmill Mixer: Feed hydrated lime into the hot aggregate before it is introduced into the mixer to ensure dry mixing is complete before the bituminous material is added.
   c. Continuous Plant Using Drier-Drum Mixer: Add hydrated lime so to ensure the lime will not become entrained into the air stream of the drier and to ensure thorough dry mixing will be complete before the bituminous material is added.

   Method B—Lime/Water Slurry—Add the required quantity of hydrated lime (based on dry weight) in lime/water slurry form to the aggregate. This solution consists of lime and water in concentrations as directed by the Engineer.

   Equip the plant to blend and maintain the hydrated lime in suspension and to mix the hydrated lime with the aggregates uniformly in the proportions specified.

3. Add Stabilizing Fiber

   When stabilizing fiber is included in the mixture, add stabilizing fiber at a rate specified in Section 819 and the Job Mix Formula. Introduce it as specified in Subsection 400.3.02.B.8, "Fiber Supply System."

4. Add Gilsonite Modifier

   When approved by the Office of Materials and Testing and required by the Contract, add the Gilsonite modifier to the mixture at a rate to ensure eight percent by weight of the asphalt cement is replaced by Gilsonite. Use either PG 64-22 or PG 67-22 asphalt cement as specified in Subsection 820.2.01. Provide suitable means to calibrate and check the rate of Gilsonite being added. Introduce Gilsonite modifier by either of the following methods.

   a. For batch type plants, incorporate Gilsonite into the pugmill at the beginning of the dry mixing cycle. Increase the dry mix cycle by a minimum of 10 seconds after the Gilsonite is added and prior to introduction of the asphalt cement. For this method, supply Gilsonite in plastic bags to protect the material during shipment and handling and store the modifier in a waterproof environment. Ensure the bags are capable of being completely melted and uniformly blended into the combined mixture.

Gilsonite may also be added through a mineral filler supply system as described in Subsection 400.3.02.B.5, "Mineral Filler Supply System." Ensure the system is capable of injecting the modifier into the weigh hopper near the center of the aggregate batching cycle so the material can be accurately weighed.

b. For drum drier plants, add Gilsonite through the recycle ring or through an acceptable means which will introduce the Gilsonite prior to the asphalt cement injection point. The modifier must proportionately feed into the drum mixer at the required rate by a proportioning device which shall be accurate within ± 10 percent of the amount required. Ensure the entry point is away from flames and the Gilsonite will not be caught up in the air stream and exhaust system.

5. Materials from Different Sources

Do not use mixtures prepared from aggregates from different sources intermittently. This will cause the color of the finished pavement to vary.

E. Observe Weather Limitations

Do not mix and place asphaltic concrete if the existing surface is wet or frozen. Do not lay asphaltic concrete OGFC mix or PEM at air temperatures below 60 ºF (16 ºC). When using a MTV, OGFC mix or PEM may be placed at 55 ºF (13 ºC) when approved by the Engineer. For other courses, follow the temperature guidelines in the following table:

Table 4—Lift Thickness Table

Lift Thickness	Minimum Temperature
1 in (25 mm) or less	55 °F (13 °C)
1.1 to 2 in (26 mm to 50 mm)	45 °F (8 °C)
2.1 to 3 in (51 mm to 75 mm)	40 °F (4 °C)
3.1 to 4 in (76 mm to 100 mm)	35 °F (2 °C)
4.1 to 8 in (101 mm to 200 mm)	32 °F (0 °C) and rising. Base Material must not be frozen.

F. Perform Spreading and Finishing

Spread and finish the course as follows:

1. Determine the course's maximum compacted layer thickness by the type mix being used according to Table 5.

Table 5—Maximum Layer Thickness

Mix Type	Minimum Layer Thickness	Maximum Layer Thickness	Maximum Total Thickness
25 mm Superpave	2 1/2 in (64 mm)	4 in (100 mm) *	—
19 mm Superpave	1 3/4 in (44 mm)	3 in (75 mm) *	—
12.5 mm Superpave	1 3/8 in (35 mm)	2 1/2 in (64 mm)**	8 in (200 mm)
9.5 mm Superpave Type 2	1 1/8 in.(28 mm)	1 1/2 in (38 mm)**	4 in (100 mm)
9.5 mm Superpave Type 1	7/8 in (22 mm)	1 1/4 in (32 mm)	4 in (100 mm)
4.75 mm Mix	3/4 in (19 mm)	1 1/8 in (28 mm)	2 in (50 mm)
9.5 mm OGFC	55 lbs/yd² (30 kg/m²)	65 lbs/yd² (36 kg/m²)	—

Mix Type	Minimum Layer Thickness	Maximum Layer Thickness	Maximum Total Thickness
12.5 mm OGFC	85 lbs/yd² (47 kg/m²)	95 lbs/yd² (53 kg/m²)	—
12.5 mm PEM	110 lbs/yd² (80 kg/m²)	165 lbs/yd² (90 kg/m²)	—
9.5 mm SMA	1 1/8 in (28 mm)	1 1/2 in (38 mm)	4 in (100 mm)
12.5 mm SMA	1 3/8 in (35 mm)	3 in (75 mm)	6 in (150 mm)
19 mm SMA	1 3/4 in (44 mm)	3 in (75 mm)	—
* Allow up to 6 in (150 mm) per lift on trench widening. **Place 9.5 mm Superpave and 12.5 mm Superpave up to 4 in (100 mm) thick for driveway and side road transition.			

2. Unload the mixture into the paver hopper or into a device designed to receive the mixture from delivery vehicles.
3. Except for leveling courses, spread the mixture to the loose depth for the compacted thickness or the spread rate. Use a mechanical spreader true to the line, grade, and cross section specified.
4. For leveling courses, use a motor grader equipped with a spreader box and smooth tires to spread the material or use a mechanical spreader meeting the requirements in Subsection 400.3.02.C, "Equipment at Project Site."
5. Obtain the Engineer's approval for the sequence of paving operations, including paving the adjoining lanes. Minimize tracking tack onto surrounding surfaces.
6. Ensure the outside edges of the pavement being laid are aligned and parallel to the roadway center line.
7. For New Construction or Resurfacing Contracts containing multiple lifts or courses, arrange the width of the individual lifts so the longitudinal joints of each successive lift are offset from the previous lift at least 1 ft (300 mm). This requirement does not apply to the lift immediately over thin lift leveling courses.

   Ensure the longitudinal joint(s) in the surface course and the mix immediately underneath asphaltic concrete OGFC or PEM are at the lane line(s).

NOTE: Perform night work with artificial light provided by the Contractor and approved by the Engineer.

8. Where mechanical equipment cannot be used, spread and rake the mixture by hand. Obtain the Engineer's approval of the operation sequence, including compactive methods, in these areas.
9. Keep small hand raking tools clean and free from asphalt build up. Do not use fuel oil or other harmful solvents to clean tools during the work.
10. Do not use mixture with any of these characteristics:
    - Segregated
    - Nonconforming temperature
    - Deficient or excessive asphalt cement content
    - Otherwise unsuitable to place on the roadway in the work
11. Remove and replace mixture placed on the roadway that the Engineer determines has unacceptable blemish levels from segregation, raveling, streaking, pulling and tearing, or other deficient characteristics. Replace with acceptable mixture at the Contractor's expense. Do not continually place mixtures with deficiencies.

    Do not place subsequent course lifts over another lift or course placed on the same day while the temperature of the previously placed mix is 140 °F (60 °C) or greater.
12. Obtain the Engineer's approval of the material compaction equipment. Perform the rolling as follows:

a. Begin the rolling as close behind the spreader as possible without causing excessive distortion of the asphaltic concrete surface.

b. Continue rolling until roller marks are no longer visible.

c. Use pneumatic-tired rollers with breakdown rollers on all courses except asphaltic concrete OGFC, PEM and SMA or other mixes designated by the Engineer.

13. If applicable, taper or "feather" asphaltic concrete from full depth to a depth no greater than 0.5 in (13 mm) along curbs, gutters, raised pavement edges, and areas where drainage characteristics of the road must be retained. The Engineer will determine the location and extent of tapering.

G. Maintain Continuity of Operations

Coordinate plant production, transportation, and paving operations to maintain a continuous operation. If the spreading operations are interrupted, construct a transverse joint if the mixture immediately behind the paver screed cools to less than 250 ºF (120 ºC).

H. Construct the Joints

1. Construct Transverse Joints

   a. Construct transverse joints to facilitate full depth exposure of the course before resuming placement of the affected course.

   b. Properly clean and tack the vertical face of the transverse joint before placing additional material.

   NOTE: Never burn or heat the joint by applying fuel oil or other volatile materials.

   c. Straightedge transverse joints immediately after forming the joint.

   d. Immediately correct any irregularity that exceeds 3/16 in. in 10 ft (5 mm in 3 m).

2. Construct Longitudinal Joints

   Clean and tack the vertical face of the longitudinal joint before placing adjoining material. Construct longitudinal joints so that the joint is smooth, well sealed, and bonded.

3. Construction Joint Detail for OGFC and PEM Mixtures

   In addition to meeting joint requirements described above, construct joints and transition areas for 12.5 mm OGFC and 12.5 mm PEM mixtures as follows:

   a. For projects which do not have milling included as a pay item:

      1) Place OGFC mixture meeting gradation requirements of 9.5 mm OGFC as specified in Section 828 on entrance and exit ramp gore areas and end of project construction joints.

         - Taper mixture from 3/8 in (10 mm) at end of project to full plan depth within maximum distance of spread for one load of mixture
         - Taper mixture placed on gore areas from thickness of the edge of the mainline to 3/8 in (10 mm) at the point of the ramp transverse joint.

      2) Construct the ramp transverse joint at the point specified in the plans or as directed by the Engineer.

      3) Mixture placed in the transition and gore areas will be paid for at the contract unit price for 12.5 mm OGFC or 12.5 mm PEM as applicable.

   b. For projects which have milling included as a pay item:

      1) Taper milling for a distance of no less than 50 ft (15 m) to a depth of 2 1/4 in (59 mm) at the point of the transverse joint

      2) Taper thickness, if needed, of the dense-graded surface mix within the 50 ft (15 m) distance to 1 1/2 in (40 mm) at the point of the transverse joint

3) Taper thickness of the 12.5 mm OGFC or 12.5 mm PEM to 3/4 in (19 mm) to ensure the material ties in at grade level with the existing surface at the point of the transverse joint

I. Protect the Pavement

Protect sections of the newly finished pavement from traffic until the traffic will not mar the surface or alter the surface texture. If directed by the Engineer, use artificial methods to cool the newly finished pavement to open the pavement to traffic more quickly.

J. Modify the Job Mix Formula

If the Engineer determines that undesirable mixture or mat characteristics are being obtained, the job mix formula may require immediate adjustment.

400.3.06 Quality Acceptance

A. Acceptance Plans for Gradation and Asphalt Cement Content

The Contractor will randomly sample and test mixtures for acceptance on a lot basis. The Department will monitor the Contractor testing program and perform comparison and quality assurance testing. The Contractor's Quality Control Technicians shall participate in the Department's Independent Assurance Systems Basis Program.

1. Determine Lot Amount

   A lot consists of the tons (megagrams) of asphaltic concrete produced and placed each production day. If this production is less than 500 tons (500 Mg), or its square yard (meter) equivalent, production may be incorporated into the next working day. The Engineer may terminate a lot when a pay adjustment is imminent if a plant or materials adjustment resulting in a probable correction has been made. Terminate all open lots at the end of the month, except for materials produced and placed during the adjustment period. The lot will be terminated as described in Subsection 400.5.01,"Adjustments".

   If the final day's production does not constitute a lot, the production may be included in the lot for the previous day's run; or, the Engineer may treat the production as a separate lot with a corresponding lower number of tests.

2. Determine Lot Acceptance

   Determine lot acceptance as found in Subsection 400.5.01, "Adjustments."

   The Department will perform the following task:

   Determine the pay factor by using the mean of the deviations from the job mix formula of the tests in each lot and apply it to Table 10 Mixture Acceptance Schedule for Surface Mixes or Table 11 Mixture Acceptance Schedule for Subsurface Mixes, whichever is appropriate. This mean will be determined by averaging the actual numeric value of the individual deviations from the job mix formula, disregarding whether the deviations are positive or negative amounts. Do not calculate lot acceptance using test results for materials not used in the Work. Determine the pay factor for each lot by multiplying the contract unit price by the appropriate pay factor from the Mixture Acceptance Schedule - Table 10 or Table 11. When two or more pay factors for a specific lot are less than 1.0, determine the adjusted payment by multiplying the contract unit price by the lowest pay factor.

   If the mean of the deviations from the job mix formula of the lot acceptance tests for a control sieve or for asphalt cement content exceeds the tolerances established in the appropriate Mixture Acceptance Schedule, and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the Engineer determines that the material is not acceptable to leave in place, the materials shall be removed and replaced at the Contractor's expense.

3. Provide Quality Control Program

   Provide a Quality Control Program as established in SOP 27 which includes:

   - Assignment of quality control responsibilities to specifically named individuals who have been certified by the Office of Materials and Testing

- Provisions for prompt implementation of control and corrective measures
- Provisions for communication with Project Manager, Bituminous Technical Services Engineer, and Testing Management Operations Supervisor at all times
- Provisions for reporting all test results daily through the Office of Materials and Testing computerized Field Data Collection System; other checks, calibrations and records will be reported on a form developed by the Contractor and will be included as part of the project records
- Notification in writing of any change in quality control personnel

a. Certification Requirements:

- Use laboratory and testing equipment certified by the Department. (Laboratories which participate in and maintain AASHTO accreditation for testing asphaltic concrete mixtures will be acceptable in lieu of Departmental certification.)
- Provide certified quality control personnel to perform the sampling and testing. A Quality Control Technician (QCT) may be certified at three levels:

1) Temporary Certification – must be a technician trainee who shall be given direct oversight by a certified Level 1 or Level 2 QCT while performing acceptance testing duties during the first 5 days of training. The trainee must complete qualification requirements within 30 Georgia Department of Transportation funded production days after being granted temporary certification. A trainee who does not become qualified within 30 Georgia Department of Transportation funded production days will not be re-eligible for temporary certification. A certified Level 1 or Level 2 QCT shall be at the plant at all times during production and shipment of mixture to monitor work of the temporarily certified technician.

2) Level 1 – must demonstrate they are competent in performing the process control and acceptance tests and procedures related to hot mix asphalt production and successfully pass a written exam.

3) Level 2 – must meet Level 1 requirements and must be capable of and responsible for making process control adjustments, and successfully pass a written exam.

- Technician certification is valid for 3 years from the date on the technician's certificate unless revoked or suspended. Eligible technicians may become certified through special training and testing approved by the Office of Materials and Testing. Technicians who lose their certification due to falsification of test data will not be eligible for recertification in the future unless approved by the State Materials and Testing Engineer.

b. Quality Control Management

1) Designate at least one Level 2 QCT as manager of the quality control operation. Ensure the Quality Control Manager meets the following requirements:

- Be accountable for actions of other QCT personnel
- Ensure all applicable sampling requirements and frequencies, test procedures, and Standard Operating Procedures are adhered to
- Ensure all reports, charts, and other documentation is completed as required

2) Provide QCT personnel at the plant as follows:

- If daily production for all mix types is to be greater than 250 tons (megagrams), have a QCT person at the plant at all times during production and shipment of mixture until all required acceptance tests have been completed
- If daily production for all mix types will not be greater than 250 tons (megagrams) a QCT may be responsible for conducting tests at up to two plants, subject to random number sample selection

- Have available at the plant or within immediate contact by phone or radio a Level 2 QCT responsible for making prompt process control adjustments as necessary to correct the mix

3) Sampling, Testing, and Inspection Requirements.

Provide all sample containers, extractants, forms, diaries, and other supplies subject to approval of the Engineer.

Perform daily sampling, testing, and inspection of mixture production that meets the following requirements:

(a) Randomly sample mixtures according to GSP 15, and GDT 73 (Method C) and test on a lot basis. In the event less than the specified number of samples are taken, obtain representative 6 in (150 mm) cores from the roadway at a location where the load not sampled was placed. Take enough cores to ensure minimum sample size requirements are met for each sample needed.

(b) Maintain a printed copy of the computer generated random sampling data as a part of the project records.

(c) Perform sampling, testing, and inspection duties of GSP 21.

(d) Perform extraction or ignition test (GDT 83 or GDT 125) and extraction analysis (GDT 38). If the ignition oven is used, a printout of sample data including weights becomes a part of the project records. For asphalt cement content only, digital printouts of liquid asphalt cement weights may be substituted in lieu of an extraction test for plants with digital recorders. Calculate the asphalt content from the ticket representing the mixture tested for gradation.

(e) Save extracted aggregate, opposite quarters, and remaining material (for possible referee testing) of each sample as follows:

- Store in properly labeled, suitable containers
- Secure in a protected environment
- Store for three working days. If not obtained by the Department, within three days they may be discarded in accordance with GSP 21.

(f) Add the following information on load tickets from which a sample or temperature check is taken:

- Mixture temperature
- Signature of the QCT person performing the testing

(g) Calibrate the lime system when hydrated lime is included in the mixture:

- Perform a minimum of twice weekly during production
- Post results at the plant for review
- Provide records of materials invoices upon request (including asphalt cement, aggregate, hydrated lime, etc.)

(h) Take action if acceptance test results are outside Mixture Control Tolerances of Section 828.

- One sample out of tolerance
  (1) Contact Level 2 - QCT to determine if a plant adjustment is needed
  (2) Immediately run a process control sample. Make immediate plant adjustments if this sample is also out of tolerance

NOTE: Determine mixture temperature at least once per hour of production for

(3) Test additional process control samples as needed to ensure corrective action taken appropriately controls the mixture

- Two consecutive acceptance samples of the same mix type out of tolerance regardless of Lot or mix design level, or three consecutive acceptance samples out of tolerance regardless of mix type
  - (1) Stop plant production immediately
  - (2) Reject any mixture in storage:
    - Deviating more than 10 percent in gradation from the job mix formula based on the acceptance sample
    - Deviating more than 0.7 percent in asphalt content from the job mix formula based on the acceptance sample
  - (3) Make a plant correction to any mix type out of tolerance prior to resuming production
    - Do not send any mixture to the project before test results of a process control sample meets Mixture Control Tolerances
    - Reject any mixture produced at initial restarting that does not meet Mixture Control Tolerances

4) Comparison Testing and Quality Assurance Program

Periodic comparison testing by the Department will be required of each QCT to monitor consistency of equipment and test procedures. The Department will take independent samples to monitor the Contractor's quality control program.

a) Comparison Sampling and Testing

Retain samples for comparison testing and referee testing if needed as described in Subsection 400.3.06.A.3.b.3. Discard these samples only if the Contractor's acceptance test results meet a 1.00 pay factor and the Department does not procure the samples within three working days.

The Department will test comparison samples on a random basis. Results will be compared to the respective contractor acceptance tests and the maximum difference is as follows:

Table 6—Allowable Percent Difference Between Department and Contractor Acceptance Tests

SIEVE SIZE	SURFACE	SUB-SURFACE
1/2 in. (12.5 mm)		4.0%
3/8 in. (9.5 mm)	3.5%	4.0%
No. 4 (4.75 mm)	3.5%	3.5%
No. 8 (2.36 mm)	2.5%	3.0%
No. 200 (75 μm)	2.0%	2.0%
A.C.	0.4%	0.5%

(1) If test comparisons are within these tolerances:

- Continue production
- Use the Contractor's tests for acceptance of the lot

(2) If test comparisons are not within these tolerances:

- Another Departmental technician will test the corresponding referee sample
- Results of the referee sample will be compared to the respective contractor and Departmental tests using the tolerance for comparison samples given above.

(a) If referee test results are within the above tolerances when compared to the Contractor acceptance test, use the Contractor's test for acceptance of the effected lot.

(b) If referee test results are not within the above tolerances when compared to the Contractor acceptance test, the Department will review the Contractor's quality control methods and determine if a thorough investigation is needed.

b) Independent Verification Sampling and Testing

(1) Randomly take a minimum of two independent samples from the lesser of five days or five lots of production regardless of mix type or number of projects.

(2) Compare test deviation from job mix formula to Mixture Control Tolerances in Section 828. If results are outside these tolerances, another sample from the respective mix may be taken.

NOTE: For leveling courses less than 110 lb/yd² (60 kg/m²) having quality assurance test results outside the Mixture Control Tolerances of Section 828, use the Department's test results only and applicable pay factors will apply.

If test results of the additional sample are not within Mixture Control Tolerances, the Department will take the following action:

- Take random samples from throughout the subject lot(s) as established in Subsection 400.3.06.A.3.b.3 and use these test results for acceptance and in calculations for the monthly plant rating. Applicable pay factors will apply and the contractor QCT test results will not be included in pay factor calculations nor in the monthly plant rating.
- Determine if the Contractor's quality control program is satisfactory and require prompt corrective action by the Contractor if specification requirements are not being met.
- Determine if the QCT has not followed Departmental procedures or has provided erroneous information.
- Take samples of any in-place mixture represented by unacceptable QCT tests and use the additional sample results for acceptance and in calculations for the monthly plant rating and apply applicable pay factors. The Contractor QCT tests will not be included in the pay factor calculations nor in the monthly plant rating.

B. Compaction

Determine the mixture compaction using either GDT 39 , GDT 59 or AASHTO T 331. The method of GDT 39 for "Uncoated Specimens, Dense Graded Mixtures Only" shall not apply when the water absorption of a sample exceeds

2.0 percent, as measured according to AASHTO T 166. In this case, either AASHTO T 331 or the paraffin method of GDT 39 shall apply. The compaction is accepted in lots defined in Subsection 400.3.06. A "Acceptance Plans for Gradation and Asphalt Cement Content" and is within the same lot boundaries as the mixture acceptance.

1. Calculate Pavement Mean Air Voids

   The Department is responsible for pavement mean air void acceptance testing. The Contractor is responsible for establishing all roller patterns and any quality control testing. Upon written request by the Contractor, the Office of Materials and Testing will provide nuclear gauge testing assistance for compaction related issues.

   The Department will calculate the pavement air voids placed within each lot as follows:

   a. One test per sub-lot.
      - Lots > 400 ton (400 Mg) of mix are divided into 5 sub-lots of equal distance
      - Lots ≤ 400 tons (400 Mg) of mix are divided into a sub-lot or sub-lots of equal distance at a rate of one per 100 tons (100 Mg) mix each. (Example: 299 tons of mix require 3 sublots and 301 tons of mix require 4 sublots) There will be less than 5 sub-lots.

   b. Average the results of all tests run on randomly selected sites in that lot.

   c. Select representative sites randomly using GDT 73.

   Density tests are not required for asphaltic concrete placed at 90 lbs/yd^2 (50 kg/m^2) or less, 4.75 mm mix, and asphaltic concrete OGFC, PEM and mixes placed as variable depth or width leveling. Compact these courses to the Engineer's satisfaction. Density tests will not be performed on turn-outs and driveways.

   The targeted maximum Pavement Mean Air Void content for all Superpave and Stone Matrix Asphalt mixtures is 5.0 percent. Ensure that the maximum Pavement Mean Air Voids for all Superpave and Stone Matrix Asphalt mixtures does not exceed 7.0 percent. The maximum Pavement Mean Air Voids for 2 foot shoulder widening is 9.0 percent. The adjustment period for density is four lots or four production days, whichever is less, in order for the contractor to ensure maximum compactive effort has been achieved which will yield no more than the specified maximum allowed Mean Air Voids. One additional lot or production day of adjustment may be given for a reduction in asphalt cement content on the JMF made by the Office of Materials and Testing for mix designs incorporating the Corrected Optimum Asphalt Content COAC.

   If the contractor needs to adjust the mixture to improve density results, a change in the job mix formula may be requested for approval during the adjustment period so long as the following values are not exceeded:

   - Coarse pay sieve ± 4%
   - No. 8 (2.36 mm) sieve ± 2%
   - No. 200 (75 μm) sieve ± 1%
   - Asphalt Content ± 0.2%
   - All value changes must still be within specification limits

   If the Office of Materials and Testing is satisfied that the contractor has exerted the maximum compactive effort and is not able to maintain Pavement Mean Air Voids at no more than 7.0%, the Engineer may establish a maximum target for Pavement Mean Air Voids.

   Ensure mixture placed during the adjustment period for density meets the requirements for a 0.90 pay factor in Table 13 of Subsection 400.5.01.C, "Calculate Mean Pavement Air Voids." Mixture not meeting these density requirements is paid for using the applicable pay factor.

   If the mean air voids of the pavement placed within a lot exceeds 100% of the maximum target air voids, if established and the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer.

2. Obtain Uniform Compaction

For a lot to receive a pay factor of 1.00 for compaction acceptance, the air void range cannot exceed 5 percent for new construction or resurfacing projects. The range is the difference between the highest and lowest acceptance test results within the affected lot. If the air void range exceeds these tolerances, apply a Pay Factor of 95%.

The 5% reduced pay factor for the compaction range does not apply in these instances:

- The mixture is placed during the adjustment period as defined in Subsection 400.5.01.A, "Materials Produced and Placed During the Adjustment Period."
- All air void results within a given lot are less than 7.0%.
- A lot containing two sublot or less.
- On two foot trench widening.
- For sub-surfaces mixes including 19 mm and 25 mm Superpave mixes if all air void results within a given lot are >2.5 % <8 %.

When lots are reevaluated for range penalty, as shown in Subsection 106.03, "Samples, Tests, Cited Specifications," sampling and testing is according to GDT 73. Request for reevaluation must be made within 5 working days of notification of the lot results. The following procedures apply:

The Department will reevaluate the lot through additional testing by obtaining and testing three additional cores acquired in representative sites selected randomly throughout each sub-lot representing the high and low in-place air voids as detailed in GDT 73. The additional six cores (three cores from each sub-lot will be averaged) will replace the original five core results for range specified requirements only. The original five cores results will be reported for Pavement Mean Air Voids for the lot. This will be the final evaluation for compaction range for the lot. Lots will not be re-evaluated for range when the Pavement Mean Air Voids result in a lower than 95% pay factor. Ensure requests for reevaluation are made within 5 working days of notification of the lot results.

The Department will determine the payment for each lot by multiplying the Contract Unit Price by the adjusted pay factor shown in the Table 7 Average Air Voids Range Acceptance Schedule:

Table 7—Average Air Voids Range For Acceptance Schedule

Pay Factor	Range between High and Low Air Void Original 5 cores	Re-evaluated Range between High and Low Air Void Cores 6 New Cores obtained from High (3 cores) and Low location (3 cores)
100	≤ 5 %	≤ 4.50 %
0.95	> 5 %	> 4.50 %

C. Surface Tolerance

In this Specification, pavement courses to be overlaid with an Open-Graded Friction Course or PEM are considered surface courses. All Open-Graded Friction Courses or PEM are to be evaluated after the roadway has been opened to traffic for a minimum of 5 days and a maximum of 15 days. Asphalt paving is subject to straightedge and visual inspection and irregularity correction as shown below:

1. Visual and Straightedge Inspection

   Paving is subject to visual and straightedge inspection during and after construction operations until Final Acceptance. Locate surface irregularities as follows:

   a. Keep a 10 ft (3 m) straightedge near the paving operation to measure surface irregularities on courses. Provide the straightedge and the labor for its use.

   b. Inspect the base, intermediate, and surface course surfaces with the straightedge to detect irregularities.

   c. Correct irregularities that exceed 3/16 in. in 10 ft (5 mm in 3 m) for base and intermediate courses, and 1/8 in. in 10 ft (3 mm in 3 m) for surface courses.

Mixture or operating techniques will be stopped if irregularities such as rippling, tearing, or pulling occur and the Engineer suspects a continuing equipment problem. Stop the paving operation and correct the problem. Correct surface course evaluations on individual Laser Road Profiler test sections, normally 1mile (1 km) long.

2. Target Surface Smoothness

The Department will use the Laser Road Profiler method to conduct acceptance testing for surface course tolerance according to GDT 126. This testing will be performed only on:

- Surface courses on Projects with mainline traveled way measuring a minimum distance of 1 mile (1600 m)
- Ramps more than 0.5 mile (800 m) long

Combine partial sections measuring less than 0.5 mile (800 m) with the previous full mile for acceptance.

Achieve the smoothest possible ride during construction. Do not exceed the target Laser Road Profiler smoothness index as shown below:

Table 8— Pavement Smoothness Target Requirements

Construction Description	Smoothness Index
All Asphaltic Concrete OGFC and PEM on interstate including resurfacing and new construction. Asphaltic Concrete OGFC and PEM placed on state routes as new construction.	750
Asphaltic Concrete SMA or dense-graded surface mixtures placed directly beneath the Asphaltic Concrete OGFC or PEM on interstates. Asphaltic Concrete OGFC and PEM placed on state routes as resurfacing. All new construction on state routes with exception of OGFC and PEM as stated above.	825
All other resurfacing on state routes (excluding LARP, PR, airports, etc.)	900
All Urban new construction and resurfacing on state routes within curb and gutter sections located in posted 35 miles per hour (MPH) or less speed zones.	1175

If the target values are not achieved, immediately adjust the operations to meet the target values. Placement operations may be suspended until a remedial plan to comply with target smoothness requirements is submitted and approved by the Engineer if adjustments do not satisfy target smoothness values.

Table 9— Pavement Smoothness Corrective Work Requirement

Construction Description	Smoothness Index
All Asphaltic Concrete OGFC and PEM placed on interstate including resurfacing and new construction. Asphaltic Concrete OGFC and PEM placed on state routes as new construction.	825
Asphaltic Concrete SMA or dense-graded surface mixtures placed directly beneath the Asphaltic Concrete OGFC or PEM on interstates. Asphaltic Concrete OGFC and PEM placed on state routes as resurfacing. All new construction on state routes with exception of OGFC and PEM as stated above.	900
All other resurfacing on state routes (excluding LARP, PR, airports, etc.)	1025
All Urban new construction and resurfacing on state routes within curb and gutter	1250

sections located in posted 35 miles per hour (MPH) or less speed zones.	

If surface tolerance deficiencies need correction, obtain the Engineer's approval of the methods and type mix used.

3. Bridge Approach Ride Quality

The following are subject to a ride quality test of roadway approaching each end of a bridge using the Laser Road Profiler, Rainhart Profiler or Lightweight Profiler:

- A state road with 4 lanes or more
- A 2-lane state road with a current traffic count of 2,000 vpd or more
- Locations designated on the Plans

All other bridge approaches not meeting the above criteria shall meet the 1/8 in. in 10 ft (3 mm in 3 m) straightedge requirement. When the distance between the ends of two bridges is less than 200 ft (60 m), the bridge approaches will meet the straightedge requirements.

Test ride quality as follows:

For Resurfacing Projects:

a. The Department will determine a profile index value using the laser road profiler in accordance with test method GDT 126.
b. The Department will determine the Half Car Simulation (HCS) IRI for each HMA asphalt 1/10th of mile (0.16 km) segments adjacent to each bridge joint for each lane. The HCS IRI will be reported in 1/20th of mile (0.08 km) segment readings in accordance with GDT 126.
    - Keep the Target profile index value under 825 mm/km and correct profile locations exceeding 900 mm/km using the Laser Road Profiler. Correct individual bumps or depression exceeding 1/8 in. in 10 ft (3 mm in 3 m) straightedge requirement as directed by the Engineer.
c. Ensure Resurfacing projects meet the profile index value for the specified 1/10th mile (0.16 km) segment of roadway up to the bridge joint.

For All New Construction Projects:

a. The Department will determine a profile index value according to test method GDT 78 or GDT 134.
b. The Department will average the profile index value from the right and left wheelpath for each 100 ft (30 m) section for each lane.
    - Keep the profile index value under 30 in/mile (475 mm/km), correct individual bumps or depressions exceeding 0.2 in. (5 mm) from blanking band on the profilograph trace.
c. Ensure New Construction projects meet the profile index value for the specified 100 ft (30 m) section of roadway up to the bridge joint.
d. Schedule the ride quality testing on All New Construction projects 5 days before needed by contacting the Office of Materials and Testing. Clean and clear obstructions from the test area.

Correct the sections that do not meet the ride quality criteria of this Specification. After correction, these sections are subject to retesting with the Lightweight Profiler. The Engineer directs the type of correction method, which may include:

- Milling
- Grinding
- Removing and replacing the roadway

No additional compensation will be made.

In accordance with Section 106.3.A.3, the Contractor may request reevaluation(s) for Lightweight Profiler Test results on newly construction bridge projects, Laser Road Profiler Test results on resurfacing bridge projects and straightedge measurement(s) on either that fail to meet specified requirements. Request for reevaluation shall be made to the Engineer within 5 working days of notification of failing results. At the Engineer's approval,

reevaluation of failing results using the Lightweight Profiler Test, Laser Road Profiler Test and straightedge measurement(s) shall be conducted by representatives from the Office of Materials and Testing in accordance with GDT 134.

The Department will perform ride quality testing up to two times on the bridge approaches at no cost to the Contractor. Additional testing will be charged to the Contractor in accordance with GDT 134.

4. Surface Smoothness Acceptance

When recommended by the Office of Materials and Testing, a pay reduction may be accepted in lieu of correction for roadways and bridge approaches that fail to achieve specified smoothness indexes. The Office of Materials and Testing may recommend a waiver of profile smoothness requirements when improvement over pre-construction smoothness profile exceeds 25 percent for urban roadways, as defined in Table 9, and 15 percent for bridge approaches.

D. Reevaluation of Lots

When lots are reevaluated as shown in Subsection 106.03, "Samples, Tests, Cited Specifications," sampling and testing is according to GDT 73. Ensure request for reevaluation are made within 5 working days of notification of the lot results. The following procedures apply:

1. Mixture Acceptance

The Department will take the same number of new tests on cores taken at the locations where the loads sampled were placed and will use only those cores results for acceptance. If the location of the sampled loads cannot be isolated and documented to the approval of the Engineer, the lot will not be re-evaluated and the original test results will be used for acceptance. The Department will use the absolute average deviations from the job mix formula for these tests to determine acceptance based on the appropriate column in the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete Mixture Acceptance Schedule—Table 10 or 11.

2. Compaction Acceptance

The Department will reevaluate the lot through additional testing by cutting the same number of cores originally obtained and averaging these results with the results from the original density tests. The Department will use the average to determine acceptance according to the Compaction Acceptance Schedule in Subsection 400.5.01.C, "Calculate Pavement Mean Air Voids".

Table 10—Mixture Acceptance Schedule—Surface Mixes

Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
Asphalt Cement Content (Extraction, Ignition)	1.00	0.00 - 0.70	0.00 - 0.54	0.00 - 0.46	0.00 - 0.41	0.00 - 0.38	0.00 - 0.35	0.00 - 0.32	0.00 - 0.30
	0.95	0.71 - 0.80	0.55 - 0.61	0.47 - 0.52	0.42 - 0.46	0.39 - 0.43	0.36 - 0.39	0.33 - 0.36	0.31 - 0.34
	0.90	0.81 - 0.90	0.62 - 0.68	0.53 - 0.58	0.47 - 0.51	0.44 - 0.47	0.40 - 0.45	0.37 - 0.40	0.35 - 0.37
	0.80	0.91 - 1.00	0.69 - 0.75	0.59 - 0.64	0.52 - 0.56	0.48 - 0.52	0.44 - 0.47	0.41 - 0.44	0.38 - 0.41
	0.70	1.01 - 1.19	0.76 - 0.82	0.65 - 0.69	0.57 - 0.61	0.53 - 0.56	0.48 - 0.51	0.45 - 0.47	0.42 - 0.44
	0.50	1.20 - 1.40	0.83 - 0.85	0.70 - 0.72	0.62 - 0.64	0.57 - 0.59	0.52 - 0.55	0.48 - 0.51	0.45 - 0.48
3/8 in. (9.5 mm) Sieve (12.5 mm OGFC, 12.5 mm PEM, 12.5 mm Superpave)	1.00	0.00 – 9.0	0.00 - 6.6	0.00 - 5.6	0.00 - 5.0	0.00 - 4.6	0.00 - 4.2	0.00 - 3.9	0.00 - 3.6
	0.98	9.1 - 10.0	6.7 - 7.5	5.7 - 6.3	5.1 - 5.6	4.7 - 5.2	4.3 - 4.7	4.0 - 4.4	3.7 - 4.1
	0.95	10.1 - 11.9	7.6 - 8.4	6.4 - 7.0	5.7 - 6.3	5.3 - 5.8	4.8 - 5.3	4.5 - 5.0	4.2 - 4.6
	0.90	12.0 - 13.0	8.5 - 9.3	7.1 - 7.7	6.4 - 6.9	5.9 - 6.3	5.4 - 5.8	5.1 - 5.4	4.7 - 5.0
	0.85	13.1 - 14.0	9.4 - 10.2	7.8 - 8.6	7.0 - 7.6	6.4 - 6.9	5.9 - 6.3	5.5 - 5.9	5.1 - 5.5
	0.80	14.1 - 14.5	10.3 - 10.5	8.7 - 8.9	7.7 - 8.0	7.0 - 7.5	6.4 - 6.8	6.0 - 6.4	5.6 - 6.0
3/8 in. (9.5 mm) Sieve (12.5 mm SMA)	1.00	0.0 - 6.8	0.00 - 5.0	0.00 - 4.2	0.00 - 3.8	0.00 - 3.4	0.00 - 3.2	0.00 - 2.9	0.00 - 2.7
	0.98	6.9 - 7.5	5.1 - 5.6	4.3 - 4.7	3.9 - 4.2	3.5 - 3.9	3.3 - 3.5	3.0 - 3.3	2.8 - 3.1
	0.95	7.6 - 8.9	5.7 - 6.3	4.8 - 5.2	4.3 - 4.7	4.0 - 4.4	3.6 - 4.0	3.4 - 3.8	3.2 - 3.4
	0.90	9.0 - 9.8	6.4 - 7.0	5.3 - 5.8	4.8 - 5.2	4.5 - 4.8	4.1 - 4.4	3.9 - 4.1	3.5 - 3.8
	0.85	9.9 - 10.5	7.1 - 7.6	5.9 - 6.4	5.3 - 5.7	4.9 - 5.2	4.5 - 4.7	4.2 - 4.4	3.9 - 4.1
	0.80	10.6 - 10.9	7.7 - 7.9	6.5 - 6.7	5.8 - 6.0	5.3 - 5.6	4.8 - 5.1	4.5 - 4.8	4.2 - 4.5
No. 4 (4.75 mm) Sieve (9.5 mm OGFC, 9.5 mm Superpave)	1.00	0.00 - 9.0	0.00 - 6.7	0.00 - 5.7	0.00 - 5.2	0.00 - 4.8	0.00 - 4.4	0.00 - 4.1	0.00 - 3.8
	0.98	9.1 - 10.0	6.8 - 7.6	5.8 - 6.3	5.3 - 5.8	4.9 - 5.4	4.5 - 4.9	4.2 - 4.6	3.9 - 4.3
	0.95	10.1 - 11.9	7.7 - 8.5	6.4 - 6.9	5.9 - 6.4	5.5 - 5.9	5.0 - 5.4	4.7 - 5.0	4.4 - 4.7

Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
	0.90	12.0 - 13.0	8.6 - 9.4	7.0 - 7.5	6.5 - 7.0	6.0 - 6.5	5.5 - 5.9	5.1 - 5.5	4.8 - 5.1
	0.85	13.1 - 14.0	9.5 - 10.2	7.6 - 8.0	7.1 - 7.6	6.6 - 7.0	6.0 - 6.4	5.6 - 5.9	5.2 - 5.5
	0.80	14.1 - 14.5	10.3 - 10.5	8.1 - 8.3	7.7 - 8.0	7.1 - 7.5	6.5 - 6.9	6.0 - 6.4	5.6 - 5.9
No. 4 (4.75 mm) Sieve (9.5 mm SMA)	1.00	0.00 - 6.8	0.00 - 5.0	0.00 - 4.3	0.00 - 3.9	0.00 - 3.6	0.00 - 3.3	0.00 - 3.1	0.00 - 2.8
	0.98	6.9 - 7.5	5.1 - 5.7	4.4 - 4.7	4.0 - 4.4	3.7 - 4.0	3.4 - 3.7	3.2 - 3.4	2.9 - 3.2
	0.95	7.6 - 8.9	5.8 - 6.4	4.8 - 5.2	4.5 - 4.8	4.1 - 4.4	3.8 - 4.0	3.5 - 3.8	3.3 - 3.5
	0.90	9.0 - 9.8	6.5 - 7.0	5.3 - 5.6	4.9 - 5.2	4.5 - 4.9	4.1 - 4.4	3.9 - 4.1	3.6 - 3.8
	0.85	9.9 - 10.5	7.1 - 7.7	5.7 - 6.0	5.3 - 5.7	5.0 - 5.2	4.3 - 4.8	4.2 - 4.4	3.9 - 4.1
	0.80	10.6 - 10.9	7.8 - 7.9	6.1 - 6.2	5.8 - 6.0	5.3 - 5.6	4.9 - 5.2	4.5 - 4.8	4.2 - 4.4
No. 8 (2.36 mm) Sieve (OGFC, PEM, Superpave and 4.75 mm mixes)	1.00	0.00 - 7.0	0.00 - 5.6	0.00 - 4.8	0.00 - 4.3	0.00 - 4.0	0.00 - 3.6	0.00 - 3.4	0.00 - 3.2
	0.98	7.1 - 8.0	5.7 - 6.3	4.9 - 5.4	4.4 - 4.8	4.1 - 4.5	3.7 - 4.1	3.5 - 3.8	3.3 - 3.6
	0.95	8.1 - 9.0	6.4 - 7.0	5.5 - 6.0	4.9 - 5.3	4.6 - 4.9	4.2 - 4.5	3.9 - 4.2	3.7 - 3.9
	0.90	9.1 - 10.9	7.1 - 7.7	6.1 - 6.6	5.4 - 5.8	5.0 - 5.4	4.6 - 4.9	4.3 - 4.6	4.0 - 4.3
	0.85	11.0 - 12.0	7.8 - 8.5	6.7 - 7.2	5.9 - 6.4	5.5 - 5.8	5.0 - 5.3	4.7 - 5.0	4.4 - 4.6
	0.75	12.1 - 12.5	8.6 - 8.8	7.3 - 7.5	6.5 - 6.8	5.9 - 6.3	5.4 - 5.7	5.1 - 5.3	4.7 - 4.9
No. 8 (2.36 mm) Sieve (12.5 mm SMA, 9.5 mm SMA)	1.00	0.00 - 5.3	0.00 - 4.2	0.00 - 3.6	0.00 - 3.2	0.00 - 3.0	0.00 - 2.7	0.00 - 2.6	0.00 - 2.4
	0.98	5.4 - 6.0	4.3 - 4.7	3.7 - 4.0	3.3 - 3.6	3.1 - 3.4	2.8 - 3.1	2.7 - 2.9	2.5 - 2.7
	0.95	6.1 - 6.8	4.8 - 5.3	4.1 - 4.5	3.7 - 4.0	3.5 - 3.7	3.2 - 3.4	3.0 - 3.2	2.8 - 2.9
	0.90	6.9 - 8.2	5.4 - 5.8	4.6 - 5.0	4.1 - 4.5	3.8 - 4.0	3.5 - 3.7	3.3 - 3.5	3.0 - 3.2
	0.85	8.3 - 9.0	5.9 - 6.4	5.1 - 5.4	4.6 - 4.8	4.1 - 4.4	3.8 - 4.0	3.6 - 3.8	3.3 - 3.4
	0.75	9.1 - 9.4	6.5 - 6.6	5.5 - 5.0	4.9 - 5.1	4.5 - 4.7	4.1 - 4.3	3.9 - 4.0	3.5 - 3.7
No. 8 (2.36 mm) Sieve for OGFC and PEM mixes: When the mean of the deviations from the Job Mix Formula for a particular lot exceeds the tolerance for a 1.00 pay									

Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
factor in the appropriate column, the lot will be paid for at 0.50 of the Contract Price.									

Table 11—Mixture Acceptance Schedule—Subsurface Mixes

Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
Asphalt Cement Content (Extraction, Ignition)	1.00	0.00 - 0.80	0.00 - 0.61	0.00 - 0.52	0.00 - 0.46	0.00 - 0.43	0.00 - 0.39	0.00 - 0.36	0.00 - 0.34
	0.95	0.81 - 0.90	0.62 - 0.68	0.53 - 0.58	0.47 - 0.51	0.44 - 0.47	0.40 - 0.43	0.37 - 0.40	0.35 - 0.37
	0.90	0.91 - 1.00	0.69 - 0.75	0.59 - 0.64	0.52 - 0.56	0.48 - 0.52	0.44 - 0.47	0.41 - 0.44	0.38 - 0.41
	0.80	1.01 - 1.19	0.76 - 0.82	0.65 - 0.69	0.57 - 0.61	0.53 - 0.56	0.48 - 0.51	0.45 - 0.47	0.42 - 0.44
	0.70	1.20 - 1.40	0.83 - 0.85	0.70 - 0.72	0.62 - 0.64	0.57 - 0.59	0.52 - 0.55	0.48 - 0.51	0.45 - 0.48
	0.50	1.41 - 1.60	0.86 - 0.88	0.73 - 0.75	0.65 - 0.67	0.60 - 0.63	0.56 - 0.60	0.52 - 0.56	0.49 - 0.52
1/2 in. (12.5 mm) Sieve (25 mm Superpave)	1.00	0.00 - 12.9	0.00 - 8.1	0.00 - 6.9	0.00 - 6.1	0.00 - 5.5	0.00 - 5.0	0.00 - 4.7	0.00 - 4.4
	0.98	13.0 - 14.0	8.2 - 9.1	7.0 - 7.7	6.2 - 6.8	5.6 - 6.1	5.1 - 5.6	4.8 - 5.2	4.5 - 4.9
	0.95	14.1 - 15.0	9.2 - 10.1	7.8 - 8.5	6.9 - 7.5	6.2 - 6.7	5.7 - 6.1	5.3 - 5.7	5.0 - 5.4
	0.90	15.1 - 16.0	10.2 - 11.1	8.6 - 9.3	7.6 - 8.2	6.8 - 7.4	6.2 - 6.7	5.8 - 6.3	5.5 - 5.9
	0.85	16.1 - 17.0	11.2 - 11.5	9.4 - 9.6	8.3 - 8.6	7.5 - 7.8	6.8 - 7.0	6.4 - 6.5	6.0 - 6.1
	0.80	17.1 - 18.0	11.6 - 11.9	9.7 - 9.9	8.7 - 9.0	7.9 - 8.1	7.1 - 7.3	6.6 - 6.8	6.2 - 6.4
1/2 in. (12.5 mm) Sieve (19 mm SMA)	1.00	0.00 - 9.7	0.00 - 6.0	0.00 - 5.2	0.00 - 4.6	0.00 - 4.1	0.00 - 3.8	0.00 - 3.5	0.00 - 3.3
	0.98	9.8 - 10.5	6.2 - 6.8	5.3 - 5.8	4.7 - 5.1	4.2 - 4.6	3.9 - 4.2	3.6 - 3.9	3.4 - 3.7
	0.95	10.6 - 11.2	6.9 - 7.8	5.9 - 6.4	5.2 - 5.6	4.7 - 5.0	4.3 - 4.6	4.0 - 4.3	3.8 - 4.0
	0.90	11.3 - 12.0	7.9 - 8.3	6.5 - 7.0	5.7 - 6.1	5.1 - 5.6	4.7 - 5.0	4.4 - 4.7	4.1 - 4.4
	0.85	12.1 - 12.8	8.4 - 8.6	7.1 - 7.2	6.2 - 6.5	5.7 - 5.9	5.1 - 5.3	4.8 - 4.9	4.5 - 5.6
	0.80	12.9 - 13.5	8.7 - 8.9	7.3 - 7.4	6.6 - 6.8	6.0 - 6.1	5.4 - 5.5	5.0 - 5.1	4.7 - 4.8
3/8 in. (9.5 mm) Sieve (19 mm Superpave, 12.5 mm Superpave)	1.00	0.00 - 10.0	0.00 - 7.5	0.00 - 6.3	0.00 - 5.6	0.00 - 5.2	0.00 - 4.7	0.00 - 4.4	0.00 - 4.1
	0.98	10.1 - 11.9	7.6 - 8.4	6.4 - 7.0	5.7 - 6.3	5.3 - 5.8	4.8 - 5.3	4.5 - 5.0	4.2 - 4.6
	0.95	12.0 - 13.0	8.5 - 9.3	7.1 - 7.7	6.4 - 6.9	5.9 - 6.3	5.4 - 5.8	5.1 - 5.4	4.7 - 5.0

Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
	0.90	13.1 - 14.0	9.4 - 10.2	7.8 - 8.6	7.0 - 7.6	6.4 - 6.9	5.9 - 6.3	5.5 - 5.9	5.1 - 5.5
	0.85	14.1 - 14.5	10.3 - 10.5	8.7 - 8.9	7.7 - 8.0	7.0 - 7.5	6.4 - 6.8	6.0 - 6.4	5.6 - 6.0
	0.80	14.6 - 15.0	10.6 - 10.8	9.0 - 9.2	8.1 - 8.4	7.6 - 7.8	6.9 - 7.3	6.5 - 6.8	6.1 - 6.5
No. 4 (4.75 mm) Sieve (9.5 mm Superpave)	1.00	0.00 - 10.0	0.00 - 7.6	0.00 - 6.3	0.00 - 5.8	0.00 - 5.4	0.00 - 4.9	0.00 - 4.6	0.00 - 4.3
	0.98	10.1 - 11.9	7.7 - 8.5	6.4 - 6.9	5.9 - 6.4	5.5 - 5.9	5.0 - 5.4	4.7 - 5.0	4.4 - 4.7
	0.95	12.0 - 13.0	8.6 - 9.4	7.0 - 7.5	6.5 - 7.0	6.0 - 6.5	5.5 - 5.9	5.1 - 5.5	4.8 - 5.1
	0.90	13.1 - 14.0	9.5 - 10.2	7.6 - 8.0	7.1 - 7.6	6.6 - 7.0	6.0 - 6.4	5.6 - 5.9	5.2 - 5.5
	0.85	14.1 - 14.5	10.3 - 10.5	8.1 - 8.3	7.7 - 8.0	7.1 - 7.5	6.5 - 6.9	6.0 - 6.4	5.6 - 5.9
	0.80	14.6 - 15.0	10.6 - 10.8	8.4 - 8.6	8.1 - 8.4	7.6 - 8.0	7.0 - 7.4	6.5 - 6.8	6.0 - 6.3
No. 8 (2.36 mm) Sieve (All mixes except SMA)	1.00	0.00 - 8.0	0.00 - 6.3	0.00 - 5.4	0.00 - 4.8	0.00 - 4.5	0.00 - 4.1	0.00 - 3.8	0.00 - 3.6
	0.98	8.1 - 9.0	6.4 - 7.0	5.5 - 6.0	4.9 - 5.3	4.6 - 4.9	4.2 - 4.5	3.9 - 4.2	3.7 - 3.9
	0.95	9.1 - 10.0	7.1 - 7.7	6.1 - 6.6	5.4 - 5.8	5.0 - 5.4	4.6 - 4.9	4.3 - 4.6	4.0 - 4.3
	0.90	10.1 - 11.9	7.8 - 8.5	6.7 - 7.2	5.9 - 6.4	5.5 - 5.8	5.0 - 5.3	4.7 - 5.0	4.4 - 4.6
	0.85	12.0 - 13.0	8.6 - 8.8	7.3 - 7.5	6.5 - 6.8	5.9 - 6.3	5.4 - 5.7	5.1 - 5.3	4.7 - 4.9
	0.75	13.1 - 14.0	8.9 - 9.1	7.6 - 7.8	6.9 - 7.2	6.4 - 6.6	5.8 - 6.1	5.4 - 5.7	5.0 - 5.3
No. 8 (2.36 mm) Sieve (19 mm SMA)	1.00	0.00 - 6.0	0.00 - 4.7	0.00 - 4.1	0.00 - 3.6	0.00 - 3.4	0.00 - 3.1	0.00 - 2.9	0.00 - 2.4
	0.98	6.1 - 6.8	4.8 - 5.2	4.2 - 4.5	3.7 - 4.0	3.5 - 3.7	3.2 - 3.4	3.0 - 3.2	2.8 - 2.9
	0.95	6.9 - 7.5	5.3 - 5.8	4.6 - 5.0	4.1 - 4.4	3.8 - 4.0	3.5 - 3.7	3.3 - 3.5	3.0 - 3.2
	0.90	7.6 - 8.9	5.9 - 6.4	5.1 - 5.4	4.5 - 4.8	4.1 - 4.4	3.8 - 4.0	3.6 - 3.8	3.3 - 3.5
	0.85	9.0 - 9.8	6.5 - 6.6	5.5 - 5.6	4.9 - 5.1	4.5 - 4.7	4.1 - 4.3	3.9 - 4.0	3.6 - 3.7
	0.75	9.9 - 10.5	6.7 - 6.8	5.7 - 5.9	5.2 - 5.4	4.8 - 5.0	4.4 - 4.6	4.1 - 4.3	3.8 - 4..0

E. Segregated Mixture

Prevent mixture placement yielding a segregated mat by following production, storage, loading, placing, and handling procedures. Ensure needed plant modifications and provide necessary auxiliary equipment. (See Subsection 400.1.01, "Definitions.")

If the mixture is segregated in the finished mat, the Department will take actions based on the degree of segregation. The actions are described below.

1. Unquestionably Unacceptable Segregation

   When the Engineer determines the segregation in the finished mat is unquestionably unacceptable, follow these measures:

   a. Suspend Work and require the Contractor to take positive corrective action. The Department will evaluate the segregated areas to determine the extent of the corrective work to the in-place mat as follows:

      - Perform extraction and gradation analysis by taking 6 in (150 mm) cores from typical, visually unacceptable segregated areas.
      - Determine the corrective work according to Subsection 400.3.06.E.3.

   b. Require the Contractor to submit a written plan of measures and actions to prevent further segregation. Work will not continue until the plan is submitted to and approved by the Department.

   c. When work resumes, place a test section not to exceed 500 tons (500 Mg) of the affected mixture for the Department to evaluate. If a few loads show that corrective actions were not adequate, follow the measures above beginning with step 1.a. above. If the problem is solved, Work may continue.

2. Unacceptable Segregation Suspected

   When the Engineer observes segregation in the finished mat and and the work may be unacceptable, follow these measures:

   a. Allow work to continue at Contractor's risk.

   d. Require Contractor to immediately and continually adjust operation until the visually apparent segregated areas are eliminated from the finished mat. The Department will immediately investigate to determine the severity of the apparent segregation as follows:

      - Take 6 in (150 mm) cores from typical areas of suspect segregation.
      - Test the cores for compliance with the mixture control tolerances in Section 828.

   When these tolerances are exceeded, suspend work for corrective action as outlined in Subsection 400.3.06.E.3.

3. Corrective Work

   a. Remove and replace (at the Contractor's expense) any segregated area where the gradation on the control sieves is found to vary 10 percent or more from the approved job mix formula, the asphalt cement varies 1.0% or more from the approved job mix formula, or if in-place air voids exceed 13.5% based on GDT 39. The control sieves for each mix type are shown in Subsection 400.5.01.B "Determine Lot Acceptance."

   b. Subsurface mixes. For subsurface mixes, limit removal and replacement to the full lane width and no less than 10 ft. (3 m) long and as approved by the Engineer.

   e. Surface Mixes. For surface mixes, ensure that removal and replacement is not less than the full width of the affected lane and no less than the length of the affected areas as determined by the Engineer.

   Surface tolerance requirements apply to the corrected areas for both subsurface and surface mixes.

400.3.07 Contractor Warranty and Maintenance

A. Contractor's Record

Maintain a dated, written record of the most recent plant calibration. Keep this record available for the Engineer's inspection at all times. Maintain records in the form of:

- Graphs
- Tables
- Charts
- Mechanically prepared data

400.4 Measurement

Thickness and spread rate tolerances for the various mixtures are specified in Subsection 400.4.A.2.b, Table 1~~1~~2, Thickness and Spread Rate Tolerance at Any Given Location. These tolerances are applied as outlined below:

A. Hot Mix Asphaltic Concrete Paid for by Weight

1. Plans Designate a Spread Rate
   a. Thickness Determinations. Thickness determinations are not required when the Plans designate a spread rate per square yard (meter).

   If the spread rate exceeds the upper limits outlined in the Subsection 400.4.A.2.b, Table 12, "Thickness and Spread Rate Tolerance at Any Given Location", the mix in excess will not be paid for.

   If the rate of spread is less than the lower limit, correct the deficient course by overlaying the entire lot.

   The mixture used for correcting deficient areas is paid for at the Contract Unit Price of the course being corrected and is subject to the Mixture Acceptance Schedule—Table 10 or 11.

   b. Recalculate the Total Spread Rate. After the deficient hot mix course has been corrected, the total spread rate for that lot is recalculated, and mix in excess of the upper tolerance limit as outlined in the Subsection 400.4.A.2.b, Table 12, "Thickness and Spread Rate Tolerance at Any Given Location" is not paid for.

   The quantity of material placed on irregular areas such as driveways, turnouts, intersections, feather edge section, etc., is deducted from the final spread determination for each lot.
2. Plans Designate Thickness

   If the average thickness exceeds the tolerances specified in the Subsection 400.4.A.2.b, Table 1~~1~~2, "Thickness and Spread Rate Tolerance at Any Given Location", the Engineer shall take cores to determine the area of excess thickness. Excess quantity will not be paid for.

   If the average thickness is deficient by more than the tolerances specified in the Thickness and Spread Rate Tolerance at Any Given Location table below, the Engineer shall take additional cores to determine the area of deficient thickness. Correct areas with thickness deficiencies as follows:

   a. Overlay the deficient area with the same mixture type being corrected or with an approved surface mixture. The overlay shall extend for a minimum of 300 ft (90 m) for the full width of the course.
   b. Ensure that the corrected surface course complies with Subsection 400.3.06.C.1, "Visual and Straightedge Inspection." The mixture required to correct a deficient area is paid for at the Contract Unit Price of the course being corrected.

   The mixture is subject to the Mixture Acceptance Schedule—Table ~~9~~10 or 11 . The quantity of the additional mixture shall not exceed the required calculated quantity used to increase the average thickness of the overlaid section to the maximum tolerance allowed under the following table.

Table 12—Thickness and Spread Rate Tolerance at Any Given Location

Course	Thickness Specified	Spread Rate Specified
Asphaltic concrete base course	± 0.5 in (±13 mm)	+40 lbs, -50 lbs (+20 kg, -30 kg)
Intermediate and/or wearing course	± 0.25 in (± 6 mm)	+20 lbs, -25 lbs (+10 kg, -15 kg)
Overall of any combination of 1 and 2	± 0.5 in (±13 mm)	+40 lbs, -50 lbs (+20 kg, -30 kg)

Note 1: For asphaltic concrete 9.5 mm OGFC and 12.5 mm OGFC, control the spread rate per lot within 5 lbs/yd^2 (3 kg/m^2) of the designated spread rate. For asphaltic concrete 12.5 mm PEM, control the spread rate per lot within 10 lbs/yd^2 (6 kg/m^2) of the designated spread rate.

Note 2: Thickness and spread rate tolerances are provided to allow normal variations within a given lot. Do not continuously operate at a thickness of spread rate not specified.

When the Plans specify a thickness, the Engineer may take as many cores as necessary to determine the average thickness of the intermediate or surface course. The Engineer shall take a minimum of one core per 1,000 ft (300 m) per two lanes of roadway. Thickness will be determined by average measurements of each core according to GDT 42.

If the average exceeds the tolerances specified in the Subsection 400.4.A.2.b, Table 1~~1~~2, "Thickness and Spread Rate Tolerance at Any Given Location", additional cores will be taken to determine the area of excess thickness and excess tonnage will not be paid for.

B. Hot Mix Asphaltic Concrete Paid for by Square Yard (Meter)

1. The thickness of the base course or the intermediate or surface course will be determined by the Department by cutting cores and the thickness will be determined by averaging the measurements of each core.
2. If any measurement is deficient in thickness more than the tolerances given in the table above, additional cores will be taken by the Department to determine the area of thickness deficiency. Correct thickness deficiency areas as follows:
   a. Overlay the deficient area with the same type mixtures being corrected or with surface mixture. Extend the overlay at least 300 ft (90 m) for the full width of the course.
   b. Ensure the corrected surface course complies with Subsection 400.3.06.C.1, Visual and Straightedge Inspection" .
   c. The mixture is subject to the Mixture Acceptance Schedule—Table 10or 11.
3. No extra payment is made for mixtures used for correction.
4. No extra payment is made for thickness in excess of that specified.

NOTE: Thickness tolerances are provided to allow normal variations within a given lot. Do not continuously operate at a thickness not specified.

C. Asphaltic Concrete

Hot mix asphaltic concrete, complete in place and accepted, is measured in tons (megagrams) or square yards (meters) as indicated in the Proposal. If payment is by the ton (megagram), the actual weight is determined by weighing each

loaded vehicle on the required motor truck scale as the material is hauled to the roadway, or by using recorded weights if a digital recording device is used.

The weight measured includes all materials. No deductions are made for the weight of the individual ingredients. The actual weight is the pay weight except when the aggregates used have a combined bulk specific gravity greater than 2.75. In this case the pay weight is determined according to the following formula:

$$T1 = T \times \left\{ \frac{\% AC + \left(\frac{\% \text{ Aggregate} \times 2.75}{\text{combined bulk Specific Gravity}} \right) + \% Y}{100} \right\}$$

Where:

T1	Pay weight, tonnage (Mg)
T=	Actual weight
% AC=	Percent asphalt cement by weight of total mixture
% Aggregate =	Percent aggregate by weight of total mixture
Combined Bulk Sp. Gr.=	Calculated combined bulk specific gravity of various mineral aggregates used in the mixture
% Y=	Percent hydrated lime by weight of mineral aggregate

D. Bituminous Material

Bituminous material is not measured for separate payment.

E. Hydrated Lime

When hydrated lime is used as an anti-stripping additive, it is not measured for separate payment.

F. Field Laboratory

The field laboratory required in this Specification is not measured for separate payment.

G. Asphaltic Concrete Leveling

Payment of hot mix asphaltic concrete leveling, regardless of the type mix, is full compensation for furnishing materials, bituminous materials, and hydrated lime (when required) for patching and repair of minor defects, surface preparation, cleaning, hauling, mixing, spreading, and rolling.

Mixture for leveling courses is subject to the acceptance schedule as stated in Subsection 400.3.06.A and Subsection 400.3.06.B.

H. Asphaltic Concrete Patching

Hot mix asphaltic concrete patching, regardless of the type mix, is paid for at the Contract Unit Price per ton (Megagram), complete in place and accepted. Payment is full compensation for:

- Furnishing materials such as bituminous material and hydrated lime (when required)

- Preparing surface to be patched
- Cutting areas to be patched, trimmed, and cleaned
- Hauling, mixing, placing, and compacting the materials

400.4.01 Limits

When the asphaltic concrete is paid for by the square yard (meter) and multiple lifts are used, the number and thickness of the lifts are subject to the Engineer's approval and are used to prorate the pay factor for the affected roadway section.

400.5 Payment

When materials or construction are not within the tolerances in this Specification, the Contract Price will be adjusted according to Subsection 106.03, "Samples, Tests, Cited Specifications" and Subsection 400.3.06, "Quality Acceptance."

Hot mix asphaltic concrete of the various types are paid for at the Contract Unit Price per ton (megagram) or per square yard (meter). Payment is full compensation for furnishing and placing materials including asphalt cement, hydrated lime when required, approved additives, and for cleaning and repairing, preparing surfaces, hauling, mixing, spreading, rolling, and performing other operations to complete the Contract Item.

Payment will be made under:

Item No. 400	Asphaltic concrete type Superpave, group-blend, Including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete type, Superpave, group-blend, including bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete type Superpave, group-blend, Including bituminous materials, Gilsonite modifier, and hydrated lime	Per ton (megagram)

Item No. 400	_____ inches asphaltic concrete, type Superpave, group-blend including bituminous materials, Gilsonite modifier and hydrated lime	Per square yard (meter)
Item No. 400	Asphaltic concrete type Stone Matrix Asphalt, group-blend, including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete type OGFC, group 2 only, including bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete type OGFC, group 2 only, including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete type Porous European Mix, group 2 only, including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)

400.5.01 Adjustments

A. Materials Produced and Placed During the Adjustment Period

An adjustment period is allowed at the start of mixing operations for each type of mix placed on the Contract. Asphaltic Concrete OGFC or PEM shall be granted an adjustment period for the first 500 tons (500 Mg) produced for the Contract. A new adjustment period shall not be granted for a change of producer, mix design or asphalt plant location. The adjustment period is provided to adjust or correct the mix and to establish the construction procedures and sequence of operations.

The adjustment period consists of the tons (megagrams) of the affected mix produced and placed on the first day of operation. If this quantity is less than 500 tons (500 Mg), the Engineer may combine the tons (megagrams) produced and placed on the first day of operation with the tons (megagrams) produced and placed on the next production day of the affected mix for the adjustment period.

The material produced and placed during the mixture adjustment period is one lot. If the mix is adjusted during this period, a new lot may be necessary, but a new adjustment period will not be permitted.

This material shall be paid for at 100 percent of the Contract Unit Price provided it meets the minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the Mixture Acceptance Schedule—Table 10 or 11 .

If the material placed during the adjustment period fails to meet the above requirements, it will be paid for using the applicable acceptance schedule. However, when mixture used for leveling at a spread rate of 90 lbs/yd² (50 kg/m²) or less is also used for the surface mix at a spread rate greater than 90 lbs/yd² (50 kg/m²), an additional adjustment period will be allowed for compaction only. This material will be paid for at a 1.00 pay factor provided it:

- Meets the minimum requirements for a 1.00 pay factor in the Mixture Acceptance Schedule—Table 10 or 11 for both asphalt content and gradation.
- Meets the minimum requirements for a 0.90 pay factor in Table 13 of Subsection 400.5.01C, "Calculate Mean Pavement Air Voids.

Mixture which does not meet these requirements shall be paid for using the applicable acceptance schedule.

B. Determine Lot Acceptance

Pay factor adjustments are based on control sieves and asphalt cement content. The control sieves used in the mixture acceptance schedule for the various types of mix are indicated below:

Control Sieves Used in the Mixture Acceptance Schedule	
Asphaltic concrete 25 mm Superpave	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm SMA	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm SMA	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm PEM	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm OGFC	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm Superpave	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm SMA	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm OGFC	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 4.75 mm Mix	No. 8 (2.36 mm) sieve and asphalt cement

For projects which do not have milling quantities established as a Pay Item, the Department will pay for 12.5 mm OGFC and PEM placed on ramps and end of project transitions under the appropriate mixture pay item, but the mix shall be subject to the same gradation and control sieve requirements as asphaltic concrete 9.5 mm OGFC. Add polymer-modified bituminous material, hydrated lime, and stabilizing fiber to this mix.

The Department will perform the following tasks:

1. Using the Mixture Acceptance Schedule—Table 10 or 11, determine the mean of the deviations from the job mix formula per test results per lot.
2. Determine this mean by averaging the actual numeric value of the individual deviations from the job mix formula; disregard whether the deviations are positive or negative amounts.
3. Use the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete Mixture Acceptance Schedule—Table10 to determine acceptance of surface mixes and the Mixture Acceptance Schedule—Table 11 to determine acceptance of subsurface mixes.

On Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete, the mixture is accepted for 100 percent payment of the asphaltic concrete Unit Price provided it meets the following:

1. Minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the applicable Mixture Acceptance Schedule—Table 10 or 11.
2. Minimum requirements for a 0.90 pay factor in Table 13 of Subsection 400.5.01C, "Calculate Pavement Mean Air Voids.

If the material placed on Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete does not meet the above requirements, the material will be paid for using the applicable acceptance schedule.

C. Calculate Pavement Mean Air Voids

The Department will determine the percent of maximum air voids for each lot by dividing the pavement mean air voids by the maximum pavement mean air voids acceptable.

The Department will determine the payment for each lot by multiplying the Contract Unit Price by the adjusted pay factor shown in the following Air Voids Acceptance schedule:

Table 13 - Air Voids Acceptance Schedule

Pay Factor	Percent of Maximum Air Voids (Lot Average of Tests)	Percent of Maximum Air Voids (Lot Average all Tests) (for Reevaluations)
1.00	≤100	≤100
0.97	100.1 — 105	100.1 — 104
0.95	105.1 — 112	104.1— 109
0.90	112.1 — 124	109.1 — 118
0.80	124.1 — 149	118.1 — 136
0.70	149.1 —172	136.1 — 153
0.50	172.1 — 191	153.1 — 166

When recommended by the Office of Materials and Testing, Lots receiving less than 0.5 pay factor shall be removed and replaced at the Contractor's expense.

When the range tolerance is exceeded, the Department will apply a pay factor of 0.95 as described in Subsection 400.3.06.B.2.

D. Asphaltic Concrete For Temporary Detours

Hot mix asphaltic concrete placed on temporary detours not to remain in place as part of the permanent pavement does not require hydrated lime. Hot mix used for this purpose is paid for at an adjusted Contract Price. Ensure the payment for this item covers all cost of construction, maintenance and removal of all temporary mix. Ensure hot mix asphaltic concrete placed as temporary mix meets requirements established in Subsection 400.3.05.F.

Where the Contract Price of the asphaltic concrete for permanent pavement is let by the ton (megagram), the Contract Price for the asphaltic concrete placed on temporary detours is adjusted by subtracting $0.75/ton ($0.85/mg) of mix used.

Where the Contract price of the mix in the permanent pavement is based on the square yard (meter), obtain the adjusted price for the same mix used on the temporary detour by subtracting $0.04/yd² ($0.05/ m²) per 1-in (25-mm) plan depth.

Further price adjustments required in Subsection 400.3.06, "Quality Acceptance," which are based on the appropriate adjusted Contract Price for mix used in the temporary detour work shall apply should temporary mix be left in place. Ensure hot mix asphalt produced as temporary mix containing no hydrated lime is removed and replaced with permanent mix containing hydrated lime.

E. Determine Lot Payment

Determine the lot payment as follows:

1. When one of the pay factors for a specific acceptance lot is less than 1.0, determine the payment for the lot by multiplying the Contract Unit Price by the adjusted pay factor.
2. When two or more pay factors for a specific acceptance lot are less than 1.0, determine the adjusted payment by multiplying the Contract Unit Price by the lowest pay factor.

If the mean of the deviations from the job mix formula of the tests for a sieve or asphalt cement content exceeds the tolerances established in the Mixture Acceptance Schedule—Table 10 or 11 and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the pavement mean air voids exceed the tolerances established in the Air Voids Acceptance Schedule – Table 13, remove and replace the materials at the Contractor's expense.

If the Engineer determines the material is not acceptable to leave in place, remove and replace the materials at the Contractor's expense.

SECTION 400 (MODIFICATION)
HOT MIX ASPHALTIC CONCRETE CONSTRUCTION

400.1 GENERAL DESCRIPTION
RETAIN as written, except as specifically noted below.

400.2 MATERIALS
RETAIN as written, except as specifically noted below.

400.3 CONSTRUCTION REQUIREMENTS
RETAIN as written, except as specifically noted below.

ADD the following paragraphs:

The Contractor shall perform Quality Control testing necessary to demonstrate that all material and workmanship complies with the requirements of the construction documents.

All Quality Control testing performed by the Contractor shall incidental to the cost of the associated payment item. The Owner will perform representative Quality Acceptance testing of areas of work completed by the Contractor. Re-testing of failing Quality Acceptance testing costs will be at Contractor expense.

400.4 MEASUREMENT
REPLACED this Section in its entirety with the following:

400.4 MEASUREMENT

The items described in this Section are incidental to other Section 402 work items and shall not be separately measured for payment.

400.5 PAYMENT
REPLACE in its entirety with the following:

400.5 PAYMENT

No direct payment will be made for work described in this Section. The work described in this Section is considered incidental to Section 402 and shall be paid for in the respective bid item of which it is a component part.

This item will not be subject to price adjustment.

END OF SECTION 400 (MODIFICATION).

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Section 402—Hot Mix Recycled Asphaltic Concrete

402.1 General Description

This work includes producing and placing hot mix recycled asphaltic concrete that incorporates reclaimed asphalt pavement (RAP), reclaimed asphalt shingles (RAS), virgin aggregate, hydrated lime, and neat asphalt cement.

402.1.01 Definitions

General Provisions 101 through 150.

402.1.02 Related References

A. Standard Specifications

Section 400—Hot Mix Asphaltic Concrete Construction

Section 800—Coarse Aggregate

Section 828—Hot Mix Asphaltic Concrete Mixtures

B. Referenced Documents

Guidelines for RAP Stockpile Approval

402.1.03 Submittals

A. Certified Weight Tickets

Notify the Engineer before removing RAP from a stockpile that belongs to the Department. Submit to the Engineer the certified weight tickets of materials removed from the stockpile.

B. Affidavit

Submit to the laboratory an affidavit stating the sources of stockpiled materials to be used on a State project. Include the following information in the letter:

- State project number
- Location from which the material was removed
- Approximate removal dates
- Mix types removed and the estimated quantity of each type in the stockpiles
- Other available information about the stockpiled material such as percentage of local sand in the RAP

Obtain specific approval from the laboratory to use RAP or RAS stockpiles.

Adhere to Guidelines for RAP Stockpile Approval.

402.2 Materials

A. RAP Material Composition

Use RAP materials from any of the following:

- Existing roadway
- Contractor's RAP stockpile that has been approved by the Department
- Department stockpile

NOTE: The location of Department RAP material stockpiles will be given on the Plans.

Do not use RAP materials that contain alluvial gravel or local sand in any mixture placed on interstate projects except for mixtures used in shoulder construction. When used in shoulder construction, limit RAP containing local sand or alluvial gravel so that the sand or gravel contributes no more than 20% of the total aggregate portion of the mix.

1. RAP Percentage

   For non-interstate projects, limit the percentage of RAP allowed in recycled mixes so that the overall amount of alluvial gravel does not exceed 5 percent of the total mix. The percentage of alluvial gravel, local sand, and Group I material in the RAP will be determined through petrographic analysis or available records.

   RAP furnished to the Contractor but not used in the work remains the Contractor's property.

   RAP used in the recycled mixtures for mainline or ramps (if applicable) may make up from 0 to 40 percent of the mixture depending on the amount of RAP available, the production facilities, and whether the mixture meets the requirements in Section 828.

   The maximum ratio of RAP material to the recycled mixture is 40 percent for continuous mix type plants and 25 percent for batch type plants.

2. Process RAP Material

   Process RAP material to be used in the recycled mixture so that 100 percent will pass the 2 in (50 mm) sieve. Additional crushing and sizing may be required if the RAP aggregate exceeds the maximum sieve size for the mix type as shown in Section 828. Obtain representative materials from the RAP stockpile for the mix design.

B. RAS Material

RAS materials are produced as a by-product of manufacturing roofing shingles and/or discarded shingle scrap from the reroofing of buildings.

1. Limit the amount of RAS material used in the recycled mixture to no greater than 5 percent of the total mixture weight.
2. Shred the RAS material before incorporating it into the mix to ensure that 100 percent of the shredded pieces are less than 1/2 in (12.5 mm) in any dimension.
3. Remove all foreign materials such as paper, roofing nails, wood, or metal flashing.
4. Provide test results for Bulk Sample Analysis, known as Polarized Light Microscopy, if post-consumer shingles are used to certify the RAS material is free of asbestos. Test stockpiles at the rate of one test per 1000 tons (megagrams) prior to processing.

Other than as specifically stated in this Subsection, ensure that RAS material is used according to the same requirements as described for RAP material.

C. Asphaltic Concrete Removed from an Existing Roadway

Asphaltic concrete removed from an existing roadway becomes the Contractor's property unless specified otherwise on the Plans. RAP material retained by the Department is designated on the Plans, and the RAP shall be stockpiled at the location specified on the Plans.

D. Local Sand and Group I Material in RAP

Use of local sand in recycled mixes is restricted as stipulated in Section 828 for the Project. However, RAP which contains local sand may be used in surface and intermediate layers of non-interstate projects so long as the RAP percentage used does not contribute more than 5% local sand to the total aggregate portion of the mix. The amount of local sand in the RAP material shall be considered when determining the percentage of local sand in the total mix.

Where Pay Items specify that Group II only aggregate is to be used, RAP which consists primarily of Group II aggregate, but contains some Group I aggregate, shall be limited such that the Group I aggregate makes up no more than 5% of the total aggregate portion of the mix. When a Blend I mix is specified, any Group I materials in the RAP will be considered when determining the Group I portion allowed in the total mix as specified in Subsection 828.2.A.2.

E. Asphalt Cement

Using laboratory evaluations, the Department will determine the asphalt cement grade to be used in the recycled mixture. The asphalt cement shall meet the requirements of Section 820.

When the asphalt cement is blended with asphalt cement recovered from the RAP material and after tests on residue from thin film oven tests, the asphalt cement shall have a viscosity of 6,000 to 16,000 poises (600 to 1600 Pa) or as approved by the Engineer. Recover asphalt cement from the recycled mixture to verify that the specified viscosity is being met.

If the Engineer determines during construction that the selected asphalt cement grade is not performing satisfactorily, the Department may change the asphalt cement grade in the mixture, with no change in the Contract Unit Price.

F. Recycled Mixture

The recycled mixture shall be a homogenous mixture of RAP or RAS material, virgin aggregate, hydrated lime, and neat asphalt cement. Ensure that the mixture conforms to an approved mixture design outlined in Section 828.

402.2.01 Delivery, Storage, and Handling

Separate the stockpiles by Project sources and by Group I and Group II aggregate types. Erect a sign on each stockpile to identify the source(s).

If RAP material from different project sources becomes intermixed in a stockpile, only use those materials when approved by the laboratory.

The Department may reject by visual inspection stockpiles that are not clean and free of foreign materials.

402.3 Construction Requirements

402.3.01 Personnel

General Provisions 101 through 150.

402.3.02 Equipment

A. Hot Mix Plant

Use a hot mix plant for the recycling process with necessary modifications approved by the Engineer to process recycled material. Design, equip, and operate the plant so that the proportioning, heating, and mixing yields a uniform final mixture within the job mix formula tolerances.

B. Cold Feed Bin

Proportion the RAP or RAS material using a separate cold feed bin. Ensure that the material meets the size requirements in Subsection 402.2, "Materials." The ratio of the RAP or RAS to virgin aggregate shall be controlled gravimetrically.

C. Electronic Belt Weighing Devices

Use electronic belt weighing devices to monitor the flow of RAP or RAS and the flow of virgin aggregate. For batch-type plants, the RAP or RAS portion of the mix may be weighed in a weigh hopper before incorporating it into the pugmill.

D. Feeders and Conveyors

Equip plants with an interlocking system of feeders and conveyors that synchronize the RAP or RAS material flow with the virgin aggregate flow. Ensure that the electronic controls track the flow rates indicated by the belt weighing devices and develop the signal to automatically maintain the desired ratio at varying production rates. Design the RAP or RAS feeder bins, conveyor system, and auxiliary bins (if used) to prevent RAP material from segregating and sticking.

402.3.03 Preparation

General Provisions 101 through 150.

402.3.04 Fabrication

General Provisions 101 through 150.

402.3.05 Construction

Follow the requirements in Section 400 for hot mix recycled asphaltic concrete production and placement, materials, equipment, and acceptance plans except as noted or modified in this Specification.

402.3.06 Quality Acceptance

The Department may require additional quality control tests to determine the RAP stockpile consistency and the RAP aggregate quality. In this case, conduct at least three extraction/gradation tests from each individual source. Ensure that aggregate meets the quality standards in Section 800.

402.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

402.4 Measurement

Recycled asphaltic concrete mixture, complete in place and accepted, is measured in tons (megagrams). The weight is determined by recorded weights if an approved recording device is used. Or, the weight is determined by weighing each loaded vehicle on an approved motor truck scale as the material is hauled to the roadway.

402.4.01 Limits

General Provisions 101 through 150.

402.5 Payment

The work performed and the materials furnished as described in this Specification will be paid for at the Contract Unit Price per ton (megagram). Payment is full compensation for providing materials, hauling and necessary crushing, processing, placing, rolling and finishing the recycled mixture, and providing labor, tools, equipment, and incidentals necessary to complete the work, including hauling and stockpiling RAP or RAS material.

Payment will be made under:

Item No. 402	Recycled asphaltic concrete type, group-blend, including bituminous materials	Per ton (megagram)
Item No. 402	Recycled asphaltic concrete type, group-blend, including bituminous materials and hydrated lime	Per ton (megagram)
Item No. 402	Recycled asphaltic concrete type, group-blend, including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 402	_____in (mm) recycled asphaltic concrete type, group-blend, including bituminous materials	Per square yard (meter)
Item No. 402	_____in (mm) recycled asphaltic concrete type, group-blend, including bituminous materials and hydrated lime	Per square yard (meter)
Item No. 402	_____in (mm) recycled asphaltic concrete type, group-blend, including polymer-modified bituminous materials and hydrated lime	Per square yard (meter)
Item No. 402	Recycled asphaltic concrete patching including bituminous materials	Per ton (megagram)
Item No. 402	Recycled asphaltic concrete patching including bituminous materials and hydrated lime	Per ton (megagram)

Item No. 402	Recycled asphaltic concrete leveling including bituminous materials	Per ton (megagram)
Item No. 402	Recycled asphaltic concrete leveling including bituminous materials and hydrated lime	Per ton (megagram)

402.5.01 Adjustments

General Provisions 101 through 150.

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SECTION 402 (MODIFICATION)
HOT MIX RECYCLED ASPHALTIC CONCRETE

402.1 GENERAL DESCRIPTION

Retain as written, except as specifically noted below.

402.1.03 Submittals

A. Certified Weight Tickets

This section is REPLACED in its entirety with the following:

A. Certified Weight Tickets

RAP stockpile belonging to the Department is NOT AVIALABLE for this project. Certified weight tickets are not required.

B. Affidavit

DELETE references to State Project and State Project Number.

402.2 MATERIALS

Add at the beginning of the 402.2:

The proposed mix shall be a GDOT approved Mix Design. The mix shall conform to GDOT Section 828.2.03 (latest edition) 12.5mm Superpave with the exception that the design optimum air voids for mixes shall be 3.5% + 0.5% in lieu of the 4.5% specified. This change in the mixture shall be effected by increasing the asphalt cement requirement of any current approved design as necessary to decrease the air voids to 3.5%+ 0.5%.

Retain as written, except as specifically noted below.

A. RAP Material Composition

REPLACE the first six lines to read:

A. **RAP Material Composition**

Use RAP materials from any of the following:

- Existing Runway
- Contractor's RAP stockpile that has been approved by the **Engineer**

402.3 CONSTRUCTION REQUIREMENTS

Retain as written, except as specifically noted below.

The Contractor shall perform Quality Control testing necessary to demonstrate that all material and workmanship complies with the requirements of the construction documents. Quality Control testing shall be performed by the Contractor and is included in the cost of the associated payment item. The Owner will perform representative Quality Acceptance testing of areas of work completed by the Contractor. Failing Quality Acceptance testing costs will be at the Contractor's expense. Quality Control shall be performed in accordance with GDOT Section 400, latest edition.

402.5 PAYMENT

This Section is REPLACED in its entirety with the following:

402.5 PAYMENT

The work performed and the materials furnished as described in this Section will be paid for at the Contract Unit Price per Ton, at the specified lift thickness. Payment is full compensation for providing materials, hauling and necessary crushing, processing, placing, rolling, and finishing the recycled mixture, and providing labor, tools, equipment, and incidentals necessary to complete the work, including hauling and stockpiling RAP or RAS material and quality control testing and reporting.

This item will not be subject to price adjustment.

A. Payment will be made under:

Item GDOT 402-1 Hot Mix Recycled Asphaltic Concrete, 12.5 mm Superpave, per Ton.

END OF SECTION 402 SP (SPECIAL PROVISION).

Section 412—Bituminous Prime

412.1 General Description

This work includes preparing and treating an existing surface with bituminous material and blotter material, if required. Treat the surface according to these Specifications and conform to the lines shown on the Plans or established by the Engineer.

412.1.01 Definitions

General Provisions 101 through 150.

412.1.02 Related References

A. Standard Specifications

Section 424—Bituminous Surface Treatment

Section 821—Cutback Asphalt

B. Referenced Documents

General Provisions 101 through 150.

412.1.03 Submittals

General Provisions 101 through 150.

412.2 Materials

Unless otherwise specified, select the types of bituminous materials. The Engineer will determine the grade of materials to be used. The Specifications for the bituminous materials include:

Material	Section
Cutback Asphalt, RC-30, RC-70, RC-250 or MC-250, MC-30, or MC-70	821.2.01
Blotter Material (Sand)	412.3.05.G.3

412.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

412.3 Construction Requirements

412.3.01 Personnel

General Provisions 101 through 150.

412.3.02 Equipment

Provide equipment that is in good repair, including at least the following units that meet the requirements of Subsection 424.3.02, "Equipment."

- Pressure distributor
- Power broom and blower
- Aggregate spreader (if required)

412.3.03 Preparation

See Subsection 412.3.05.B, "Condition of Surface."

412.3.04 Fabrication

General Provisions 101 through 150.

412.3.05 Construction

Prime the following bases and other areas:

- Cement or lime stabilized bases or subbases, regardless of pavement thickness
- Soil or aggregate bases or sub-bases on which bituminous surface treatment will be placed
- Soil or aggregate bases or sub-bases on which less than 5 in (125 mm) total thickness of hot mix asphaltic concrete will be placed

Prime is not required on driveway construction and paved shoulders.

A. Weather Limitations

Do not apply bituminous prime under any of these conditions:

- Surface is wet.
- Air temperature is below 40 ºF (4 ºC) in the shade.
- Rain is imminent.
- Weather conditions may prevent proper prime coat construction.

B. Condition of Surface

Ensure that the surface to which the prime is to be applied has been finished to the line, grade, and cross section specified.

Ensure that the surface is uniformly compacted and bonded. Correct surface irregularities according to the Specifications for the construction being primed.

C. Cleaning

Remove from the road loose material, dust, caked clay, and other material that may prevent bonding of the prime with the surface. Use power sweepers or blowers the full width of the prime and 2 ft (600 mm) more on each side. Where necessary, sweep by hand.

D. Moisture

Ensure that the surface is only slightly damp. If the surface is too wet, allow it to dry. If it is too dry, the Engineer may require that it be sprinkled lightly just before priming.

E. Temperature and Surface Texture

The surface texture and condition of the surface determine the bituminous material grades to be used.

The following table shows the bituminous material grades and application temperatures as they are applied to various surface textures.

Base Texture	Tight	Average	Open
Materials and grade	MC-30 RC-30	RC-70 or MC-70	RC-250 or MC-250
Application temperature °F (°C)	80–120 (27–49)	105-180 (41–82)	145–220 (63–104)

The Engineer will determine the temperature for applying bituminous prime within the limits shown above.

Heat and apply bituminous materials as specified in Subsection 424.3.05.D, "Heating Bituminous Material" and Subsection 424.3.05.E, "Applying Bituminous Material."

F. Amount and Extent of Prime

The Engineer will determine the exact amount of bituminous material to be used within minimum and maximum rates of 0.15 to 0.30 gal/yd² (0.7 to 1.4 liters/m²). Apply the specified amount as follows:

1. Apply the determined amount uniformly and accurately. Ensure that the amount applied to any 0.5-mile (800 m) section is within 5 percent of the amount specified.
2. Apply the prime the full width of the proposed wearing surface that will be superimposed plus 6 in (150 mm) more on each side.

G. Protection, Curing, and Maintenance

Do the following after priming the surface:

1. Close to Traffic

   Do not allow traffic on the primed surface. Leave the surface undisturbed until the prime thoroughly cures and does not pick up under traffic.

2. Roll

   If the surface becomes soft after it is primed, roll the surface longitudinally with a pneumatic-tired roller at no more than 6 mph (10 kph) until the surface is firmly set.

3. Blot

   If necessary to prevent the prime from being picked up, spread clean, dry, sharp sand over the surface by hand or mechanically. Apply sand only to places that are tacky and use the least amount needed to prevent pick up. No extra payment for this work or material will be made.

4. Open to Traffic

   After rolling and sanding (if required), open the primed surface to ordinary traffic subject to the conditions in Subsection 412.3.05.G.1, “Close to Traffic.”

5. Maintenance

   Maintain the prime coat and the primed course surface until it is covered by other construction. Remove excess bituminous material.

412.3.06 Quality Acceptance

General Provisions 101 through 150.

412.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

412.4 Measurement

Bituminous material for prime is not measured for separate payment.

412.4.01 Limits

General Provisions 101 through 150.

412.5 Payment

Bituminous material for prime is not paid for separately. The cost to clean the surface, furnish, haul and apply materials including water and sand, roll, and perform repairs and maintenance is included in the Unit Price bid for each individual Base Item.

412.5.01 Adjustments

General Provisions 101 through 150.

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Section 636—Highway Signs

636.1 General Description

This work includes fabricating and installing highway signs according to the details on the Plans and the Manual on Uniform Traffic Control Devices.

636.1.01 Definitions

General Provisions 101 through 150.

636.1.02 Related References

A. Standard Specifications

Section 500—Concrete Structures

Section 830—Portland Cement

Section 855—Steel Pile

Section 870—Paint

Section 910—Sign Fabrication

Section 911—Sign Posts

Section 912—Sign Blanks and Panels

Section 913—Reflectorizing Materials

Section 914—Sign Paint

Section 915—Mast Arm Assemblies

Section 916—Delineators

Section 917—Reflective and Nonreflective Characters

B. Referenced Documents

Manual on Uniform Traffic Control Devices

636.1.03 Submittals

Before fabricating overhead panel type signs, submit to the Engineer the Shop Drawings to approve the sign bracing and method of attaching to sign supports.

Before driving piles, furnish a list of proposed pile lengths to the Engineer.

636.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Sign Fabrication and Accessories	910
Steel Sign Posts and Bolts (Drive Type)	911.2.01
Galvanized Steel Structural Shape Posts	911.2.02
Delineator Posts	
Galvanized Steel	911.2.04.A.4

Material	Section
Aluminum “U” Flange	911.2.04.A.5
Wood	911.2.04.A.6
Flexible	911.2.04.A.7
Aluminum Sign Blanks	912.2.01
Extruded Aluminum Sign Panels	912.2.02
Reflective Sheeting	913.2.01
Silk Screen Lettering Paint	914.2.01
Steel Posts and Arms for Mast Arm Assembly	915.2.01
Guy Wires for Mast Arm Assembly	915.2.02
Center Mount Reflector	916.2.01
Demountable Characters with Reflective Sheeting	917.2.01
Fittings, bolts, nuts, washers, clips, molding, etc., for panel signs shall conform to the requirements shown on the Plans.	
Class A Concrete Footings for Signs	500
Piling	855.2.03
Portland Cement	830.2.01
Sign Paint, Enamel	870.2.03

636.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

636.3 Construction Requirements

636.3.01 Personnel

General Provisions 101 through 150.

636.3.02 Equipment

General Provisions 101 through 150.

636.3.03 Preparation

General Provisions 101 through 150.

636.3.04 Fabrication

General Provisions 101 through 150.

636.3.05 Construction

A. Finished Signs

Ensure that the finished signs are clear cut and that the lines of letters and details are true, regular, and free of waviness, unevenness, furry edges or lines, scaling, cracking, blistering, pitting, dents, or blemishes.

Only one type of demountable characters (letters, numerals, symbols, and borders) is permitted on special roadside signs on each Project.

B. Erecting the Signs

1. Drive Type Posts

   Drive type posts may be driven in place or placed in prepared holes.

   a. Use driven posts only in firm and stable soil. If the soil is sandy or unstable, place each drive type post in a prepared dry hole of at least a 4 in (100 mm) diameter.

   b. When placing posts in prepared holes:

      1) Backfill the holes with a mixture of damp, clean friable soil and 8 percent by volume Portland cement.

      2) Thoroughly tamp the mixture in place around the posts.

   c. Erect posts vertically as deep and at an angle to the roadway as shown on the Plans or as directed.

   d. Do not penetrate posts in the coastal plain region less than 4 ft (1.2 m) or 3 ft (1 m) for posts in the Piedmont and the Valley and Ridge Regions when no guard rail is present.

      When erecting signs behind a guard rail, penetrate at least 3 ft (1 m) for posts 14 ft (4.2 m) or less long, or 4 ft (1.2 m) for posts over 14 ft (4.2 m) long.

2. Single-Plate Signs

   Erect single-plate signs 9 ft^2 (0.84 m^2) or less on one drive-type post unless otherwise specified on the Plans.

   Erect single-plate signs greater than 9 ft^2 (0.84 m^2) on two drive-type posts.

   Leave enough distance between the two posts to fit the mounting holes in the sign plate.

3. Steel Posts for Mast Arm Assemblies

   a. Erect steel posts for mast arm assemblies in a concrete foundation according to the Plans. Erect at the place, height, and angle to the roadway specified.

   b. After curing the concrete foundation for at least 24 hours, securely fasten the specified signs into place on the mast arm.

4. Ground-Mounted Panel-Type Signs

   a. Erect the supporting members of ground-mounted panel-type signs where shown on the Plans or as directed by the Engineer at the specified angle to the roadway.

   b. Securely fasten the panels into place.

5. Milepost Signs

   Erect milepost signs including posts as specified on the Plans.

6. Delineator Posts

   Use delineator posts made of galvanized steel, aluminum, or an alloy that conforms to the requirements of Subsection 911.2.04.A.4 or 911.2.04.A.5.

   a. Erect the posts where shown on the Plans.

   b. Mount reflectors for galvanized steel or aluminum posts on the flange side of the post.

   c. When signs are attached to supports, torque the bolts to at least 20 ft-lbs (27 N•m).

7. Overhead Panel-Type Signs

   Erect overhead panel type signs on sign supports where shown on the Plans or as directed by the Engineer.

   a. Ensure that the bottom of the sign is 18 in (450 mm) above the top of the lighting fixture.

   b. Ensure that the sign has ample bracing for mounting the sign support so that each sign can withstand 1 in (25 mm) of ice accumulated on the entire sign and wind pressures shown on the Plans.

   c. Ensure that the top of each sign is three degrees off perpendicular from the bottom of the sign. Use the three-degree slant to lean the sign toward the approaching traffic.

C. Foundations (for Special Roadside Signs)

Do not disturb the natural ground adjacent to a foundation more than necessary to construct the footing.

1. Excavate for the footings to the lines and elevations shown on the Plans or established by the Engineer. Do not disturb or loosen the foundation below these elevations.
2. Use forms of the necessary shape and dimensions to construct the footings to the lines and elevations shown on the Plans.
3. Cure the concrete foundations, constructed in conformance with Section 500 and the Plan details, at least 7 days before erecting the sign.
4. Ensure that the minimum lengths of steel H piling used in the foundations of ground-mounting signs are accepted and meet the Plan penetration requirements.

   The Plan quantity of steel H piling is shown for estimating purposes only; determine and provide the necessary lengths of piles.
5. Before driving the piles, furnish a list of proposed pile lengths to the Engineer.
   a. Use full-length piles or built-up piles with a maximum of two splices that are made in the presence of the Engineer.
   b. Furnish satisfactory identification for all piles or portions thereof.
6. When rock prevents the penetration required on the Plans, construct according to the notes and details shown on the Plans.
7. The minimum energy ratings required by Section 520 for pile hammers will be waived for constructing ground-mounted sign supports. Jetting is not permitted.
8. Place required backfilling in layers no greater than 6 in (150 mm) thick and thoroughly compact it to the approximate density of the undisturbed soil in the area.

D. Sign Panels

Use extruded, panel-type aluminum. Ensure that the sign type used meets the requirements of Subsection 912.2.02.

E. Legends and Borders

Place legends and borders according to Subsection 917.2.01, "Demountable Characters", with Type VI reflective sheeting.

636.3.06 Quality Acceptance

General Provisions 101 through 150.

636.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

636.4 Measurement

A. Type-1 or Type-2 Highway Signs

Type 1 or Type 2 highway signs with reflective sheeting of Type III, IV, or VI as specified on the Plans to be paid for are measured for payment by the actual number of square feet (meters) and fraction thereof of sign type and sheeting specified. The measurement includes providing the message and furnishing and placing signs complete and accepted. The Plan quantity will be the pay quantity.

B. Extruded Aluminum Panels

Extruded aluminum panels to be paid for are the number of square feet (meters) or portion of square feet (meters) furnished, including legend components, border material, fittings, nuts, washers, clamps, molding, etc., furnished, erected, completed, and accepted.

C. Galvanized Steel Posts

Galvanized steel posts, types 1, 2, 3, 4, 5, 6, 7, or 8 to be paid for are the actual number of linear feet (meters) and fraction thereof of the type specified, furnished, erected, completed, and accepted.

Galvanized steel to be paid for is the number of pounds (kilograms) furnished, erected, and accepted. Weights are computed from theoretical weights listed in the Plans for each post size. Base plates, connections, anchors, stub post, etc., are not measured for payment but are considered incidental to the Item.

D. Delineators

Delineators (reflectorized guide markers) to be paid for are the number of the type specified, including posts, rivets, and spacers, that are furnished, placed, and completed and accepted.

E. Mast Arm Assemblies

Mast arm assemblies to be paid for are the actual number furnished and erected, including concrete footing, sign, and post, completed and accepted.

F. Special Roadside Signs

Class A concrete for special roadside signs to be paid for are measured by the cubic yard (meter), neat measurement according to Section 500.5 "Payment." No deductions are made for the volume of concrete displaced by steel piling, anchor bolts, or posts.

G. Portland Cement

Portland cement stabilized material used for backfilling holes is not measured for payment.

H. Steel H—Piling

Steel H—piling is measured for payment by the linear foot (meter) of accepted piling in place (signs), remaining in the completed work.

636.4.01 Limits

General Provisions 101 through 150.

636.5 Payment

Highway signs, galvanized steel posts, I-beam posts, delineators, mast arm assemblies, Class A concrete, and piling for signs are paid for at the Contract Unit Price for the various items. Payment is full compensation for furnishing and erecting the Item complete in place according to this Specification.

Separate payment will not be made for piling splices, the cost of cutting, or the cutoff portions. Pile cutoffs remain the Contractor's property.

Piles eliminated due to authorized revisions will be paid for according to Subsection 109.06, "Eliminated Items." These piles become Departmental property. Except for the above provision, no payment will be made for piles delivered to the Project that are not used in the work.

Payment will be made under:

Item No. 636	Highway signs, type 1 material, reflective sheeting type___,	Per square foot (meter)

Item No. 636	Highway signs, type 2 material, reflective sheeting type___,	Per square foot (meter)
Item No. 636	Galvanized steel posts, type ___	Per linear foot (meter)
Item No. 636	Galvanized steel structural shape posts	Per pound (kilogram)
Item No. 636	Highway signs, aluminum extruded panels, reflective sheeting type ___	Per square foot (meter)
Item No. 636	Plastic Flexible Delineator, type___	Per each
Item No. 636	Delineator, Type___	Per each
Item No. 636	Piling in place, signs, steel H, HP 12x53 (HP 310x79)	Per linear foot (meter)

636.5.01 Adjustments

General Provisions 101 through 150.

SECTION 636 (MODIFICATION)
HIGHWAY SIGNS

636.1 GENERAL DESCRIPTION
RETAIN as written.

636.2 MATERIALS
RETAIN as written.

636.3 CONSTRUCTION REQUIREMENTS
RETAIN as written, except as specifically noted below.

The Contractor shall perform Quality Control testing necessary to demonstrate that all material and workmanship complies with the requirements of the construction documents. All Quality Control testing performed by the Contractor shall incidental to the cost of the associated payment item. The Owner may perform representative Quality Acceptance testing of areas of work completed by the Contractor. Failing Quality Acceptance testing costs will be at Contractor expense.

636.4 MEASUREMENT
REPLACE section in its entirety with the following.

Measurement will be made per each unit provided, installed, and completed in place, including all necessary incidental work.

636.5 PAYMENT
Retain as written, except as specifically noted below.

Payment will be made only under the following items:

Item GDOT 636-1	Sign Panel R1-1, Stop, 24”x24”, Post-Mounted, Airfield Installation – Per Each.
Item GDOT 636-2	Sign Panel R1-1, Stop, 24”x”, Post-Mounted, Landside Installation – Per Each.
Item GDOT 636-3	Sign Panel R7-8, Handicap Parking, 12”x18”, Post-Mounted – Per Each.
Item GDOT 636-4	Sign Panel R7-8, Handicap Parking, 12”x18”, with Van Accessible Panel, Post-Mounted – Per Each.

These items will not be subject to price adjustment.

END OF SECTION 636 (MODIFICATION)

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Section 652—Painting Traffic Stripe

652.1 General Description

This work includes furnishing and applying reflectorized traffic line paint according to the Plans and these Specifications.

This Item also includes applying words and symbols according to Plan details, Specifications, and the current Manual on Uniform Traffic Control Devices.

652.1.01 Definitions

Painted Stripes: Solid or broken (skip) lines. The location and color are designated on the Plans.

Skip Traffic Stripes: Painted segments between unpainted gaps as specified on the Plans. The location and color are designated on the Plans.

652.1.02 Related References

A. Standard Specifications

Section 656—Removal of Pavement Markings

Section 870—Paint

B. Referenced Documents

QPL 46

AASHTO M 247

652.1.03 Submittals

General Provisions 101 through 150.

652.2 Materials

Ensure that materials for painting traffic stripe, words, and symbols meet the following requirements:

Material	Section
Traffic Line Paint 5A and 5B	870.2.02.A.2 and 870.2.02.A.3
Glass Beads for Use in Luminous Traffic Lines	AASHTO M 247 Type 1*

*In addition, meet the following requirements for glass beads:

- Maximum quantity of angular particles is less than 1% by weight
- Maximum quantity of particles with milkiness, scoring, or scratching is less than 2% by weight
- Glass beads do not impart any noticeable hue to the paint film
- Glass beads conforming to the following alternate gradation may be used provided that all other requirements of AASHTO M 247 and this Specification are met.

Alternate Gradation	
Sieve Size	Percent Passing
No. 16 (1.190 mm)	99 - 100
No. 20 (0.850 mm)	75 - 95
No. 30 (0.600 mm)	55 – 85
No. 50 (0.300 mm)	10 – 35
No. 100 (0.150 mm)	0 - 5

652.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

652.3 Construction Requirements

652.3.01 Personnel

General Provisions 101 through 150.

652.3.02 Equipment

A. Traveling Traffic Stripe Painter

Use a traffic stripe painter that can travel at a predetermined speed both uphill and downhill, applying paint uniformly. Ensure that the painter feeds paint under pressure through nozzles spraying directly onto the pavement.

Use a paint machine equipped with the following:

1. Three adjacent spray nozzles capable of simultaneously applying separate stripes, either solid or skip, in any pattern.
2. Nozzles equipped with the following:
    - Cutoff valves for automatically applying broken or skip lines
    - A mechanical bead dispenser that operates simultaneously with the spray nozzle to uniformly distribute beads at the specified rate
    - Line-guides consisting of metallic shrouds or air blasts
3. Tanks with mechanical agitators
4. Small, portable applicators or other special equipment as needed

B. Hand Painting Equipment

Use brushes, templates, and guides when hand painting.

C. Cleaning Equipment

Use brushes, brooms, scrapers, grinders, high-pressure water jets, or air blasters to remove dirt, dust, grease, oil, and other foreign matter from painting surfaces without damaging the underlying pavement.

652.3.03 Preparation

Locate approved paint manufacturers on QPL 46.

Before starting each day's work, thoroughly clean paint machine tanks, connections, and spray nozzles, using the appropriate solvent.

Thoroughly mix traffic stripe paint in the shipping container before putting it into machine tanks.

Before painting, thoroughly clean pavement surfaces of dust, dirt, grease, oil, and all other foreign matter.

652.3.04 Fabrication

General Provisions 101 through 150.

652.3.05 Construction

A. Alignment

Ensure that the traffic stripe is the specified length, width, and placement. On sections where no previously applied markings are present, ensure accurate stripe location by establishing control points at spaced intervals. The Engineer will approve control points.

B. Application

Apply traffic stripe paint by machine. If areas or markings are not adaptable to machine application, use hand equipment.

1. Application Rate

   All work will be subject to application rate checks for both paint and beads.

   Apply 5 in (125 mm) wide traffic stripe at the following minimum rates:

   a. Solid Traffic Stripe Paint: At least 25 gal/mile (58.8 L/km)

   b. Skip Traffic Stripe Paint: At least 6.3 gal/mile (14.8 L/km)

NOTE: Change minimum rate proportionately for varying stripe widths.

2. Thickness

   Maintain a 15 mils (0.38 mm) minimum wet film thickness for all painted areas.

3. Do not apply paint to areas of pavement when:
   - The surface is moist or covered with foreign matter.
   - Air temperature in the shade is below 40 °F (5 °C)
   - Wind causes dust to land on prepared areas or blows paint and beads around during application.

4. Apply a layer of glass beads immediately after laying the paint. Apply beads at a minimum rate of 6 lbs to each gallon (700 grams to each liter) of paint.

C. Protective Measures

Protect newly applied paint as follows:

1. Traffic

   Control and protect traffic with warning and directional signs during painting. Set up warning signs before beginning each operation and place signs well ahead of the painting equipment. When necessary, use a pilot car to protect both the traffic and the painting operation.

2. Fresh Paint

   Protect the freshly painted stripe using cones or drums. Repair stripe damage or pavement smudges caused by traffic according to Subsection 652.3.06.

D. Appearance and Tolerance of Variance

Continually deviating from stated dimensions is cause for stopping the work and removing the nonconforming stripe. (See Section 656.) Adhere to the following measurements:

1. Width

   Do not lay stripe less than the specified width. Do not lay stripe more than 1/2 in (13 mm) over the specified width.

2. Length

   Ensure that the 10 ft (3 m) painted skip stripe and the 30 ft (10 m) gap between painted segments vary no more than ± 1 ft (300 mm) each.

3. Alignment
   a. Ensure that the stripe does not deviate from the intended alignment by more than 1 in (25 m) on tangents or curves of 1 degree or less.
   b. Ensure that the stripe does not deviate by more than 2 in (50 mm) on curves exceeding 1 degree.

652.3.06 Quality Acceptance

Ensure that stripes and segments of stripes are clean-cut and uniform. Markings that do not appear uniform or satisfactory, either during the day or night, or do not meet Specifications, will be corrected at the Contractor's expense. Work will be subject to application rate checks for both paint and beads.

The following will be accepted:

- Sections of painted stripe, words, and symbols that have dried so that paint will not be picked up or marred by vehicle tires
- Sections placed according to the Plans and Specifications

The Contractor will be relieved of responsibility for maintenance on accepted sections.

A. Correction of Alignment

When correcting a deviation that exceeds the permissible tolerance in alignment, do the following:

1. Remove the affected portion of stripe, plus an additional 25 ft (8 m) in each direction.
2. Paint a new stripe according to these Specifications.

Remove the stripe according to Section 656.

B. Removal of Excess Paint

Remove misted, dripped, or spattered paint to the Engineer's satisfaction. Do not damage the underlying pavement during removal.

Refer to the applicable portions of Section 656.

652.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

652.4 Measurement

When traffic stripe is paid for by the square yard (meter), the number of square yards (meters) painted is measured and the space between stripes is included in the overall measurement.

Linear measurements are made on the painted surface by an electronic measuring device attached to a vehicle. On curves, chord measurements, not exceeding 100 linear feet (30 linear meters), are used.

Traffic stripe and markings, complete in place, are measured and accepted for payment as follows:

A. Solid Traffic Stripe

Solid traffic stripe is measured by the linear foot (meter), linear mile (kilometer), or square yard (meter). Breaks or omissions in solid lines or stripes at street or road intersections are not measured.

B. Skip Traffic Stripe

Skip traffic stripe is measured by the gross linear foot (meter) or gross linear mile (kilometer). Unpainted spaces between the stripes are included in the overall measurements if the Plan ratio of 1 to 3 remains uninterrupted. Measurement begins and ends on a stripe.

C. Pavement Markings

Markings are words and symbols completed according to Plan dimensions. Markings are measured by the unit.

652.4.01 Limits

General Provisions 101 through 150.

652.5 Payment

Payment will be full compensation for the work under this Section, including the following:

- Cleaning and preparing surfaces
- Furnishing materials, including paints, beads, and thinners
- Applying, curing, and protecting paints
- Protecting traffic, including providing and placing necessary warning signs
- Furnishing tools, machines, and other equipment necessary to complete the Item

Payment will be made under:

Item No. 652	Solid traffic stripe, _____ in (mm), (color)	Per linear mile (kilometer)
Item No. 652	Skip traffic stripe, _____in (mm), (color)	Per gross linear mile (kilometer)
Item No. 652	Solid traffic stripe, _____in (mm), (color)	Per linear mile (kilometer)
Item No. 652	Skip traffic stripe, _____in (mm), (color)	Per gross linear foot (meter)
Item No. 652	Pavement markings, words, and symbols, (color)	Per each
Item No. 652	Traffic stripe, _____in (mm), (color)	Per square yard (meter)

652.5.01 Adjustments

General Provisions 101 through 150.

SECTION 652 (MODIFICATION)
PAINTING TRAFFIC STRIPE

652.1 GENERAL DESCRIPTION
RETAIN as written.

652.2 MATERIALS
RETAIN as written.

652.3 CONSTRUCTION REQUIREMENTS
RETAIN as written, except as specifically noted below.

The Contractor shall perform Quality Control testing necessary to demonstrate that all material and workmanship complies with the requirements of the construction documents. All Quality Control testing performed by the Contractor shall incidental to the cost of the associated payment item. The Owner may perform representative Quality Acceptance testing of areas of work completed by the Contractor. Failing Quality Acceptance testing costs will be at Contractor expense.

Markings shall be constructed to the dimensions indicated on the plans. Color of markings shall be as indicated on the plans.

Part 652.3.02B Hand Painting Equipment. Brushwork painting will NOT be allowed.

652.4 MEASUREMENT
REPLACE section in its entirety with the following:

Measurement will be made of actual marked area, measured in place, completed and accepted. Only painted areas will be measured for payment. Unpainted areas will not be measured. Unit of measurement shall be per Square Foot. Control and layout work for pavement marking shall be incidental to the Work and will not be separately measured or paid. Reflective media is incidental to the Work.

652.5 PAYMENT
REPLACE section in its entirety with the following:

Payment will be full compensation for the work under this Section, including the following:

- Cleaning and preparing surfaces
- Furnishing materials, including paints, beads, and thinners
- Applying, curing, and protecting paints
- Protecting traffic, including providing and placing necessary warning signs
- Furnishing stencils, tools, machines, and other equipment necessary to complete the Item

Payment will be made only under the following items:

Item GDOT 652-1	Landside Pavement Markings, Yellow or White, Linework, with Reflective Media – Per Square Foot.
Item GDOT 652-2	Landside Pavement Markings, Blue, Linework, with Reflective Media – Per Square Foot.
Item GDOT 652-3	Landside Pavement Markings, White, Traffic Arrow Symbol, with Reflective Media – Per Each.
Item GDOT 654-4	Landside Pavement Markings, White, Stop Bar, 24” wide, with Reflective Media – Per Square Foot.

Item GDOT 652-5	Landside Pavement Markings, Symbol of Accessibility, Blue/White, with Reflective Media – Per Each.
Item GDOT 652-6	Landside Pavement Markings, White, Parking Stall Number, 4” Height – Per Each.

These items will not be subject to price adjustment.

END OF SECTION 652 (MODIFICATION).

Section 800—Coarse Aggregate

800.1 General Description

This section includes requirements for coarse aggregate. All aggregate shall be the specified type, class, and grade, and shall meet the requirements for the intended use.

800.1.01 Related References

A. Standard Specifications

Section 424—Bituminous Surface Treatment

B. Referenced Documents

AASHTO	ASTM	
T 11	C 277	C 295
T 27	C 289	C 586
T 96	C 294	E 30
T 104		G 23

GDT 104

GDT 129

GDT 133

QPL 2

800.2 Materials

800.2.01 Coarse Aggregate

A. Requirements

The Contractor shall use the type, group, class, and grade of coarse aggregate specified. For coarse aggregate sources, see QPL 2.

1. Coarse Aggregate Types

Type	Characteristics
Crushed stone	Sound, durable rock particles.
Gravel	Sound, durable rock without damaging coatings.
Air-cooled blast furnace slag	Sound, durable particles with uniform density and quality, or other slags that have a good service record. Dry slag shall weigh at least 70 lb/ft³ (1120 kg/m³) compacted and shall contain less than 30% glassy particles by weight. Do not use slag as aggregate for Portland cement concrete.
Synthetic aggregate	Sound, durable, expanded clay, shale, or other manufactured product.

2. Coarse Aggregate Groups
   a. Group I: Limestone, dolomite, marble, or any combination thereof. Ensure Group I aggregates meet the abrasion requirement for Class A stone when used in Portland cement concrete of any type or class.
   b. Group II: Slag, gravel, granitic and gneissic rocks, quartzite, synthetic aggregate, or any combination thereof.
3. Classes

   Aggregates are classified by physical properties that determine how they are used.
   a. Do not blend aggregates that meet abrasion requirements with aggregates that do not meet requirements.
   b. “Class A“ and “Class B” aggregate used in Portland cement concrete, asphaltic concrete, and bituminous surface treatment shall meet these limits:

	Percent Wear AASHTO T 96 ("B" Grading)	
	Class A	Class B
Group I Aggregates	0-40	41-55
Group II Aggregates	0-50	51-60

c. "Class B" aggregates used in all applications other than Portland cement concrete, asphaltic concrete, or bituminous surface treatment shall meet these limits:

Percent Wear AASHTO T 96 ("B" Grading)	
	Class B
Group I Aggregates	41-55
Group II Aggregates	51-65

4. Soundness

Test coarse aggregate used in Portland cement concrete, bituminous surfaces, bituminous bases, aggregate bases, or surface treatment with five alternations of the magnesium sulfate soundness test.

a. Use aggregate with a weight loss of less than 15 percent.

b. The 15 percent soundness loss for a Class "CS" concrete is waived if it has a 5-year service record.

c. If the material meets all the requirements except for the 15 percent soundness requirement, the material may be used in Zones 3 and 4 (see Subsection 424.3.05, "Construction Requirements") under the following conditions:

1) The aggregate in bituminous courses and in all types and classes of Portland cement concrete construction, except as stated in Group I, has a satisfactory five-year service record under similar service and exposure.

2) The Engineer's investigation shows that it equals or exceeds the quality of approved aggregate (in cases where the material's uniformity changes at the source, or does not have a five-year service record).

5. Grades

Use coarse aggregate that is well graded within the limits and sizes specified in Table 800.1.

6. Detrimental Substances

a. Detrimental substances include shale, weathered or decomposed rock, friable particles, or any substance that may be detrimental for the use intended..

b. Do not use any aggregate that can cause a deleterious reaction.

c. Do not use aggregates that contain Chrysotile (defined as fibrous serpentinite) as a temporary or permanent unbound surfacing for roads, nor as stabilizer for soil used as subgrade, base, or surface course.

d. Detrimental substances shall not exceed the following limits:

1) For Portland Cement Concrete:

Substance	Max % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use GDT 104 to analyze these materials.	5
Materials that pass the No. 200 (75 µm) sieve.	1.5
Flat and elongated pieces (with lengths more than five times the average thickness).	10
Sulphur content computed as sulfide sulphur (for bridge-type structures)—If the sulphur content exceeds 0.01%, do not use the aggregate unless it passes a petrographic analysis and a weathering test equivalent to 6 months or more of exposure.	0.01
Other local detrimental substances. (Any Combination)	2.0
NOTE: Do not use aggregate in Portland Cement concrete that is capable of producing a deleterious reaction when combined with Portland Cement.	

2) For Asphaltic Concrete:

Substance	Max. % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use GDT 104 to analyze these materials. (Use this requirement for Interstate Construction only.)	10
Flat or elongated particles (with lengths more than five times the average thickness).	10
Glassy particles (slag).	30
Other local detrimental substances. (Any combination)	2.0

3) For Bituminous Surface Treatment:

Substance	Max. % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use GDT 104 to analyze these materials.	10
Material finer than No. 200 (75 µm) sieve. #5 Stone #6 Stone #7 Stone #89 Stone	 0.5 0.7 0.7 1.0
Flat and elongated particles (with lengths more than five times the average thickness).	10
Glassy particles (slag).	30
Other local detrimental substances. (Any combination)	2

e. Ensure that gravel used in asphaltic concrete and bituminous surface treatment meets the following additional requirements:

- Consists of siliceous particles.
- A minimum of 85%, by count, of the material retained on the No. 4 (4.75 mm) sieve has one or more fractured faces.
- The fracture is for the approximate average diameter or thickness of the particle.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Material that passes the No. 200 (75 µm) sieve	AASHTO T 11
Sulphur content	ASTM E 30, Leco method
Weathering	ASTM G 23
Petrographic analysis	ASTM C 295
Soundness (magnesium sulfate)	AASHTO T 104
Percent wear	AASHTO T 96
Aggregate gradation	AASHTO T 27
Reactivity	ASTM C 227, C 289, and C 586
Schist or phyllite	GDT 104
Flat and elongated particles	GDT 129
Friable Particles	GDT 133

D. Materials Warranty

General Provisions 101 through 150.

TABLE 800.1 - SIZES OF COARSE AGGREGATES

SIZE NO	NOMINAL SIZE SQUARE OPENINGS		AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENINGS). %, BY WEIGHT										
	(1)	mm	2 ½"	2"	1 ½"	1"	¾"	½"	3/8"	No. 4	No. 8	No- 16	No. 50
			63 mm	50 mm	37.5mm	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36mm	1.18 mm	300 µm
3	2-1	50 - 25	100	90-100	35-70	00-15	-----	00-5	----	-----	-----	-----	-----
357	2-No. 4	50 - 4.75	100	95-100	-----	35-70	-----	10-30	----	00-5	-----	-----	-----
4	1 ½ -3/4	37.5 - 19	-----	100	90-100	20-55	00-15	-----	00-5	-----	-----	-----	-----
467	1 ½- No. 4	37.5 - 4.75	-----	100	95-100	-----	35-70	-----	10-30	00-5	-----	-----	-----
5	1-1/2	25 – 12.5	-----	-----	100	90-100	20-55	00-10	00-5	-----	-----	-----	-----
56	1-3/8	25 – 9.5	-----	-----	100	90-100	40-75	15-35	00-15	00-5	-----	-----	-----
57	1-No. 4	25 – 4.75	-----	-----	100	95-100	-----	25-60	-----	00-10	00-5	-----	-----
6	¾-3/8	19 – 9.5	-----	-----	-----	100	90-100	20-55	00-15	00-5	-----	-----	-----
67	¾-No. 4	19 – 4.75	-----	-----	-----	100	90-100	-----	20-55	00-10	00-5	-----	-----
68	¾-No. 8	19 –2.36	-----	-----	-----	100	90-100	-----	30-65	05-25	00-10	0-5	-----
7	½-No. 4	12.5 – 4.75	-----	-----	-----	-----	100	90-100	40-70	00-15	00-5	-----	-----
78	½-No. 8	12.5 – 2.36	-----	-----	-----	-----	100	90-100	40-75	05-25	00-10	0-5	-----
8	3/8-No. 8	9.5 – 2.36	-----	-----	-----	-----	-----	100	85-100	10-40	0-10	0-5	-----
89	3/8-No. 16	9.5 – 1.18	-----	-----	-----	-----	-----	100	90-100	20-55	0-15	0-10	0-5
9	No. 4-No. 16	4.75 – 1.18	-----	-----	-----	-----	-----	-----	100	85-100	10-40	0-10	0-5

(1) In inches, except where otherwise indicated. Numbered sieves are those of the United States Standard Sieve Series.

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Section 802—Aggregates for Asphaltic Concrete

802.1 General Description

This section includes the requirements for fine and coarse aggregates used in asphaltic concrete.

802.1.01 Definitions

Fine Aggregate: All aggregate passing a No. 8 (2.36 mm) sieve

Coarse Aggregate: All aggregate retained on a No. 8 (2.36 mm) sieve

802.1.02 Related References

A. Standard Specifications

Section 800—Coarse Aggregate

Section 828—Hot Mix Asphaltic Concrete Mixtures

B. Referenced Documents

AASHTO T 27

AASHTO T 96

ASTM C 295

GDT 63

GDT 76

802.2 Materials

802.2.01 Fine Aggregate for Asphaltic Concrete

A. Requirements

Use the appropriate type, group, class, and grade of fine aggregate.

1. Types

   Use fine aggregate made of sharp, strong, angular material meeting the required performance characteristics when combined into a mixture.

   a. Ensure that the aggregate meets the following requirements:

   - Does not contain any deleterious substances.
   - Natural sand is free of organic matter, roots, or twigs.
   - Aggregate is manufactured from Class A or B crushed stone, gravel, slag, or synthetic aggregate that meets the requirements of Section 800.
   - A combination of natural and manufactured sands meets the requirements in Subsection 802.2.01.A.3 and Subsection 802.2.01.A.4 after being combined.

   b. Do not use crushed alluvial gravel as virgin aggregate in any mixture.

2. Groups

   Fine aggregate groups include:

   a. Group I—Limestone, dolomite, marble, or combination thereof

   b. Group II—Gravel, slag, granitic and gneissic rocks, quartzite, natural sand, or a combination thereof

3. Sand Equivalent

   Use these sand equivalent values:

Material	Sand Equivalent Value
Group I	At least 28

Group II	At least 40
Natural sand	At least 25
Blended sand*	Natural sand at least 20; combined blend at least 25
*Blended natural sands or natural sand blended with stone screenings that meet the Group I or Group II sand equivalent limits.	

4. Mica
   a. Use fine aggregate with no more than 35 percent free mica in asphaltic concrete surface mixes.
   b. When approved by the Engineer, use fine aggregate with more than 35 percent mica if blended with natural sand or sand manufactured from Group II aggregates. Ensure the blend has no more than 35 percent free mica and meets all other requirements of this Section, Section 800 and Section 828.
5. Aggregate for Stone Matrix Asphalt

   Manufactured screenings will be considered as fine aggregate and shall contain no more than 20 percent by weight coarser than a No. 4 (4.75 mm) sieve.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test the fine aggregate as follows:

Test	Method
Aggregate gradation	AASHTO T 27
Sand equivalent	GDT 63
Mica content	GDT 76 or ASTM C 295

D. Materials Warranty

General Provisions 101 through 150.

802.2.02 Coarse Aggregate for Asphaltic Concrete

A. Requirements

1. Types

   Ensure coarse aggregate meets the following requirements:
   - Class A or B crushed stone, gravel, slag, or synthetic aggregate as in Subsection 800.2.
   - Have uniform quality throughout without any deleterious substances.
   - Meet the required performance characteristics when combined into a mixture.

   NOTE: Do not use alluvial gravel as virgin aggregate.
2. Groups

   Coarse aggregate shall be one of either group below as specified in the composition Table in Subsection 828.2.A.2:
   - Group I—Limestone, dolomite, marble, or combination thereof
   - Group II—Gravel, slag, granite and gneissic rocks, quartzite, or combination thereof
3. Aggregate for Stone Matrix Asphalt

   Use coarse aggregate that meets requirements of this Section and Section 800 except as follows:
   - Use Class A aggregate only with percent wear of each individual size not to exceed 45 percent based on the B grading of AASHTO T 96
   - Use aggregate which contains no more than 20 percent flat and elongated pieces (length greater than three times the average thickness) for that portion of the blend of all aggregate retained on the No. 4 (4.75 mm) sieve.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Coarse Aggregate	Subsection 800.2.01.C

D. Materials Warranty

General Provisions 101 through 150.

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SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:
   1. Not-to-Exceed allowances.

C. Related Requirements:

   1. None

1.2 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.3 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 NOT-TO-EXCEED ALLOWANCES

A. For the purposes of competitive bidding, Bidders shall include in their bid the quantity, unit price, and to total item value specified in the Bid Schedule. This value shall be considered the Not-to-Exceed value of the item of work.

B. Prior to construction, the Architect and Owner shall more fully define the scope of the work to be performed, and the Contractor shall develop a cost proposal to perform the work, and shall negotiate an authorized value for the work item. The scope of the work may be amended during negotiations to remain within the Not-to-Exceed Allowance.

C. Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

D. In the event that the Architect and Owner are unable to agree with the Contractor on a scope and fee for the work included in the allowance, the Owner reserves the right to remove the allowance item from the contract, and to separately contract for the work outside of this project.

1.6 ADJUSTMENT OF ALLOWANCES

A. Allowance adjustment shall be made only by Change Order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 012100-1: Not to Exceed Allowance: Include the sum of $25,000 per Base Bid: Primary Power Relocation and Maintenance of Power to Existing Facilities Allowance, Georgia Power. Include the cost to facilitate the relocation by Georgia Power of Georgia Power-Owned primary power cable and ducts and to maintain/restore power to existing airport hangar facilities.

B. Allowance No. 012100-2: Not to Exceed Allowance: Include the sum of $50,000 per Base Bid: Primary Power to Skylane Development Infrastructure – Phase 2 Allowance, Georgia Power. Include the cost of primary power cable, ducts, and transformers to support the proposed hangar development by Georgia Power.

C. Allowance No. 012100-3: Not to Exceed Allowance: Include the sum of $25,000 per Base Bid: Maintenance of Communication Systems and Establishment of Primary Communications Portals Allowance. Include the cost to facilitate the relocation and maintenance of communications services to existing hangars and to provide communications service connection point(s) to

proposed hangar development. Services may be supported by AT&&, Comcast, Liveoak Fiber, and/or other providers.

D. Allowance No. 012100-4: Not to Exceed Allowance: Include the sum of $25,000 per Base Bid: Landscape Planting and Irrigation Allowance. Include the cost to design and provide landscaping plantings and lawn irrigation, as directed by the Owner and as specified in Section 329300-1 Plants and Section 328400 Planting Irrigation.

END OF SECTION 012100

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SECTION 321713 – PRECAST CONCRETE WHEEL STOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes precast concrete wheel stops.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 WHEEL STOPS

A. Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete, 4000-psi (27.6-MPa) minimum compressive strength, manufacturer's standard height and width. Provide chamfered corners, transverse drainage slots on underside, and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.
   1. Mounting Hardware: Galvanized-steel spike or dowel, 1/2-inch (13-mm) diameter, 14-inch minimum length.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wheel stops according to manufacturer's written instructions unless otherwise indicated.

B. Securely anchor wheel stops to pavement with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer. Recess head of hardware beneath top of wheel stop.

C. Measurement shall be made for each precast concrete wheel stop completed and accepted in-place by the Owner.

D. Payment shall be made per each precast concrete wheel stop completed and accepting in-place by the Owner.

END OF SECTION 321713

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SECTION 328400 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Piping.
2. Manual valves.
3. Automatic control valves.
4. Automatic drain valves.
5. Sprinklers.
6. Quick couplers.
7. Controllers.
8. Boxes for automatic control valves.

1.2 PERFORMANCE REQUIREMENTS

A. Irrigation zone control shall be automatic operation with controller and automatic control valves.

B. Delegated Design: Design 100 percent coverage irrigation system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1. Soil Conditions: Refer to Geotechnical data provided in Section 310000 and 310000A. Additional testing (if required), shall be included in the cost of the Delegated Design.

2. Flow Conditions: Delegated Design shall include observation and testing of existing systems as necessary to design the system.

C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:

1. Irrigation Main Piping: 200 psig (1380 kPa).
2. Circuit Piping: 150 psig (1035 kPa).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories.

B. Wiring Diagrams: For power, signal, and control wiring.

C. Delegated-Design Submittal: For irrigation systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Zoning Chart: Show each irrigation zone and its control valve.

B. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.

C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

B. Galvanized-Steel Pipe: ASTM A 53/A 53M, Standard Weight, Type E, Grade B.

1. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106/A 106M, Standard Weight, seamless-steel pipe with threaded ends.
2. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
3. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.
4. Cast-Iron Flanges: ASME B16.1, Class 125.

C. Ductile-Iron Pipe with Push-on Joint: AWWA C151, with push-on-joint bell and spigot ends.

1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

a. Gaskets: AWWA C111, rubber.

D. Soft Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), water tube, annealed temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

E. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), and ASTM B 88, Type M (ASTM B 88M, Type C),] water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

F. PE Pipe with Controlled ID: ASTM F 771, PE 3408 compound; SIDR 11.5 and SIDR 15.

1. Insert Fittings for PE Pipe: ASTM D 2609, nylon or propylene plastic with barbed ends. Include bands or other fasteners.

G. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedules 40 and 80.

1. PVC Socket Fittings: ASTM D 2466, Schedules 40 and 80.
2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.
3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.

H. PVC Pipe, Pressure Rated: ASTM D 2241, PVC 1120 compound, SDR 21 and SDR 26.

1. PVC Socket Fittings: ASTM D 2467, Schedule 80.
2. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket or threaded ends.

2.2 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick unless otherwise indicated; full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

F. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.3 MANUAL VALVES

A. Curb Valves:

1. Description:

a. Standard: AWWA C800.
b. NPS 1 (DN 25) and Smaller Pressure Rating: 100 psig (690 kPa) minimum.
c. NPS 1-1/4 to NPS 2 (DN 32 to DN 50) Pressure Rating: 80 psig (550 kPa) minimum.
d. Body Material: Brass or bronze with ball or ground-key plug.

e. End Connections: Matching piping.
f. Stem: With wide-tee head.

B. Curb-Valve Casing:

1. Standard: Similar to AWWA M44 for cast-iron valve casings.
2. Top Section: Telescoping, of length required for depth of burial of curb valve.
3. Barrel: Approximately 3-inch (75-mm) diameter.
4. Plug: With lettering "WATER."
5. Bottom Section: With base of size to fit over valve.
6. Base Support: Concrete collar.

C. Shutoff Rods for Curb-Valve Casings: Furnish one steel, tee-handle shutoff rod(s) with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve for Project.

D. Brass Ball Valves:
1. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig (1035 kPa).
c. CWP Rating: 600 psig (4140 kPa).
d. Body Design: Two piece.
e. Body Material: Forged brass.
f. Ends: Threaded or solder joint if indicated.
g. Seats: PTFE or TFE.
h. Stem: Brass.
i. Ball: Chrome-plated brass.
j. Port: Full.

E. Bronze Ball Valves:
1. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig (1035 kPa).
c. CWP Rating: 600 psig (4140 kPa).
d. Body Design: Two piece.
e. Body Material: Bronze.
f. Ends: Threaded or solder joint if indicated.
g. Seats: PTFE or TFE.
h. Stem: Bronze.
i. Ball: Chrome-plated brass.
j. Port: Full.

F. Iron Ball Valves:
1. Description:

a. Standard: MSS SP-72.
b. CWP Rating: 200 psig (1380 kPa).
c. Body Design: Split body.
d. Body Material: ASTM A 126, gray iron.
e. Ends: Flanged.
f. Seats: PTFE or TFE.
g. Stem: Stainless steel.
h. Ball: Stainless steel.

i. Port: Full.

G. Plastic Ball Valves:
1. Description:

a. Standard: MSS SP-122.
b. Pressure Rating: 125 psig (860 kPa) minimum.
c. Body Material: PVC.
d. Type: Union.
e. End Connections: Socket or threaded.
f. Port: Full.

H. Iron Gate Valves, Resilient Seated:

1. Description:

a. Standard: AWWA C509.
b. Pressure Rating: 200 psig (1380 kPa) minimum.
c. Body Material: Ductile or gray iron with bronze trim.
d. End Connections: Mechanical joint or push-on joint.
e. Interior Coating: Comply with AWWA C550.
f. Body Design: Nonrising stem.
g. Operator: Stem nut.
h. Disc: Solid wedge with resilient coating.

I. Iron Gate Valve Casings:

1. Standard: AWWA M44 for cast-iron valve casings.
2. Top Section: Adjustable extension of length required for depth of burial of valve.
3. Barrel: Approximately 5-inch (125-mm) diameter.
4. Plug: With lettering "WATER."
5. Bottom Section: With base of size to fit over valve.
6. Base Support: Concrete collar.

J. Operating Wrenches for Iron Gate Valve Casings: Furnish one steel, tee-handle operating wrench(es) with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut for Project.

2.4 AUTOMATIC CONTROL VALVES

A. Bronze, Automatic Control Valves:
1. Description: Cast-bronze body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

B. Plastic, Automatic Control Valves:
1. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

2.5 AUTOMATIC DRAIN VALVES

A. Description: Spring-loaded-ball type of corrosion-resistant construction and designed to open for drainage if line pressure drops below 2-1/2 to 3 psig (17 to 20 kPa).

2.6 SPRINKLERS

A. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.

B. Sprinkler Heads:
   1. Description:

      a. Body Material: ABS.
      b. Nozzle: ABS
      c. Retraction Spring: Stainless steel.
      d. Internal Parts: Corrosion resistant.

   2. Capacities and Characteristics:

      a. Flow: As required by design.
      b. Pop-up Height: 4 inches (100 mm) aboveground to nozzle.
      c. Arc: As required by design.
      d. Radius: As required by design.
      e. Inlet: As required by design.

2.7 QUICK COUPLERS

A. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

2.8 CONTROLLERS

A. Description:

   1. Controller Stations for Automatic Control Valves: Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station.
   2. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.

      a. Body Material: Enameled-steel sheet metal or Molded plastic.
      b. Mounting: Surface type for wall.

   3. Control Transformer: 24-V secondary, with primary fuse.
   4. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.

      a. Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
      b. Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.
      c. Surface Protection: Metal-oxide-varistor type on each station and primary power.

   5. Moisture Sensor: Adjustable from one to seven days, to shut off water flow during rain.

6. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.

    a. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
    b. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.
    c. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.

2.9 BOXES FOR AUTOMATIC CONTROL VALVES

A. Plastic Boxes:

1. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.

    a. Size: As required for valves and service.
    b. Shape: Manufacturer standard.
    c. Sidewall Material: PE, ABS, or FRP.
    d. Cover Material: PE, ABS, or FRP.

        1) Lettering: "IRRIGATION".

B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch (19 mm) minimum to 3 inches (75 mm) maximum.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Install warning tape directly above pressure piping, 12 inches (300 mm) below finished grades, except 6 inches (150 mm) below subgrade under pavement and slabs.

B. Drain Pockets: Excavate to sizes indicated. Backfill with cleaned gravel or crushed stone, graded from 3/4 to 3 inches (19 to 75 mm), to 12 inches (300 mm) below grade. Cover gravel or crushed stone with sheet of asphalt-saturated felt and backfill remainder with excavated material.

C. Provide minimum cover over top of underground piping according to the following:

1. Irrigation Main Piping: Minimum depth of 36 inches (900 mm) below finished grade, or not less than 18 inches (450 mm) below average local frost depth, whichever is deeper.
2. Circuit Piping: 12 inches (300 mm).
3. Drain Piping: 12 inches (300 mm).
4. Sleeves: 24 inches (600 mm).

3.2 PIPING INSTALLATION

A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.

B. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.

C. Install piping free of sags and bends.

D. Install groups of pipes parallel to each other, spaced to permit valve servicing.

E. Install fittings for changes in direction and branch connections.

F. Install unions adjacent to valves and to final connections to other components with NPS 2 (DN 50) or smaller pipe connection.

G. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 (DN 65) or larger pipe connection.

H. Install underground thermoplastic piping according to ASTM D 2774.

I. Install expansion loops in control-valve boxes for plastic piping.

J. Lay piping on solid subbase, uniformly sloped without humps or depressions.

K. Install ductile-iron piping according to AWWA C600.

L. Install PVC piping in dry weather when temperature is above 40 deg F (5 deg C). Allow joints to cure at least 24 hours at temperatures above 40 deg F (5 deg C) before testing.

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

E. Ductile-Iron Piping Gasketed Joints: Comply with AWWA C600 and AWWA M41.

F. Copper-Tubing Brazed Joints: Construct joints according to CDA's "Copper Tube Handbook," using copper-phosphorus brazing filler metal.

G. Copper-Tubing Soldered Joints: Apply ASTM B 813 water-flushable flux to tube end unless otherwise indicated. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B 32.

H. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners according to piping manufacturer's written instructions.

I. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
3. PVC Nonpressure Piping: Join according to ASTM D 2855.

3.4 VALVE INSTALLATION

A. Underground Curb Valves: Install in curb-valve casings with tops flush with grade.

B. Underground Iron Gate Valves, Resilient Seat: Comply with AWWA C600 and AWWA M44. Install in valve casing with top flush with grade.

1. Install valves and PVC pipe with restrained, gasketed joints.

C. Aboveground Valves: Install as components of connected piping system.

D. Throttling Valves: Install in underground piping in boxes for automatic control valves.

E. Drain Valves: Install in underground piping in boxes for automatic control valves.

3.5 SPRINKLER INSTALLATION

A. Install sprinklers after hydrostatic test is completed.

B. Install sprinklers at manufacturer's recommended heights.

C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches (100 mm) from walls and 2 inches (50 mm) from other boundaries unless otherwise indicated.

3.6 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION

A. Equipment Mounting: Install interior controllers on wall.

1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Equipment Mounting: Install exterior freestanding controllers on precast concrete bases.

1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.

C. Install control cable in same trench as irrigation piping and at least 2 inches (51 mm) below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.7 IDENTIFICATION

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.

1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

B. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches.

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Any irrigation product will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.9 ADJUSTING

A. Adjust settings of controllers.

B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.

C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/2 inch (13 mm) above, finish grade.

3.10 PIPING SCHEDULE

A. Install components having pressure rating equal to or greater than system operating pressure.

B. Piping in control-valve boxes and aboveground may be joined with flanges or unions instead of joints indicated.

C. Aboveground irrigation main piping, NPS 4 (DN 100) and smaller, shall be one of]the following:

1. Galvanized-steel pipe and galvanized-steel pipe nipples; galvanized, gray-iron threaded fittings; and threaded joints.
2. Type L (Type B) or Type M (Type C) hard copper tube, wrought- or cast-copper fittings, and brazed or soldered joints.
3. Schedule 80, PVC pipe; socket-type PVC fittings; and solvent-cemented joints.
4. Schedule 80, PVC pipe; Schedule 80, threaded PVC fittings; and threaded joints.

D. Underground irrigation main piping, NPS 4 (DN 100) and smaller, shall be one of the following:
1. Schedule 80, PVC pipe and socket fittings, and solvent-cemented joints.
2. Schedule 80, PVC pipe; Schedule 80, threaded PVC fittings; and threaded joints.
3. SDR 21, PVC, pressure-rated pipe; Schedule 80, PVC socket fittings; and solvent-cemented joints.

E. Circuit piping, NPS 2 (DN 50) and smaller, shall be one of the following:
1. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
2. SDR 26, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.

F. Circuit piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100), shall be one of]the following:
1. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
2. SDR 26, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.

G. Underground Branches and Offsets at Sprinklers and Devices: Schedule 80, PVC pipe; threaded PVC fittings; and threaded joints.

1. Option: Plastic swing-joint assemblies, with offsets for flexible joints, manufactured for this application.

H. Risers to Aboveground Sprinklers and Specialties: Type L (Type B) or Type M (Type C) hard copper tube, wrought-copper fittings, and brazed or soldered joints.

I. Risers to Aboveground Sprinklers and Specialties: Schedule 80, PVC pipe and socket fittings; and solvent-cemented joints.

J. Drain piping shall be one of the following:
1. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
2. SDR 21, 26, or 32.5, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.

3.11 VALVE SCHEDULE

A. Underground, Shutoff-Duty Valves: Use the following:

1. NPS 2 (DN 50) and Smaller: Curb valve, curb-valve casing, and shutoff rod.
2. NPS 3 (DN 80) and Larger: Iron gate valve, resilient seated; iron gate valve casing; and operating wrench(es).

B. Aboveground, Shutoff-Duty Valves:

1. NPS 2 (DN 50) and Smaller: Brass or bronze ball valve.
2. NPS 2-1/2 (DN 65) and Larger: Iron ball valve.

C. Throttling-Duty Valves:

1. NPS 2 (DN 50) and Smaller: Bronze automatic control valve.
2. NPS 2 (DN 50) and Smaller: Brass or bronze ball valve.
3. NPS 2-1/2 and NPS 3 (DN 65 and DN 80): Bronze automatic control valve.
4. NPS 2-1/2 and NPS 3 (DN 65 and DN 80): Iron ball valve.

D. Drain Valves:

1. NPS 1/2 and NPS 3/4 (DN 15 and DN 20): Automatic drain valve.
2. NPS 1/2 and NPS 3/4 (DN 15 and DN 20): Brass or bronze ball valve.
3. NPS 1 to NPS 2 (DN 25 to DN 50): Brass or bronze ball valve.

END OF SECTION 328400

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plants.
2. Landscape edgings.

B. Related Requirements:

1. 328400 Planting Irrigation

1.2 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

C. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

D. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year.

1.7 QUALITY ASSURANCE

A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1. Pesticide Applicator: State licensed, commercial.

B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver bare-root stock plants within 24 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.

B. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

C. Handle planting stock by root ball.

D. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F (16 to 18 deg C) until planting.

E. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1.9 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
b. Structural failures including plantings falling or blowing over.

2. Warranty Periods: From date of Substantial Completion.

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

c. Annuals: Three months.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

B. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

C. Annuals and Biennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.

2.2 FERTILIZERS

A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: Tablet size as recommended.
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 MULCHES

A. Organic Mulch: Wood and bark chips.

B. Mineral Mulch: Rounded riverbed gravel or smooth-faced stone.

1. Size Range: 1-1/2 inches (38 mm) maximum, 3/4 inch (19 mm) minimum.
2. Color: Readily available natural gravel color range.

2.4 WEED-CONTROL BARRIERS

A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. (101g/sq. m) minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.

B. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz./sq. yd. (162 g/sq. m).

2.5 PESTICIDES

A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

2.6 LANDSCAPE EDGINGS

A. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
   1. Edging Size: 1/4 inch (6.4 mm) thick by 5 inches (125 mm) deep.
   2. Finish: Zinc coated.

PART 3 - EXECUTION

3.1 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil as required.

B. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade.

C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.2 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits.

   1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
   2. Excavate approximately three times as wide as ball diameter.
   3. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
   4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

3.3 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set each plant plumb and in center of planting pit or trench with root flare 1 inch (25 mm) to 2 inches (50 mm) above adjacent finish grades.

1. Backfill: Planting soil. For trees, use excavated soil for backfill.
2. Balled and Burlapped Stock: After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Balled and Potted and Container-Grown Stock: Carefully remove root ball from container without damaging root ball or plant.
4. Fabric Bag-Grown Stock: Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
5. Bare-Root Stock: Support stem of each plant and spread roots without tangling or turning toward surface. Plumb before backfilling, and maintain plumb while working. Carefully work backfill around roots by hand. Bring roots into close contact with the soil.
6. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
7. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.

    a. Bare-Root Stock: Place tablets beside soil-covered roots; do not place tablets touching the roots.
    b. Quantity: as required.

8. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.4 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.5 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

E. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

F. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.6 PLANTING AREA MULCHING

A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 6 inches (150 mm and secure seams with galvanized pins.

B. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Treelike Shrubs in Turf Areas: Apply organic mulch ring of 3-inch (75-mm) average thickness, with 24-inch (600-mm) radius around trunks or stems. Do not place mulch within 3 inches (75 mm) of trunks or stems.
2. Organic Mulch and Mineral Mulch in Planting Areas: Apply 3-inch (75-mm) average thickness of organic mulch extending 12 inches (300 mm) beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches (75 mm) of trunks or stems.

3.7 EDGING INSTALLATION

A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches (760 mm) apart, driven below top elevation of edging.

3.8 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

D. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

E. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

F. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.9 MAINTENANCE SERVICE

A. Maintenance Service: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period for Trees and Shrubs: 12 months from date of Substantial Completion.
2. Maintenance Period for Ground Cover and Other Plants: Six months from date of Substantial Completion.

END OF SECTION 329300

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APPENDIX

APPENDIX

ECS Florida, LLC

Geotechnical Engineering Report

Skylane Infrastructure Development Phase II

McKinnon Airport
St. Simons Island, Georgia

ECS Project Number 35:33867

Revised September 24, 2024

Revised September 24, 2024

Mr. Brian Thompson, P.E.
RS&H
10748 Deerwood Park Boulevard South
Jacksonville, Florida 32256

ECS Project No. 35:33867

Reference: Geotechnical Engineering Report
Skylane Infrastructure Development Phase II
McKinnon Airport
St. Simons Island, Georgia

Dear Mr. Thompson:

ECS Florida, LLC. (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

This report includes two additional Double Ring Infiltrometer tests (DRI4 and DRI5).

It has been our pleasure to be of service to you during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify the assumptions of subsurface conditions made for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,
ECS Florida, LLC.

Chris Egan, P.E.
Principal Engineer
Cegan@ecslimited.com

Robert W. Clark, State of Georgia Professional Engineer, License No. 19985

This item has been digitally signed and sealed by Robert W. Clark on the date indicated here

Printed copies of this document are not considered Signed and sealed and the signature must be verified On any electronic copies

Digitally signed by Robert W Clark
Date: 2024.09.24 10:54:16 -04'00'

Robert W. Clark, P.E.
Senior Project Engineer
Registered Georgia No. 19985
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EXECUTIVE SUMMARY

This Executive Summary is intended as a very brief overview of the primary geotechnical conditions that are expected to affect design and construction. Information gleaned from the Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

- Based on the results of our exploration, we consider the subsurface conditions at the site adaptable for support of the proposed taxiways. Provided the site preparation and earthwork construction recommendations outlined in Section 5.0 of this report are performed.

- The fine sands (SP) and fine sands with silt (SP-SM) encountered in the proposed stormwater borings from 0 to 20 feet below ground surface are considered suitable for use as fill soil.

- The borings encountered groundwater at depths varying from about 5 to 6½ feet below the existing ground surface at the time of our exploration. Because of the need for densification of the soils within the upper 2 feet below the stripped surface, temporary groundwater control measures may be required if the groundwater level is within 2 feet below the stripped and grubbed surface at the time of construction.

- We recommend that ECS be provided the opportunity to review the foundation plans and earthwork specifications to verify that our recommendations have been properly interpreted and implemented. ECS should also be retained to perform the construction materials testing and observations required for this project, to verify that our recommendations have been implemented.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for the design of pavements, and stormwater management facilities. The project will include new and updated taxiways and two redesigned stormwater facilities. The recommendations developed for this report are based on project information supplied by you.

Our services were provided in accordance with our Proposal No. 19200-GP, dated August 22, 2022, as authorized by you, which includes the Subcontract for Professional Services between ECS Florida, LLC and RS&H, dated December 13, 2019.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items:

- A brief review and description of our field and laboratory test procedures and the results of testing conducted.
- A review of surface topographical features and site conditions.
- A review of subsurface soil stratigraphy with pertinent available physical properties.
- Final copies of our soil boring logs.
- Evaluation and recommendations relative to groundwater control.
- Recommendations for design and construction of drainage structures and stormwater management facilities.
- Recommendations for site preparation and construction of compacted fills, including an evaluation of on-site soils for use as compacted fills.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE

The project site is generally located at the south side of the McKinnon Airport on St. Simons Island, Glynn County, Georgia. The site is bordered to the north, east and west by hangers, taxiways, and runways, and to the south by commercial development. The general site location is shown on Figure 1 in Appendix A.

Figure 2.1.1. Site Location

At the time of our exploration, there were existing hangers and taxiways. The undeveloped portions were mostly grassed areas. A site survey was not available to our office at the time of this report preparation. However, based on publicly available information, we understand that the site is generally level, with two drainage swales. Surface water was not observed near planned structural areas at the time of our exploration.

2.2 PROJECT DESCRIPTION

We understand that a new taxiway will be constructed near the center of the project area. We also understand that the existing drainage features will be redesigned.

If actual project information varies from these conditions, then the recommendations in this report may need to be re-evaluated. We should be contacted if any of the above project information is incorrect so that we may reevaluate our recommendations.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedures. Our scope of work included drilling 13 Standard Penetration Test (SPT) borings and three auger borings. We also performed five Double Ring Infiltrometer tests, one at each of the auger borings. Our borings/tests were located using our handheld GPS units and their approximate locations are shown on the Field Exploration Diagram (Figure 2) in Appendix A.

3.1 SUBSURFACE CHARACTERIZATION

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil strata. Please refer to the boring logs in Appendix B.

Typical Depth (ft)		Stratum	Description
From	To		
Existing Ground Surface	0.5 -1	n/a	Topsoil, Asphalt/Limerock Pavement or Sand Asphalt Mix
0.5 - 1	20	I	Very Loose to Medium Dense Fine SAND (SP), Fine SAND with Silt (SP-SM), and Silty Fine SAND (SM)

A graphical presentation of the subsurface conditions is shown on the Generalized Subsurface Profiles included in Appendix A.

3.2 GROUNDWATER OBSERVATIONS

3.2.1 Encountered Groundwater

Water levels were measured during our field exploration and are presented in our boring logs in Appendix B. Groundwater depths measured at the time of drilling ranged from about 5 to 6½ feet below the ground surface. Variations in the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors.

3.2.2 Estimated Seasonal High Groundwater

The normal seasonal high groundwater level is affected by a number of factors. The drainage characteristics of the soils, land surface elevation, relief points such as drainage ditches, lakes, rivers, swamp areas, etc., and distance to relief points are some of the more important factors influencing the seasonal high groundwater level.

Based on our interpretation of the site conditions, including the boring logs and Web Soil Survey, we estimate the normal seasonal high groundwater level at the boring locations to be at the depths shown on the Generalized Subsurface Profiles. It is possible that groundwater levels may exceed the estimated normal seasonal high groundwater level as a result of significant or prolonged rains.

3.3 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples. The laboratory testing determined the moisture and fines contents of selected soil samples. The results of the laboratory testing are summarized in Appendix C.

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols, and ASTM D2487 Standard Practice for Classification for Engineering

Purposes (Unified Soil Classification System (USCS)). After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

4.0 DESIGN RECOMMENDATIONS

4.1 STORMWATER MANAGEMENT FACILITIES

4.1.1 Soil Infiltration Rate

The results of the DRI tests indicated the following vertical infiltration rates:

DRI Test Results

Test Location	Vertical Infiltration Rate (ft/day)
PA1/DRI1	17.1
PA2/DRI2	12.1
PA3/DRI3	9.9

The measured permeability/vertical infiltration rates should not be construed to represent the actual pond exfiltration rate. For pond drawdown calculations, we recommend an appropriate factor of safety be applied to the above vertical infiltration rate values.

4.1.2 Borrow Suitability

Based on the boring results and classification of the soil samples, the fine sands (SP) and fine sands with silt (SP-SM) encountered in the borings are considered suitable for use as fill soil. These soils were encountered in the borings from the existing ground surface to 20 feet below the existing ground surface. The soils containing surficial organic material will require removal and are unsuitable as structural fill. The organic soils could be used in landscape berms.

It should be anticipated that the soils in the proposed pond areas below the groundwater level will have moisture contents in excess of the Modified Proctor optimum moisture content. This will require stockpiling or spreading to drain the excess moisture. Generally, the wet soils should be dried to bring the soil moisture content within ±2 percent of the soil's optimum moisture content to facilitate placement and compaction.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Stripping and Grubbing

Prior to construction, the location of existing underground utilities within the construction area should be established. Provisions should then be made to relocate interfering utilities to appropriate locations.

Underground pipes that are not properly removed or plugged may serve as conduits for subsurface erosion, which may subsequently lead to excessive settlement of overlying structures.

Site preparation should consist of clearing the existing vegetation and near surface organic topsoil. The clearing/stripping operations should extend within and to a distance of at least five feet beyond the perimeter of the proposed building areas and three feet beyond pavement areas. During grubbing operations, roots with a diameter greater than 0.5-inch, stumps, or small roots in a concentrated state, should be grubbed and completely removed.

Based on the results of our field exploration, it should be anticipated that 6 inches to 12 inches of topsoil and soils containing significant amounts of organic materials may be encountered across the site. The actual depths of the organic soils should be determined by ECS using visual observation and judgment during earthwork operations. Any topsoil removed from the building and parking/drive areas can be stockpiled and used subsequently in non-structural areas.

5.1.2 Proofrolling

After removing surface organics, cutting to the proposed grade, and prior to the placement of any structural fill or other construction materials, the exposed subgrade should be evaluated by an ECS authorized representative. The exposed subgrade should be proofrolled with previously approved construction equipment having a minimum axle load of 10 tons (e.g. fully loaded tandem-axle dump truck). The areas subject to proofrolling should be traversed by the equipment in two perpendicular (orthogonal) directions with overlapping passes of the vehicle under the observation of ECS' authorized representative. This procedure is intended to assist in identifying any localized yielding materials. In the event that unstable or "pumping" subgrade is identified by the proofrolling, those areas should be marked for repair prior to the placement of any subsequent structural fill or other construction materials. Methods of repair of unstable subgrade, such as undercutting or moisture conditioning or chemical stabilization, should be discussed with ECS to determine the appropriate procedure with regard to the existing conditions causing the instability. Test pit(s) may be excavated to explore the shallow subsurface materials in the area(s) of the instability to help in determined the cause of the observed unstable materials and to assist in the evaluation of the appropriate remedial action to stabilize the subgrade.

5.1.3 Temporary Groundwater Control

Because of the need for densification of the soils within the upper 2 feet below the stripped surface, temporary groundwater control measures may be required if the groundwater level is within 2 feet below the stripped and grubbed surface at the time of construction. Should groundwater control measures become necessary, dewatering methods should be determined by the contractor. We recommend the groundwater control measures, if necessary; remain in place until compaction of the existing soils is completed. The dewatering method should be maintained until backfilling has reached a height of 2 feet above the groundwater level at the time of construction. The site should be graded to direct surface water runoff from the construction area.

5.1.4 Subgrade Compaction

Subgrade Compaction: After completing the clearing and stripping operations and installing the temporary groundwater control measures (if required), the exposed surface should be compacted with a vibratory drum roller having a minimum static, at-drum weight, on the order of 4 tons to 6 tons. Typically, the material should exhibit moisture contents within ±2 percentage points of the modified Proctor

optimum moisture content (ASTM D 1557) during the compaction operations. Compaction should continue until densities of at least 95 percent of the modified Proctor maximum dry density (ASTM D 1557) have been achieved within the upper one foot of the compacted natural soils at the site.

Should the bearing level soils experience pumping and soil strength loss during the compaction operations, compaction work should be immediately terminated, and (1) the disturbed soils should be removed and backfilled with compacted structural fill, or (2) the excess moisture content within the disturbed soils should be allowed to dissipate before recompacting.

Care should be exercised to avoid damaging any nearby structures while the compaction operation is underway. Prior to commencing compaction, occupants of adjacent structures should be notified, and the existing conditions of the structures should be documented with photographs and survey (if deemed necessary). Compaction should cease if deemed detrimental to adjacent structures, and ECS should be contacted immediately. We recommend the vibratory roller remain a minimum of 50 feet from existing structures. Within this zone, use of a track-mounted bulldozer, or a vibratory roller operating in the static mode, is recommended.

5.2 EARTHWORK OPERATIONS

5.2.1 Structural Backfill and Fill Soils

Structural fill is defined as a non-plastic, inorganic, granular soil having less than 15 percent material passing the No. 200 mesh sieve and containing less than 4 percent organic material. In landscaped and lot areas, we recommend the upper 1 foot of material be structural fill with less than 10 percent material passing the No. 200 mesh sieve to facilitate drainage. The fine sand and fine sand with silt, without roots, as encountered in the borings, are acceptable for use as fill materials and, with proper moisture control, should densify using conventional compaction methods. Soils with more than 10 to 12 percent passing the No. 200 sieve will be more difficult to compact, due to their nature to retain soil moisture, and may require drying.

Structural Fill Compaction Requirements: Materials satisfactory for use as structural fill should consist of soils with the following compaction requirements.

STRUCTURAL FILL COMPACTION REQUIREMENTS	
Subject	**Requirement**
Compaction Standard	Modified Proctor, ASTM D1557
Required Compaction	95% of Max. Dry Density (general structural fill) 98% of Max. Dry Density (upper one foot below the proposed pavement base course)
Loose Thickness prior to compaction	12 inches if vibratory drum roller compaction equipment is used 8 inches if vibratory drum roller is used in static mode 8 inches if track-mounted compaction equipment is used 6 inches if hand-held compaction equipment is used

Fill materials should not be placed on excessively wet soils. Excessively wet soils should be moisture conditioned, which may include scarifying and aerating. Proper drainage should be maintained during the earthwork phases of construction in an attempt to prevent ponding of water which has a tendency to

degrade subgrade soils. The contractor should minimize dusting or implement dust control measures, as required.

We recommend that the grading contractor have equipment on site during earthwork for both drying and wetting fill soils. Moisture control may be difficult during extended periods of rain. The control of moisture content of soils containing more than 10% fines may be difficult when these soils become wet. Further, such soils are easily degraded by construction traffic when the moisture content is elevated.

5.3 UTILITY INSTALLATIONS

Utility Subgrades: The soil borings along the proposed taxiways encountered fine sands (SP), fine sands with silt (SP-SM) and silty fine sands (SM). It is our opinion that the fine sands and fine sand with silt (SP, SP-SM) soils will be suitable for bedding soils for pipelines and utility structures. The silty fine sand (SM) soils may also be suitable if they can be compacted to the required density (typically 98 percent of the soil's Modified Proctor (ASTM D 1557) maximum dry density). If the SM soils cannot be compacted to the required density, then we recommend these soils be overexcavated a minimum of 12 inches below the pipe invert elevation (24 inches below the manhole base elevation) and replaced with compacted structural fill as described in Section 5.2.1 above.

Alternatively, a medium-duty woven geotextile, such as Mirafi 600X or equivalent, may be used as a separation barrier between the compacted backfill and the silty/clayey soils. If a woven geotextile is used, then no overexcavation is necessary for the pipeline, and the depth of overexcavation for the utility manholes may be reduced to 12 inches. The geotextile should be placed in the excavation bottom and along the sides above the silty/clayey soils creating a separation between these soils and the sand backfill to preclude contamination of the backfill.

Utility Backfilling: Backfill placed around the pipe, and to a height of 2 feet above the top of pipe, should be placed in 6-inch lifts. Each lift should be compacted with hand-held equipment to at least 95 percent of the soil's Modified Proctor (ASTM D 1557) maximum dry density. Backfill placed above the 2-foot zone above the top of pipe elevation may be placed in 12-inch lifts and compacted with heavier equipment. Backfill material should meet the recommendations as described in Section 5.2.1. Typically, the backfill soil should exhibit moisture contents within ±2 percent of the soil's optimum moisture content as determined from the Proctor test. Care should be taken to avoid damaging the pipe during compaction operations.

Backfill placed around utility structures should be placed in 6-inch thick lifts, and compacted with hand-held equipment to the same in-place soil density stated above. Heavy equipment should not be used within 5 feet of the structures to prevent overstressing of the structure walls.

Utility Excavation Dewatering: Based on the groundwater depths encountered in our borings, groundwater will likely be encountered by utility excavations which extend below existing grades. It is expected that removal of groundwater will be required, especially for deeper utility excavations. If required by the jurisdiction, the contractor should submit a dewatering plan prior to installing the site utilities.

5.4 GENERAL CONSTRUCTION CONSIDERATIONS

Moisture Conditioning: We anticipate that typical moisture conditioning for soils in this area should be anticipated. The sandy surface soils may require wetting during dry periods or periods of high heat.

Drying of soils containing more than 10% fines or excavated from below the water table may be required to be within ±2 percentage points of the modified Proctor optimum moisture content (ASTM D 1557).

Subgrade Protection: Measures should also be taken to limit site disturbance, especially from rubber-tired heavy construction equipment, and to control and remove surface water from development areas, including structural and pavement areas. It would be advisable to designate a haul road and construction staging area to limit the areas of disturbance and to prevent construction traffic from excessively degrading sensitive subgrade soils and existing pavement areas. Haul roads and construction staging areas could be covered with excess depths of aggregate to protect those subgrades. The aggregate can later be removed and can likely be used in pavement areas.

Surface Drainage: Surface drainage conditions should be properly maintained. Surface water should be directed away from the construction area, and the work area should be sloped away from the construction area at a gradient of at least 1 percent or greater to reduce the potential of ponding water and the subsequent saturation of the surface soils. At the end of each work day, the subgrade soils should be sealed by rolling the surface with a smooth drum roller to limit infiltration of surface water.

Excavation Safety: All excavations and slopes should be made and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing and constructing stable, temporary excavations and slopes and should shore, slope, or bench the sides of the excavations and slopes as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

Erosion Control: The surface soils may be erodible. Therefore, the Contractor should provide and maintain good site drainage during earthwork operations to maintain the integrity of the surface soils. All erosion and sedimentation controls should be in accordance with sound engineering practices and local requirements.

6.0 CLOSING

Our geotechnical exploration has been performed, our findings presented, and our recommendations prepared, in accordance with generally accepted geotechnical engineering principles and practices. ECS is not responsible for any independent conclusions, interpretation, opinions, or recommendations made by others based on the data contained in this report.

Our scope of services was intended to evaluate the soil conditions within the zone of soil influenced by the foundation system. Our scope of services does not address geologic conditions, such as sinkholes or soil conditions existing below the depth of the soil borings.

If any of the project description information discussed in this report is inaccurate, either due to our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted immediately in order that we can review the report in light of the changes and provide additional or alternate recommendations as may be required to reflect the proposed construction.

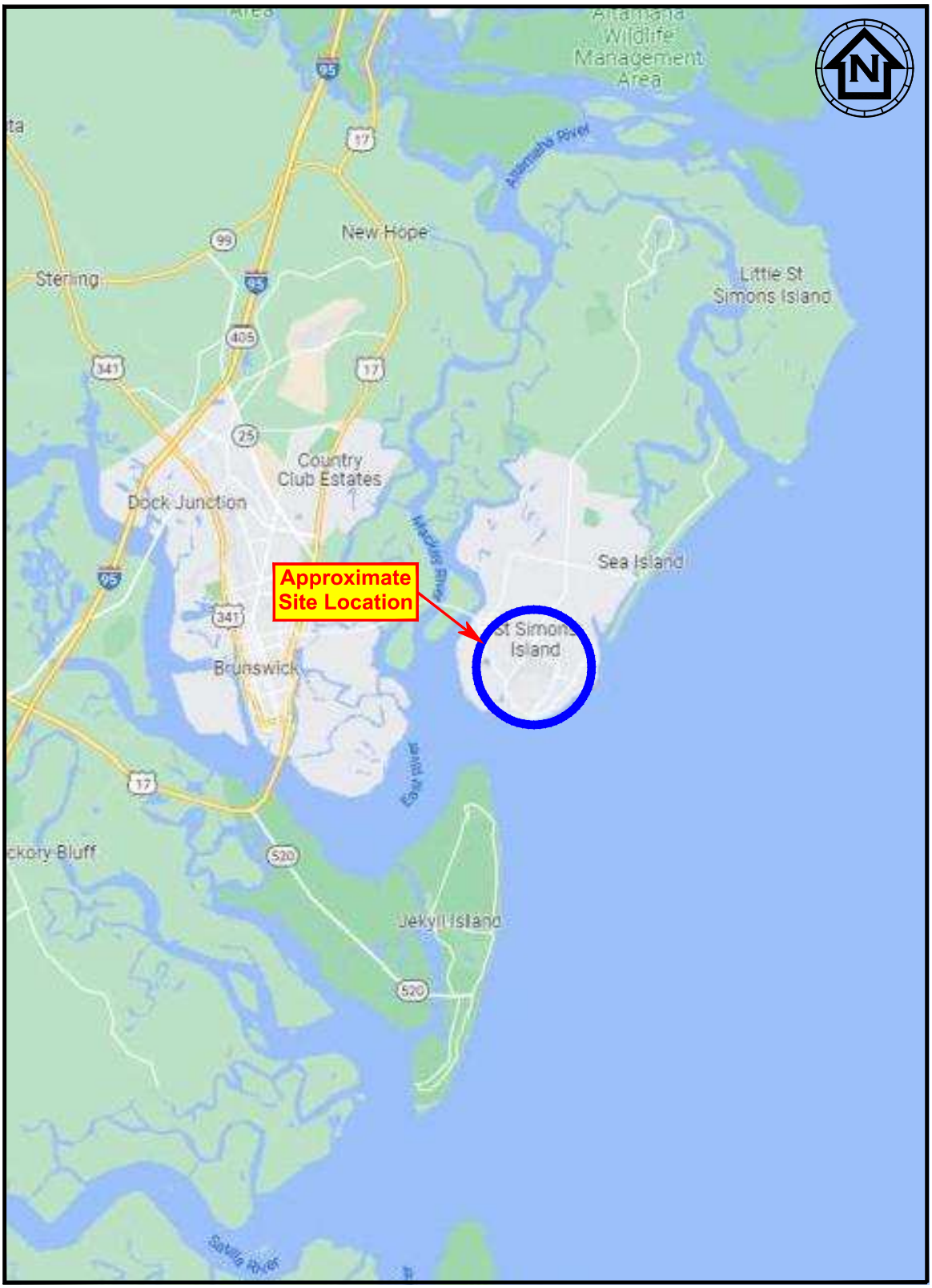
We recommend that ECS be retained to review the project's plans and specifications pertaining to our work so that we may ascertain consistency of those plans/specifications with the intent of the geotechnical report.

Field observations, monitoring, and quality assurance testing during earthwork and foundation installation are an extension of and integral to the geotechnical design recommendation. We recommend that the owner retain these quality assurance services and that ECS be retained to continue our involvement throughout these critical phases of construction to provide general consultation as issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Diagrams & Reports

Figure 1 - Site Location Diagram
Figure 2 - Field Exploration Diagram
Figures 3-5 – Generalized Subsurface Profiles



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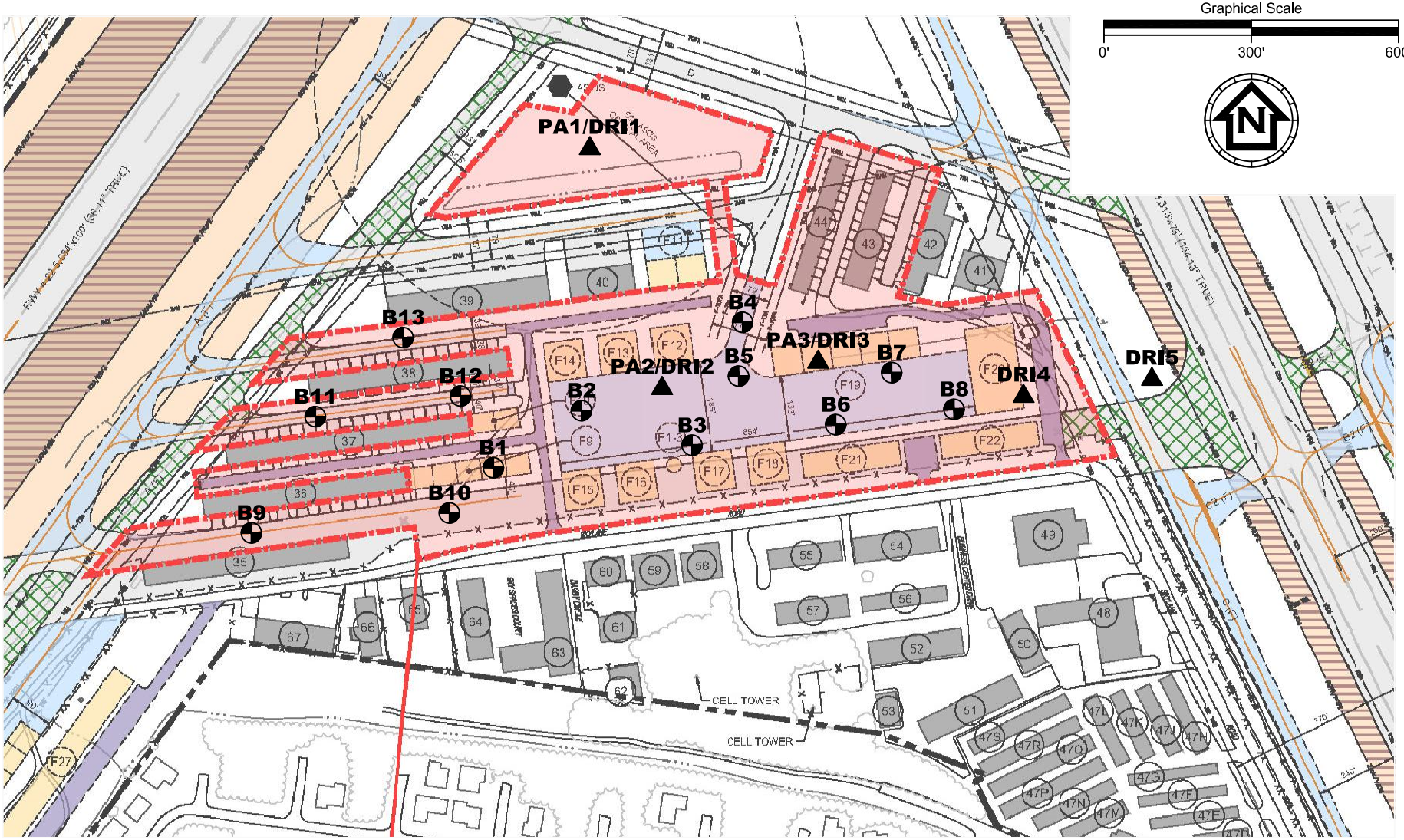
Site Location Diagram

Skylane Infrastructure Development Phase II

St. Simions Island, Georgia

Date: 01/31/23	Project No.: 35-33867	Figure 1



LEGEND

- Approximate Location of Standard Penetration Test (SPT) Boring
- Approximate Location of Auger Boring and Double Ring Infiltrometer (DRI) Test

ECS Florida, LLC

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www.ecslimited.com

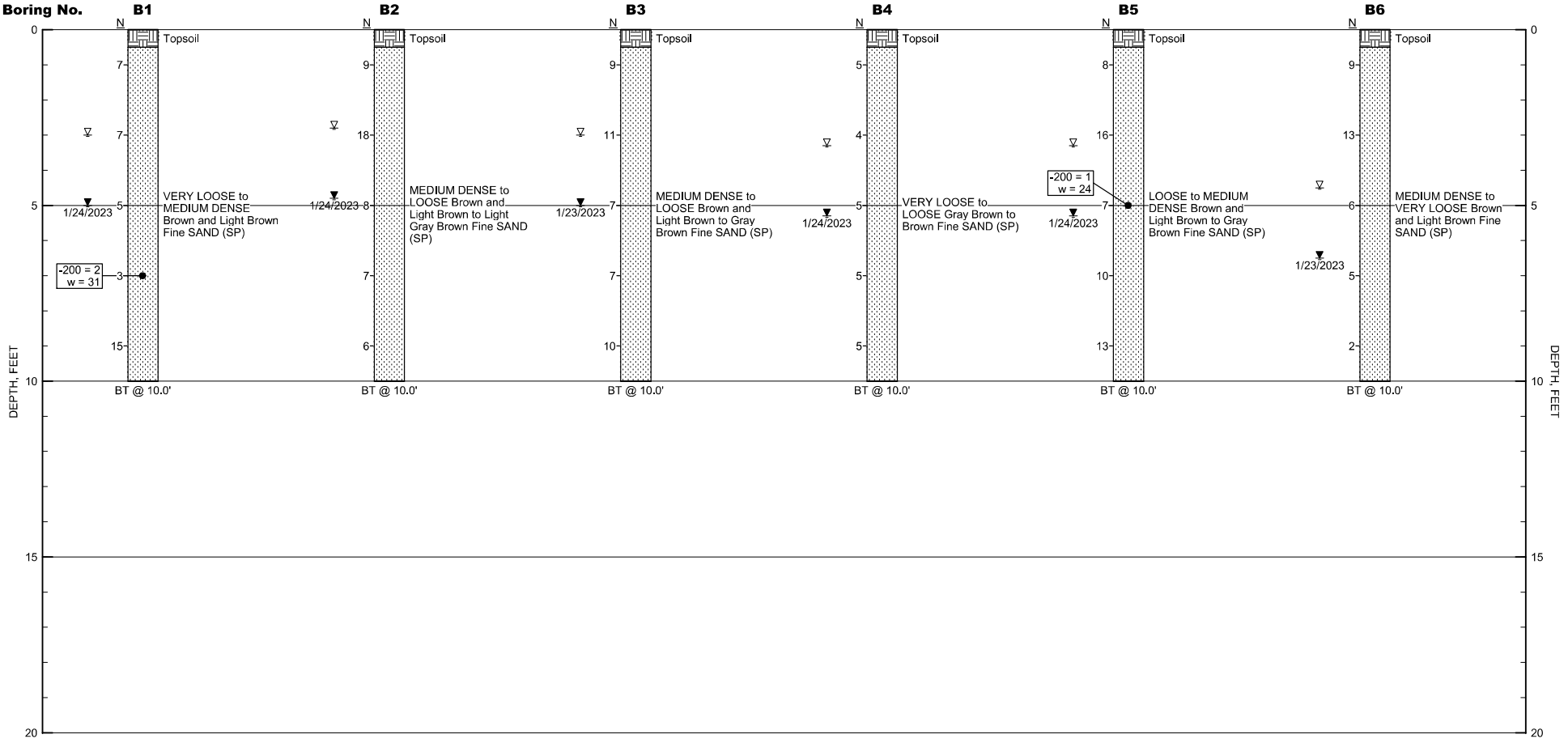
Field Exploration Diagram

Skylane Infrastructure Development Phase II

St. Simons Island, Georgia

Date: 09/24/23	Project No.: 35-33867	Figure 2

JAS - 35-3867



LEGEND

- Asphalt Pavement
- Gravel
- Topsoil
- Fine SAND With Silt (SP-SM)
- Debris/Trash Fill
- Limerock Base
- Fine SAND (SP)
- Silty Fine SAND (SM)
- N — Standard Penetration Resistance, Blows/Foot
- SP — Unified Soil Classification System
- Groundwater Level at Time of Drilling
- Estimated Normal Seasonal High Groundwater Level
- -200 — % Passing No. 200 U.S. Standard Sieve
- w — Natural Moisture Content (%)
- BT — Boring Terminated at Depth Below Grade

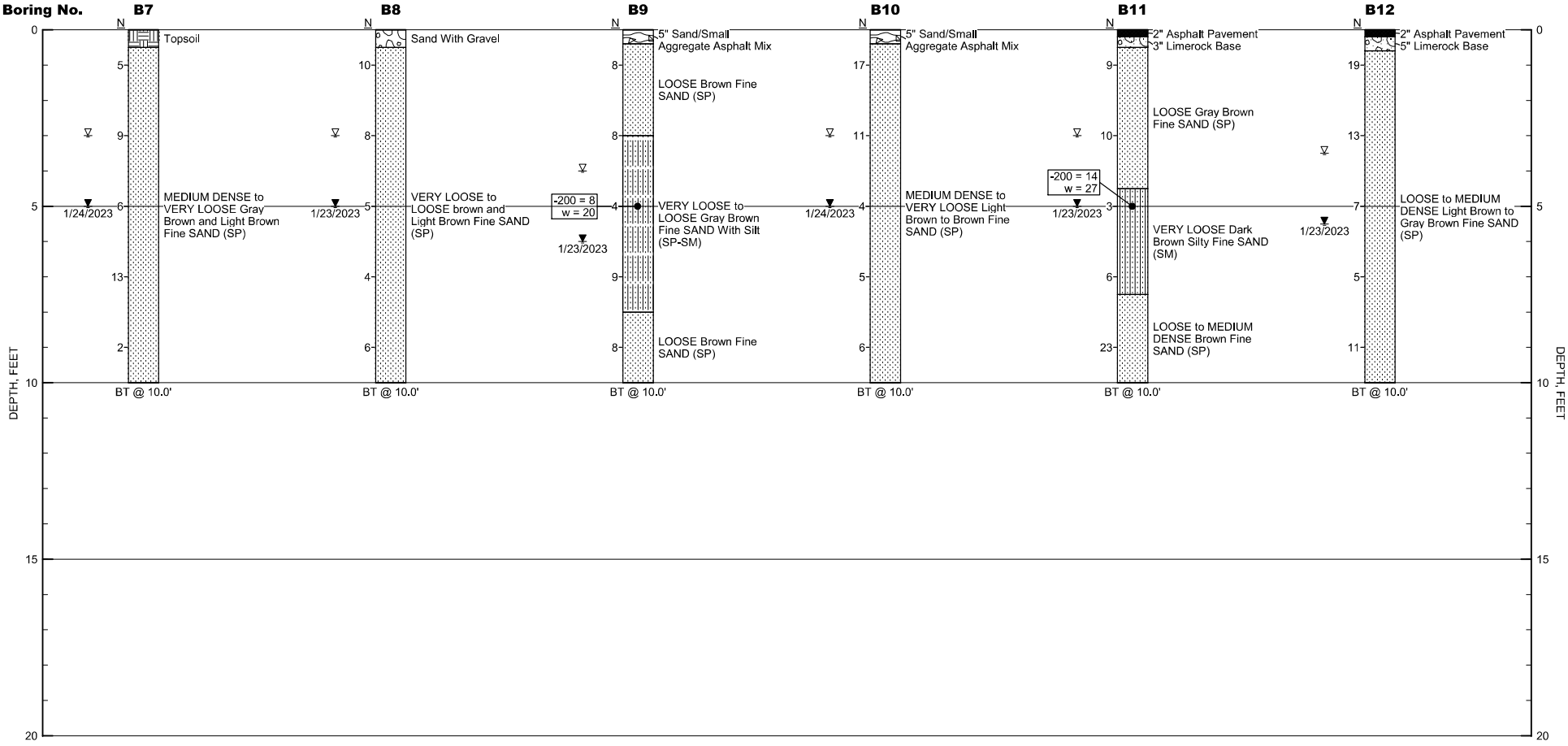
Generalized Subsurface Profiles

Skylane Infrastructure Development Phase II

St. Simions Island, Georgia

ECS

DATE: 2/2/23 | PROJ. NO.: 35-33867 | Figure 3



LEGEND

- Asphalt Pavement
- Gravel
- Topsoil
- Fine SAND With Silt (SP-SM)
- Debris/Trash Fill
- Limerock Base
- Fine SAND (SP)
- Silty Fine SAND (SM)
- N — Standard Penetration Resistance, Blows/Foot
- SP — Unified Soil Classification System
- Groundwater Level at Time of Drilling
- Estimated Normal Seasonal High Groundwater Level
- -200 — % Passing No. 200 U.S. Standard Sieve
- w — Natural Moisture Content (%)
- BT — Boring Terminated at Depth Below Grade

Generalized Subsurface Profiles

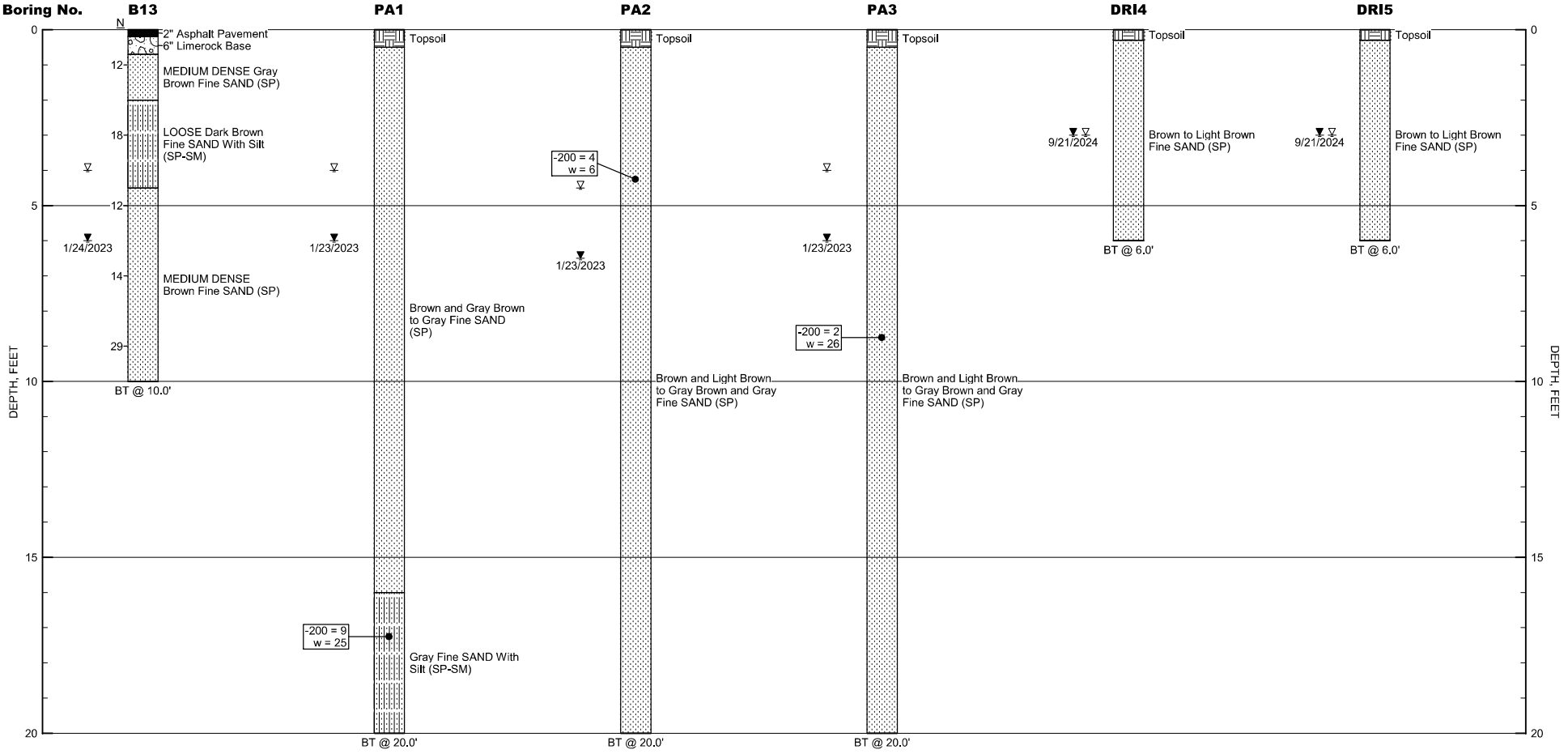
Skylane Infrastructure Development Phase II

St. Simions Island, Georgia

ECS

DATE: 2/2/23	PROJ. NO.: 35-33867	Figure 4

-2



LEGEND

- Asphalt Pavement
- Gravel
- Topsoil
- Fine SAND With Silt (SP-SM)
- Debris/Trash Fill
- Limerock Base
- Fine SAND (SP)
- Silty Fine SAND (SM)
- N — Standard Penetration Resistance, Blows/Foot
- SP — Unified Soil Classification System
- Groundwater Level at Time of Drilling
- Estimated Normal Seasonal High Groundwater Level
- -200 — % Passing No. 200 U.S. Standard Sieve
- w — Natural Moisture Content (%)
- BT — Boring Terminated at Depth Below Grade

Generalized Subsurface Profiles

Skylane Infrastructure Development Phase II

St. Simions Island, Georgia

ECS

DATE: 9/24/24 | PROJ. NO.: 35-33867 | Figure 5

APPENDIX B – Field Operations

Reference Notes for Boring Logs
Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
Subsurface Exploration Procedure: Hand Auger
Boring Logs
Infiltration Test Results

REFERENCE NOTES FOR BORING LOGS

MATERIAL[1,2]

	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
GW	WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
GP	POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
GM	SILTY GRAVEL gravel-sand-silt mixtures
GC	CLAYEY GRAVEL gravel-sand-clay mixtures
SW	WELL-GRADED SAND gravelly sand, little or no fines
SP	POORLY-GRADED SAND gravelly sand, little or no fines
SM	SILTY SAND sand-silt mixtures
SC	CLAYEY SAND sand-clay mixtures
ML	SILT non-plastic to medium plasticity
MH	ELASTIC SILT high plasticity
CL	LEAN CLAY low to medium plasticity
CH	FAT CLAY high plasticity
OL	ORGANIC SILT or CLAY non-plastic to low plasticity
OH	ORGANIC SILT or CLAY high plasticity
PT	PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

WATER LEVELS[6]

- WL (First Encountered)
- WL (Completion)
- WL (Seasonal High Water)
- WL (Stabilized)

FILL AND ROCK

FILL | POSSIBLE FILL | PROBABLE FILL | ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

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SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 18-24 inches (in 3 or 4 Increments of 6 inches each)

- Auger is advanced* and an additional SPT is performed
- One SPT typically performed for every two to five feet. An approximate 1.5 inch diameter soil sample is recovered.

**Drilling Methods May Vary*— The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

SUBSURFACE EXPLORATION PROCEDURE:
Hand Auger Borings
ASTM D1452

In this procedure, a shallow depth boring is made by manually rotating and advancing an auger to the desired depths while periodically removing the auger from the hole to clear and examine the auger cuttings. The auger cuttings are visually classified in the field in accordance with ASTM D2488. Disturbed samples are collected in each soil stratum and sealed in an airtight container and labeled appropriately.

Hand Auger Procedure:

- Involves manually rotating a tube or barrel type auger to the desired sample depth
- Recording the depth of changes in strata
- Describing soil in each major stratum in accordance with ASTM D2488
- Recording groundwater depth and location of seepage zones, when/if found
- Describing condition of augered hole (i.e. whether the hole remains open or the sides cave)

Project No.: 35-33867
Boring No.: B1
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 5 ft Time: Drilling Date: 1/24/23
Boring Begun: 1/24/23
Boring Completed: 1/24/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT / MOISTURE CONTENT / LIQUID LIMIT (%)	SHEAR STRENGTH (ksf)
	0		Topsoil	2					
1			LOOSE Brown Fine SAND (SP)	3 4 4	7				
2			LOOSE Light Brown Fine SAND (SP)	3 3 4 4	7				
3	5		VERY LOOSE to MEDIUM DENSE Brown Fine SAND (SP) ▼	3 2 2	5				
4				1 1 2 2	3		2		
5				4 6 9 9	15				
	10		Boring Terminated @ 10 ft.						
	15								
	20								

Pocket Penetrometer Undisturbed Sample
Pocket Penetrometer Disturbed Sample
Torvane
Unconfined Compression
Triaxial Compression

0 10 20 30 40
0 1 2

Remarks

Project No.: 35-33867
Boring No.: B2
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 4.8 ft Time: Drilling Date: 1/24/23
Boring Begun: 1/24/23
Boring Completed: 1/24/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil	2					
			LOOSE Brown Fine SAND (SP)	3					
1				6	9				
				6					
			MEDIUM DENSE to LOOSE Light Brown Fine SAND (SP)	9					
				9					
2				9	18				
				5					
				4					
			▼	4					
3	5			4	8				
				4					
			LOOSE Light Gray Brown Fine SAND (SP)	3					
				3					
4				4	7				
				4					
				2					
				3					
5				3	6				
	10		Boring Terminated @ 10 ft.	3					
	15								
	20								

SHEAR STRENGTH (ksf)
- ⊙ Pocket Penetrometer Undisturbed Sample
- ◕ Pocket Penetrometer Disturbed Sample
- ▼ Torvane
- ● Unconfined Compression
- ⊠ Triaxial Compression

0 10 20 30 40 (%)
0 1 2

Remarks

Project No.: 35-33867
Boring No.: B3
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 5 ft Time: Drilling Date: 1/23/23
Boring Begun: 1/23/23
Boring Completed: 1/23/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil	2					
1			LOOSE Brown Fine SAND (SP)	4 5 6 7	9				
2			MEDIUM DENSE to LOOSE Light Brown Fine SAND (SP)	6 5 6	11				
3	5			1 3 4 3 3	7				
4			LOOSE Gray Brown Fine SAND (SP)	3 4 4 4	7				
5				4 6 6	10				
	10		Boring Terminated @ 10 ft.						
	15								
	20								

Pocket Penetrometer Undisturbed Sample
Pocket Penetrometer Disturbed Sample
Torvane
Unconfined Compression
Triaxial Compression

0 10 20 30 40
0 1 2

Remarks

Project No.: 35-33867
Boring No.: B4
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 5.3 ft Time: Drilling Date: 1/24/23
Boring Begun: 1/24/23
Boring Completed: 1/24/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil	1					
1			VERY LOOSE to LOOSE Gray Brown Fine SAND (SP)	3 2	5				
				1 1					
2				2 2	4				
				3 1					
3	5			2 3	5				
				4					
			LOOSE Brown Fine SAND (SP)	1 2					
4				3	5				
				3 2					
5				2 3	5				
	10		Boring Terminated @ 10 ft.	3					
	15								
	20								

Pocket Penetrometer Undisturbed Sample
Pocket Penetrometer Disturbed Sample
Torvane
Unconfined Compression
Triaxial Compression

Remarks

Project No.: 35-33867
Boring No.: B5
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 5.3 ft Time: Drilling Date: 1/24/23
Boring Begun: 1/24/23
Boring Completed: 1/24/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT / MOISTURE CONTENT / LIQUID LIMIT (%)	SHEAR STRENGTH (ksf)
	0		Topsoil	1					
1			LOOSE Brown Fine SAND (SP)	3 5 6	8				
				7					
2			MEDIUM DENSE to LOOSE Light Brown Fine SAND (SP)	7 9 6	16				
	5			3 3					
3				4	7		1	+	
				4					
			LOOSE to MEDIUM DENSE Gray Brown Fine SAND (SP)	3 4					
4				6 6	10				
				3					
5				6 7	13				
	10		Boring Terminated @ 10 ft.	12					
	15								
	20								

Pocket Penetrometer Undisturbed Sample
Pocket Penetrometer Disturbed Sample
Torvane
Unconfined Compression
Triaxial Compression

Remarks

Project No.: 35-33867
Boring No.: B6
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 6.5 ft Time: Drilling Date: 1/23/23
Boring Begun: 1/23/23
Boring Completed: 1/23/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil	3					
1			LOOSE to MEDIUM DENSE Brown Fine SAND (SP)	4 5 5	9				
				6 6					
2				7	13				
			LOOSE Light Brown Fine SAND (SP)	6 2					
3	5			3 3	6				
				2 3					
4				2 3	5				
			VERY LOOSE Brown Fine SAND (SP)	2 1					
5				1 1	2				
	10		Boring Terminated @ 10 ft.						
	15								
	20								

Shear Strength (ksf): ⊙ Pocket Penetrometer Undisturbed Sample; ◕ Pocket Penetrometer Disturbed Sample; ▼ Torvane; ● Unconfined Compression; ⊠ Triaxial Compression

Moisture Content (%): 0, 10, 20, 30, 40

Shear Strength (ksf): 0, 1, 2

Remarks

Project No.: 35-33867
Boring No.: B7
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 5 ft Time: Drilling Date: 1/24/23
Boring Begun: 1/24/23
Boring Completed: 1/24/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil	1					
1			LOOSE Gray Brown Fine SAND (SP)	2 3 3	5				
2				3 4 5	9				
			LOOSE Light Brown Fine SAND (SP)	5 3 3					
3	5		▼	3 3	6				
4			MEDIUM DENSE to VERY LOOSE Gray Brown Fine SAND (SP)	4 6 7	13				
5				7 3 1					
	10		Boring Terminated @ 10 ft.	1 3	2				
	15								
	20								

0 10 20 30 40

SHEAR STRENGTH (ksf)
⊙ Pocket Penetrometer Undisturbed Sample
◕ Pocket Penetrometer Disturbed Sample
▼ Torvane
● Unconfined Compression
⊠ Triaxial Compression
0 1 2

Remarks

Project No.: 35-33867
Boring No.: B8
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 5 ft Time: Drilling Date: 1/23/23
Boring Begun: 1/23/23
Boring Completed: 1/23/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Sand With Gravel	3					
			LOOSE Brown Fine SAND (SP)	4					
1				6	10				
				4					
				4					
			LOOSE to VERY LOOSE Light Brown Fine SAND (SP)	4					
2				4	8				
				4					
				3					
				2					
3	5		▼	3	5				
				2					
				2					
				1					
4				3	4				
				5					
			LOOSE Brown Fine SAND (SP)	1					
				2					
5				4	6				
				6					
	10		Boring Terminated @ 10 ft.						
	15								
	20								

SHEAR STRENGTH (ksf)
- ⊙ Pocket Penetrometer Undisturbed Sample
- ◕ Pocket Penetrometer Disturbed Sample
- ▼ Torvane
- ● Unconfined Compression
- ⊠ Triaxial Compression

0 10 20 30 40 (%)
0 1 2

Remarks

Project No.: 35-33867
Boring No.: B9
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 6 ft Time: Drilling Date: 1/23/23
Boring Begun: 1/23/23
Boring Completed: 1/23/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT / MOISTURE CONTENT / LIQUID LIMIT (%)	SHEAR STRENGTH (ksf)
	0		5" Sand/Small Aggregate Asphalt Mix	3					
			LOOSE Brown Fine SAND (SP)	3					
1				5	8				
				4					
				4					
2				4					
			VERY LOOSE to LOOSE Gray Brown Fine SAND With Silt (SP-SM)	4	8				
				4					
				1					
				1					
3	5			3	4		8		
				4					
				3					
				4					
4				5	9				
				5					
			LOOSE Brown Fine SAND (SP)	4					
				4					
5				4	8				
				4					
	10		Boring Terminated @ 10 ft.						
	15								
	20								

SHEAR STRENGTH (ksf)
- Pocket Penetrometer Undisturbed Sample
- Pocket Penetrometer Disturbed Sample
- Torvane
- Unconfined Compression
- Triaxial Compression

PLASTIC LIMIT / MOISTURE CONTENT / LIQUID LIMIT (%): 0, 10, 20, 30, 40
SHEAR STRENGTH (ksf): 0, 1, 2

Remarks

Project No.: 35-33867
Boring No.: B10
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 5 ft Time: Drilling Date: 1/24/23
Boring Begun: 1/24/23
Boring Completed: 1/24/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		5" Sand/Small Aggregate Asphalt Mix						
1			MEDIUM DENSE Light Brown Fine SAND (SP)	8 9 7	17				
				6 5					
2				6 4	11				
			VERY LOOSE to LOOSE Brown Fine SAND (SP)	2 2					
3	5		▼	2 2	4				
				2 2					
4				3 4	5				
				1 2					
5				4 10	6				
	10		Boring Terminated @ 10 ft.						
	15								
	20								

Pocket Penetrometer Undisturbed Sample
Pocket Penetrometer Disturbed Sample
Torvane
Unconfined Compression
Triaxial Compression

0 10 20 30 40
0 1 2

Remarks

Project No.: 35-33867
Boring No.: B11
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 5 ft Time: Drilling Date: 1/23/23
Boring Begun: 1/23/23
Boring Completed: 1/23/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT / MOISTURE CONTENT / LIQUID LIMIT (%)	SHEAR STRENGTH (ksf)
	0		2" Asphalt Pavement	7					
			3" Limerock Base	5					
1			LOOSE Gray Brown Fine SAND (SP)	4	9				
				4					
				6					
2				8					
				2	10				
				2					
				2					
3	5		VERY LOOSE Dark Brown Silty Fine SAND (SM) ▼	2					
				1	3		14	+	
				1					
				1					
4				2					
				4	6				
			LOOSE to MEDIUM DENSE Brown Fine SAND (SP)	4					
				6					
				8					
5				15	23				
	10			17					
			Boring Terminated @ 10 ft.						
	15								
	20								

○ Pocket Penetrometer Undisturbed Sample
◐ Pocket Penetrometer Disturbed Sample
▼ Torvane
● Unconfined Compression
☒ Triaxial Compression

Remarks

Project No.: 35-33867
Boring No.: B12
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 5.5 ft Time: Drilling Date: 1/23/23
Boring Begun: 1/23/23
Boring Completed: 1/23/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		2" Asphalt Pavement	8				0 10 20 30 40	0 1 2
			5" Limerock Base	10					
1			MEDIUM DENSE Light Brown Fine SAND (SP)	9	19				
				6					
				4					
2				7					
				6	13				
				9					
				1					
3	5		LOOSE to MEDIUM DENSE Gray Brown Fine SAND (SP) ▼	3					
				4	7				
				5					
				1					
4				2					
				3	5				
				8					
				4					
5				5					
				6	11				
	10		Boring Terminated @ 10 ft.	4					
	15								
	20								

○ Pocket Penetrometer Undisturbed Sample
◐ Pocket Penetrometer Disturbed Sample
▼ Torvane
● Unconfined Compression
☒ Triaxial Compression

Remarks

Project No.: 35-33867
Boring No.: B13
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type: Auto
Drill Rod: AWJ
Casing Size:
Length of Casing:
Groundwater Depth: 6 ft Time: Drilling Date: 1/24/23
Boring Begun: 1/24/23
Boring Completed: 1/24/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		2" Asphalt Pavement	6				0 10 20 30 40	0 1 2
			6" Limerock Base	6					
1			MEDIUM DENSE Gray Brown Fine SAND (SP)	6	12				
				7					
			LOOSE Dark Brown Fine SAND With Silt (SP-SM)	6					
2				9					
				9	18				
				7					
				3					
			MEDIUM DENSE Brown Fine SAND (SP)	5					
3	5			7	12				
				9					
				10					
				7					
4				7	14				
				8					
				9					
				17					
5				12	29				
	10		Boring Terminated @ 10 ft.						
	15								
	20								

SHEAR STRENGTH (ksf)
- ⊙ Pocket Penetrometer Undisturbed Sample
- ◕ Pocket Penetrometer Disturbed Sample
- ▼ Torvane
- ● Unconfined Compression
- ⊠ Triaxial Compression

Remarks

Project No.: 35-33867
Boring No.: PA1
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type:
Drill Rod: Flight Auger
Casing Size:
Length of Casing:
Groundwater Depth: 6 ft Time: Drilling Date: 1/23/23
Boring Begun: 1/23/23
Boring Completed: 1/23/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil						
			Brown Fine SAND (SP)						
1									
2									
	5		Gray Brown Fine SAND (SP)						
3									
	10								
4									
			Gray Fine SAND (SP)						
	15								
			Gray Fine SAND With Silt (SP-SM)						
5							9	+	
	20								

Boring Terminated @ 20 ft.

SHEAR STRENGTH (ksf): ⊙ Pocket Penetrometer Undisturbed Sample; ◕ Pocket Penetrometer Disturbed Sample; ▼ Torvane; ● Unconfined Compression; ⊠ Triaxial Compression

MOISTURE CONTENT (%): 0 10 20 30 40

SHEAR STRENGTH (ksf): 0 1 2

Remarks

Project No.: 35-33867
Boring No.: PA2
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type:
Drill Rod: Flight Auger
Casing Size:
Length of Casing:
Groundwater Depth: 6.5 ft Time: Drilling Date: 1/23/23
Boring Begun: 1/23/23
Boring Completed: 1/23/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil						
			Brown Fine SAND (SP)						
1									
			Light Brown Fine SAND (SP)						
2							4	+	
	5								
			Gray Brown Fine SAND (SP)						
3									
4									
	10								
			Gray Fine SAND (SP)						
	15								
5									
	20		Boring Terminated @ 20 ft.						

SHEAR STRENGTH (ksf): Pocket Penetrometer Undisturbed Sample; Pocket Penetrometer Disturbed Sample; Torvane; Unconfined Compression; Triaxial Compression

MOISTURE CONTENT (%): 0, 10, 20, 30, 40

SHEAR STRENGTH (ksf): 0, 1, 2

Remarks

Project No.: 35-33867
Boring No.: PA3
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: 111G
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type:
Drill Rod: Flight Auger
Casing Size:
Length of Casing:
Groundwater Depth: 6 ft Time: Drilling Date: 1/23/23
Boring Begun: 1/23/23
Boring Completed: 1/23/23

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil						
			Brown Fine SAND (SP)						
1									
			Light Brown Fine SAND (SP)						
2	5								
3			Brown Fine SAND (SP)						
4							2	+	
	10		Gray Brown Fine SAND (SP)						
5									
	15		Gray Fine SAND (SP)						
6									
	20		Boring Terminated @ 20 ft.						

Pocket Penetrometer Undisturbed Sample
Pocket Penetrometer Disturbed Sample
Torvane
Unconfined Compression
Triaxial Compression

0 10 20 30 40 (%)
0 1 2

Remarks

Project No.: 35-33867
Boring No.: DRI4
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: Hand Auger
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type:
Drill Rod:
Casing Size:
Length of Casing:
Groundwater Depth: 3 ft Time: Drilling Date: 9/21/24
Boring Begun: 9/21/24
Boring Completed: 9/21/24

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil						
			Brown Fine SAND (SP)						
1									
2									
	5		Light Brown Fine SAND (SP)						
3									
			Boring Terminated @ 6 ft.						
	10								
	15								
	20								

SHEAR STRENGTH (ksf)
- Pocket Penetrometer Undisturbed Sample
- Pocket Penetrometer Disturbed Sample
- Torvane
- Unconfined Compression
- Triaxial Compression

(%): 0 10 20 30 40
(ksf): 0 1 2

Remarks

Project No.: 35-33867
Boring No.: DRI5
Sheet 1 of 1

LOG OF BORING

Project: Skylane Infrastructure Development Phase II
Client: Reynolds Smith & Hills
Drill Rig: Hand Auger
Driller: M. Letchworth
Boring Location: See Field Exploration Plan
Hammer Type:
Drill Rod:
Casing Size:
Length of Casing:
Groundwater Depth: 3 ft Time: Drilling Date: 9/21/24
Boring Begun: 9/21/24
Boring Completed: 9/21/24

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT ○ / MOISTURE CONTENT + / LIQUID LIMIT ◇ (%)	SHEAR STRENGTH (ksf)
	0		Topsoil						
1			Brown Fine SAND (SP)						
2			Light Brown Fine SAND (SP)						
3	5								
			Boring Terminated @ 6 ft.						
	10								
	15								
	20								

SHEAR STRENGTH (ksf)
- ⊙ Pocket Penetrometer Undisturbed Sample
- ◕ Pocket Penetrometer Disturbed Sample
- ▼ Torvane
- ● Unconfined Compression
- ⊠ Triaxial Compression

MOISTURE CONTENT (%): 0, 10, 20, 30, 40
SHEAR STRENGTH (ksf): 0, 1, 2

Remarks

ECS FLORIDA, LLC
Geotechnical • Construction Materials • Environmental • Facilities

DOUBLE RING INFILTROMETER TEST RESULTS

Project: Skylane Infrastructure Development Phase II

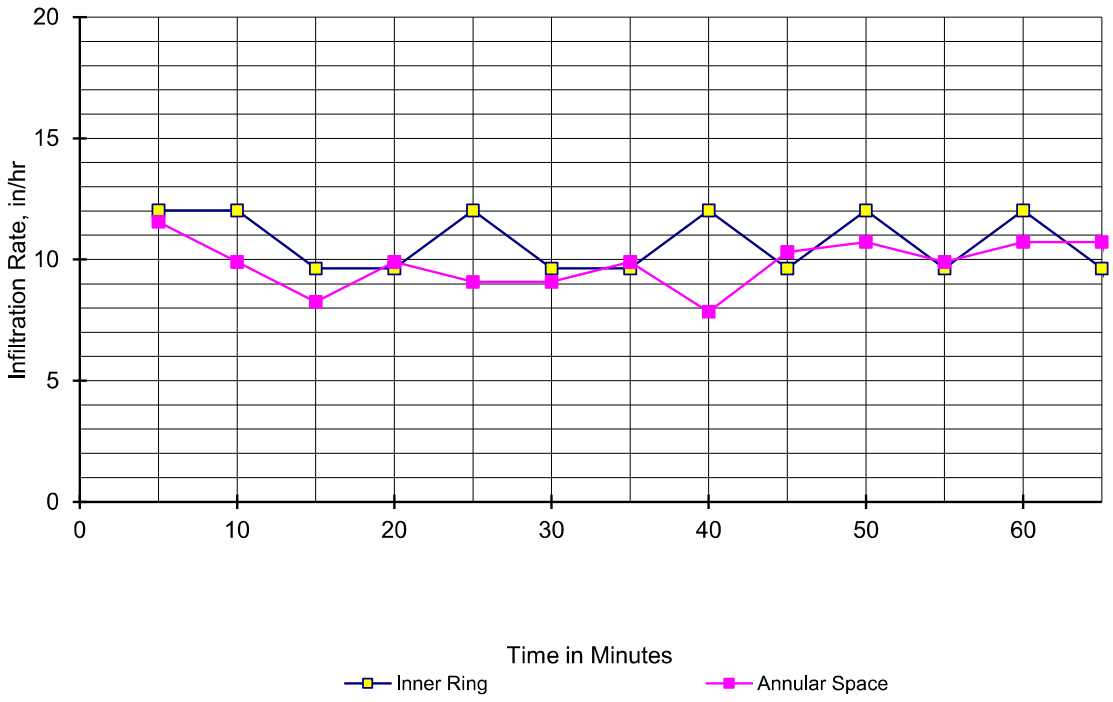
ECS Project No.: 35-33867
Test No.: DRI1
Date Performed: 1/24/2023
Performed by: JP

DOUBLE RING INFILTROMETER TEST RESULTS:

Groundwater Depth: approx 6 Feet

Test Depth: 12 Inches
Test Location: field test

Average Stabilized Infiltration Rate, In/Hr = 8.5 17.1 ft/day



DOUBLE RING INFILTROMETER TEST RESULTS

Project: Skylane Infrastructure Development Phase II

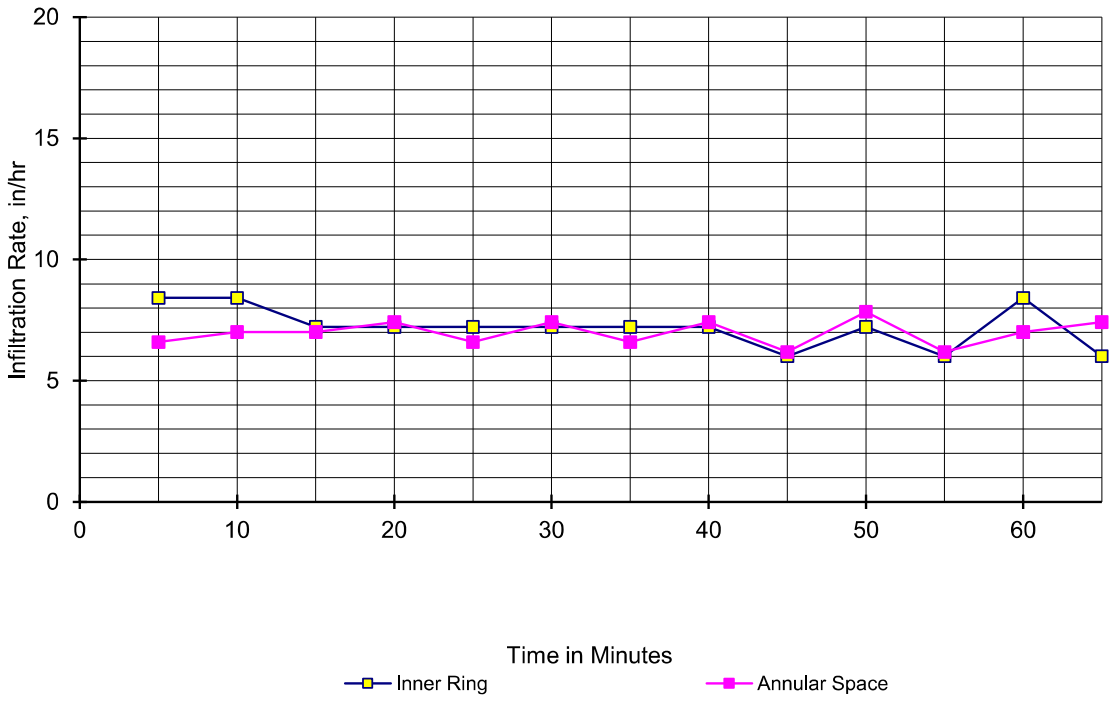
ECS Project No.: 35-33867
Test No.: DRI2
Date Performed: 1/24/2023
Performed by: JP

DOUBLE RING INFILTROMETER TEST RESULTS:

Groundwater Depth: approx 6.5 Feet

Test Depth: 12 Inches
Test Location: field test

Average Stabilized Infiltration Rate, In/Hr = 6.1 12.1 ft/day



ECS FLORIDA, LLC
Geotechnical • Construction Materials • Environmental • Facilities

DOUBLE RING INFILTROMETER TEST RESULTS

Project: Skylane Infrastructure Development Phase II

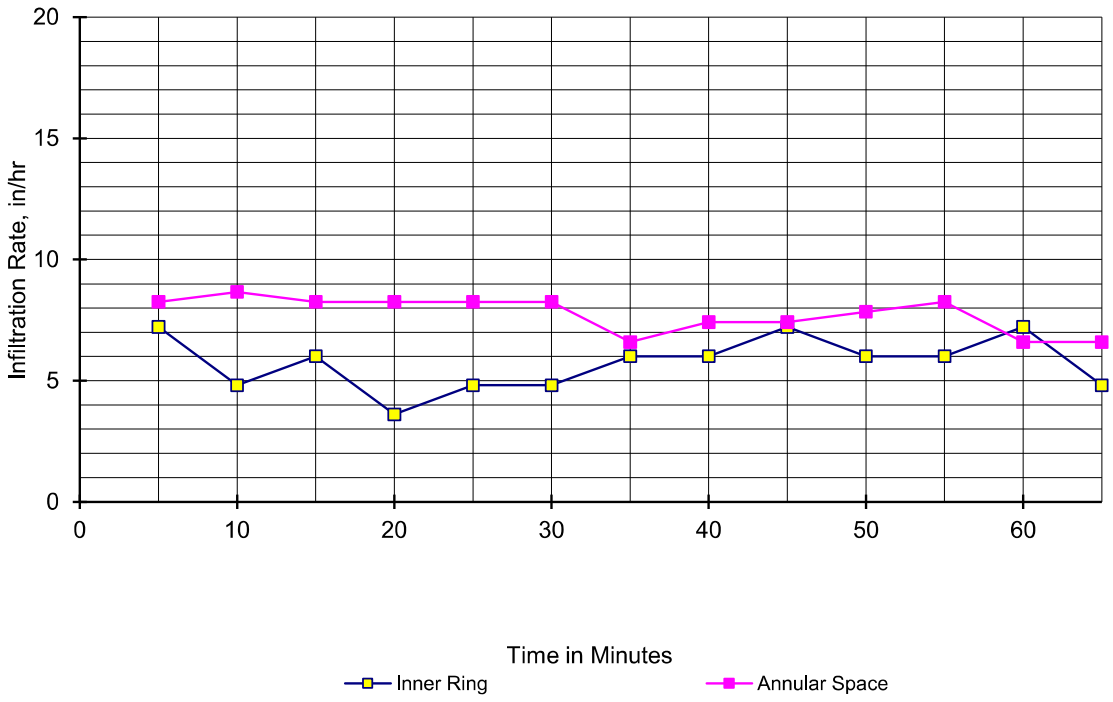
ECS Project No.: 35-33867
Test No.: DRI3
Date Performed: 1/24/2023
Performed by: JP

DOUBLE RING INFILTROMETER TEST RESULTS:

Groundwater Depth: approx 6 Feet

Test Depth: 12 Inches
Test Location: field test

Average Stabilized Infiltration Rate, In/Hr = 5.0 9.9 ft/day



DOUBLE RING INFILTROMETER TEST RESULTS

Project: Skylane Infrastructure Development Phase II

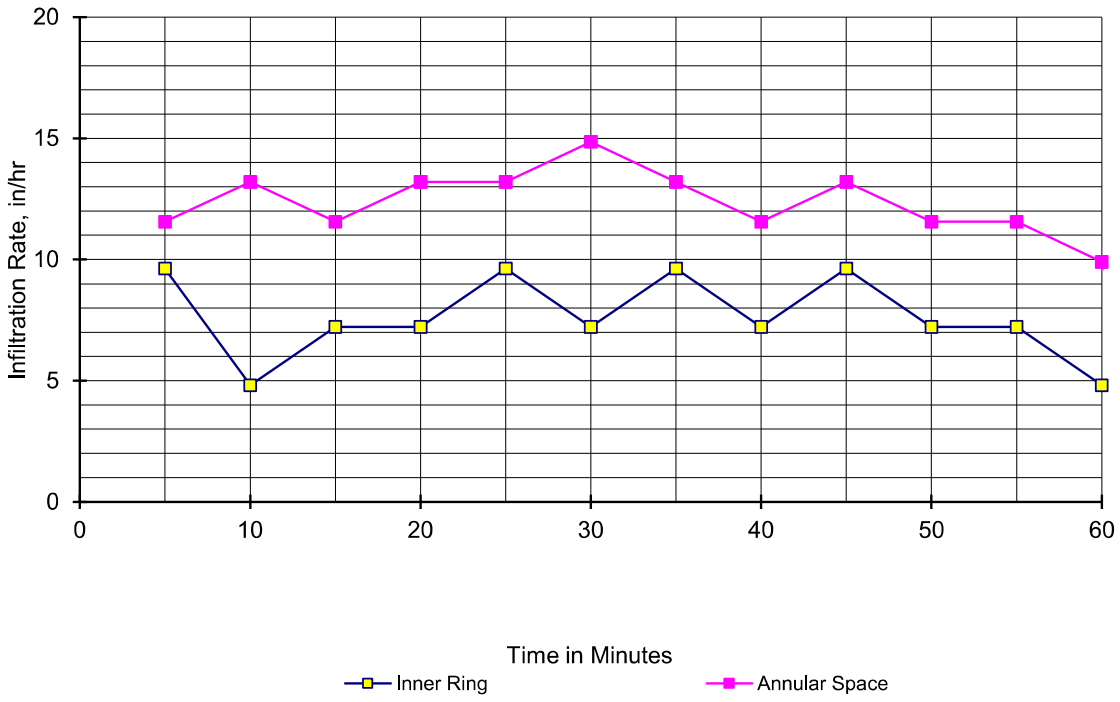
ECS Project No.: 35-33867
Test No.: DRI4
Date Performed: 9/21/2024
Performed by: ML

DOUBLE RING INFILTROMETER TEST RESULTS:

Groundwater Depth: approx 3 feet

Test Depth: 12 Inches
Test Location: field test

Average Stabilized Infiltration Rate, In/Hr = 6.1 12.2 ft/day



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DOUBLE RING INFILTROMETER TEST RESULTS

Project: Skylane Infrastructure Development Phase II

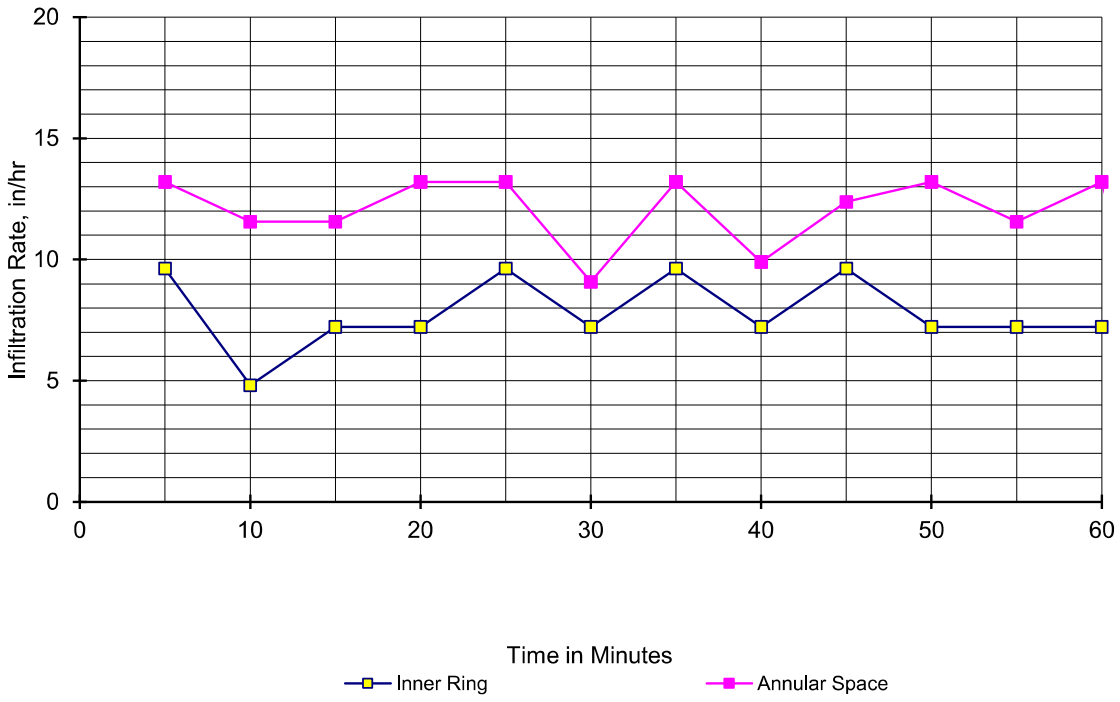
ECS Project No.: 35-33867
Test No.: DRI5
Date Performed: 9/21/2024
Performed by: ML

DOUBLE RING INFILTROMETER TEST RESULTS:

Groundwater Depth: approx 3 feet

Test Depth: 12 Inches
Test Location: field test

Average Stabilized Infiltration Rate, In/Hr = 6.3 12.5 ft/day



APPENDIX C – Laboratory Testing

Laboratory Test Results Summary

ECS FLORIDA, LLC

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SUMMARY OF LABORATORY TEST RESULTS

Project: Skylane Infrastructure Development II
Client: RS&H
Project No.: 33867

Boring/ Sample No.	Sample Depth (ft.)	Organic Content %	Fines Content %	Natural Moisture Content %	Atterberg Limits			Pocket Pen. (tsf)
					Liquid Limit %	Plastic Limit %	Plasticity Index	
B1-4	6-8		1.8	31				
B5-3	4-6		0.7	24				
B9-3	4-6		8.3	20				
B11-3	4-6		14.1	27				
PA1-5	17		9.0	25				
PA2-2	4		3.6	6				
PA3-4	9		2.3	26				

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U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Airport Safety Self-Inspection	**Date:** 9/27/2022	**AC No:** 150/5200-18D
	Initiated By: AAS-300	**Change:**

1 **Purpose.**

This advisory circular (AC) provides information to airport operators on airport self-inspection programs and identifies the items included in these programs.

2 **Cancellation.**

This AC cancels AC 150/5200-18C, *Airport Safety Self-Inspection,* dated April 23, 2004.

3 **Application.**

This AC provides voluntary guidance for all airport operators in developing self-inspection programs. It also provides the standards for developing and implementing self-inspection programs at airports certificated under Title 14 Code of Federal Regulations (CFR) part 139 (hereinafter referred to as part 139) which are acceptable to the Administrator. Part 139 regulations require an airport operator at a certificated airport to develop a self-inspection program acceptable to the Administrator as a means of compliance with § 139.327, Self-Inspection Program. The standards in this AC may be applicable for projects funded with federal grant monies through the Airport Improvement Program (AIP) and with revenue from the Passenger Facility Charges (PFC) Program. See Grant Assurance No. 34, "Policies, Standards, and Specifications," and PFC Assurance No. 9, "Standards and Specifications." Mandatory terms such as "must" apply only to those who conduct inspections at airports that are obligated by Federal grant funds or PFC agreements or those who seek to demonstrate compliance by use of the specific method described by this AC.

4 **Principal Changes.**

The AC incorporates the following principal changes:

a. Changed the numbering system to reflect the beta testing within the Federal Aviation Administration.

b. Added in Chapter 2, specific role definitions for the Airport Certificate Holder, Airport Manager and or Operations Director.

c. The Recommended Inspection Frequency section moved to chapter 7 “Inspection Requirements by Type.”

d. Knowledge and Equipment for Self-Inspection changed to reflect changes to part 139.

e. Added record keeping requirements to Knowledge and Equipment for Self-Inspection.

f. Changed “Regularly Scheduled Inspection” to “Daily Inspection” for clarity.

g. Added part 139 references to each section.

h. Updated the checklist to reflect changes to part 139.

i. Added photos to show equipment placards and markings.

5 **Related CFR and Reference Materials.**

Appendix A lists related reference materials.

6 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.

John R. Dermody
Director of Airport Safety and Standards

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Chapter 3. The Self-Inspection Program 3-1

Chapter 4. Types of Self-Inspections 4-1

Chapter 5. Inspection Records 5-1

Chapter 6. Knowledge and Equipment for the Self-Inspection Program 6-1

Chapter 7. Inspection Requirements by Type 7-1

Appendix A. Reference and Related Reading Material A-1

Appendix B. Suggested Airport Safety Self-Inspection Checklists B-1

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CHAPTER 1. BACKGROUND

1.1 A self-inspection program is integral to airport safety. Inspecting features that affect airside operations are critical to ensuring that components of various systems—for example, lighting, marking, and signs—are functioning properly. Additionally, an effective inspection process can identify hazards, e.g. fuel product leaks, exposed ignition sources, that represent safety risks which, when addressed early, can be mitigated successfully and at lower cost.

1.1.1 Through an airport self-inspection program, the airport operator:

1. Monitors airport conditions through a daily inspection schedule
2. Identifies specific conditions that pose a risk to airport safety
3. Takes appropriate corrective actions to address deficiencies on the airport
4. Maintains a self-inspection log (can be electronic) to note deficiencies and the date and time corrective measures were taken, and
5. Identifies trends through recurring deficiencies.

1.2 Through an airport self-inspection program, operators of certificated airports can maintain a level of airport safety by complying with the provisions of part 139. This AC identifies the components and responsibilities of each section of part 139 and provides a basis for developing a comprehensive self-inspection program for the individual airport. Sample checklists to assist airport operators are located in Appendix B.

CHAPTER 2. RESPONSIBILITIES

2.1 Airport Certificate Holder.

The Airport Certificate Holder has overall responsibility for airside safety but can delegate this responsibility to an Airport Manager, Operations Director, or other entity. This AC uses the terms airport certificate holder and airport operator interchangeably, as they are in the regulation, to denote responsibility.

2.2 The Airport Manager or Operations Director.

The Airport Manager or Operations Director authorizes Operations/Maintenance Personnel to perform inspections in the self-inspection program. At certificated airports, operations/maintenance personnel must be thoroughly familiar with part 139; they must be familiar with the airport and properly trained in vehicle/pedestrian operations; and given pertinent sections of the Airport Certification Manual (ACM), which identify their duties and responsibilities. The training must address specifically the following operational areas:

- §139.305, Paved areas
- §139.307, Unpaved areas, if applicable
- §139.309, Safety areas
- § 139.311, Marking, signs, and lighting
- § 139.323, Traffic and wind direction indicators
- § 139.325, Airport emergency plan
- § 139.327, Self-inspection plan
- § 139.329, Pedestrians and ground vehicles
- § 139.335, Public protection
- § 139.337, Wildlife hazard management
- § 139.339, Airport condition reporting
- § 139.341, Identifying, marking, and lighting construction and other unserviceable areas
- § 139.343, Non-complying conditions
- ACM WHMP (Wildlife Hazard Management Plan)
- Types of self-inspections
- Airport self-inspection procedures
- Self-inspection records

Note 1: Chapter 7 addresses each of the above part 139 subjects in more detail.

Note 2: The terms “operations personnel”, “maintenance personnel” and “inspector(s)” are used interchangeably.

CHAPTER 3. THE SELF-INSPECTION PROGRAM

3.1 The effective self-inspection program is comprehensive and thorough. However, it depends on alert and well-trained personnel who understand their duties and responsibilities and have the resources to carry them out.

3.2 Inspection Personnel can be most effective in performing inspections when they have clear instructions, checklists, and access to informational resources. ACs in the 150 Series provide the standards for certificated airports. Self-inspection personnel must have access to these resources. Inspection personnel are also responsible for developing and using techniques that preclude complacency generated by routine. For example, inspectors can vary the pattern of the inspection and view the airport from different perspectives. Avoiding a repetitive inspection pattern enables the inspector to be more aware; fixed inspection patterns, while easy to learn, generally, over time, do not provide for an adequate inspection and have the potential for missing deficiencies during the inspection process.

3.2.1 For example, runway inspections are usually conducted in both directions. During the runway inspection, when time allows, the inspector should inspect all stub taxiways up to the runway side of the runway hold position. When inspecting taxiways adjacent to a runway, the inspector should inspect all stub taxiways up to the taxiway side of the runway hold position. These areas are often overlooked. Any practices and procedures that vary the inspection pattern can greatly benefit airport safety.

3.2.2 While inspecting parallel taxiways, self-inspection personnel should check the stub taxiways and holding positions as stub taxiways are sometimes bypassed during the inspection of the movement area. During nighttime inspections, the runway inspections should be conducted in both directions to check runway lighting and signs in both directions. Some airports have a Letter of Agreement (LOA) with the ATCT addressing self-inspection routes depending on the direction of aircraft landing/takeoff operations.

3.3 Inspection of areas that have been assigned to individual air carriers, fixed base operators, or other tenants can be made the responsibility of the user. The transfer of this responsibility is usually accomplished through Letters of Agreement (LOAs) or through lease agreements, which are legally binding. However, oversight of these areas and accountability for them are within the purview of the airport operator, and, at certificated airports, the Federal Aviation Administration (FAA) holds the certificate holder ultimately responsible for operating the airport safely. Advice from airport counsel can guide the certificate holder in writing agreements and LOAs that identify user responsibilities.

NOTE: Tenants are generally only responsible for leased portions of non-movement areas with rare exceptions such as at military installations where certain taxiways or arresting gear installations are maintained by DOD.

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CHAPTER 4. TYPES OF SELF-INSPECTIONS

4.1 There are different types of inspections in an effective self-inspection program; each type is appropriate to specific activities on the airport. They are:

4.1.1 Daily inspection schedule.

The airport must be inspected daily except otherwise required by the Airport Certification Manual. Larger airports normally conduct multiple inspections daily. The Part 139 requirement to inspect daily does not mean that only one self-inspection is required each day. Typically, the first daily inspection is conducted early in the morning before the first air carrier operation. An effective self-inspection program includes a daylight inspection and a separate nighttime inspection to evaluate lighting systems and glass bead visibility. Optimally, self-inspections should occur when aircraft activity is minimal, in order to create the least impact on airport operations. Part of this inspection must occur during the hours of darkness at those airports that serve air carriers during hours of darkness. Airport operators holding an FAA Airport Operating Certificate—Class I, II, III, or IV—must conduct a daily airport inspection, to include a nighttime inspection to be in compliance. The daily airport inspection requirement, including a nighttime inspection, is required regardless of whether or not the airport receives air carrier service except as otherwise required by the ACM. Air carrier service is not a prerequisite for complying with § 139.327 (a) (1).

4.1.2 Continuous surveillance inspection.

Those activities and facilities that airport management has identified and documented in the ACM as requiring continuous surveillance are inspected whenever personnel are in these areas. Hazardous conditions can occur at any time and in a short period can pose significant safety risks.

4.1.3 Special inspection.

Special inspections of activities and facilities must take place after receipt of a complaint or when an unusual condition or unusual event occurs on the airport, such as a significant meteorological event or an accident or incident. Special inspections must also occur at the end of construction activities, at the end of a construction shift, at the end of the day, and at the end of the construction project, to ensure that there are no unsafe conditions related to the construction activity. This special inspection must occur prior to construction personnel leaving the airport, in the event that corrective actions are necessary. Document special inspections on the appropriate portions of the Airport Daily Safety Self-Inspection checklist. Some airports use a separate inspection checklists for special inspections.

4.1.4 Periodic condition inspection.

Periodic condition inspections are conducted to focus on slowly changing conditions that may not be noticed during daily inspections. For example, a periodic condition inspection of markings may be conducted in the Spring to evaluate the condition of airfield markings to determine the priority for repainting markings when weather

condition permit painting work. A periodic condition inspection of markings may also be conducted in the Fall to evaluate the condition of markings to determine if any marginal airfield markings are in need of repainting before cold weather prevents repainting of markings. Periodic condition inspections may be conducted to focus on the condition of pavement lips and safety areas, especially where turf is not yet well established after construction projects. Settling of soil can expose pavement lips and erosion in safety areas are common problems after construction projects. A periodic condition inspection may be conducted during or immediately after heavy rain to check for drainage problems that may occur from turf damming or plugged drains in safety areas. At airports with potential rubber buildup problems, periodic condition inspection are conducted with Continuous Friction Measuring Equipment (CFME) to monitor the pavement for friction problems and obscuration of the runway centerline marking.

CHAPTER 5. INSPECTION RECORDS

5.1 An effective safety self-inspection program includes procedures for capturing and tracking information about deficiencies and other phenomena from the inspection checklists. In addition, the airport operator must include a work order system so that deficiencies noted on the checklists can be corrected and documented in a timely manner.

5.2 The Inspection Log constitutes a record of conditions noted and can act as proof of follow-up corrective actions taken. Inspection logs can be electronic but the airport operator must be able to print hard copies when necessary. Information from the individual checklists is also an important administrative tool for airport management, providing a daily snapshot of the condition of the airport. Over defined periods, this information can indicate trends and identify problem areas and systems that must be addressed. This helps to direct financial planning and budgetary requirements. Certificated airports must retain checklist records for 12 consecutive calendar months [§139.301 (b) (5)]. Certificate holders are required to prepare and maintain for at least 12 consecutive calendar months, a record of each inspection, showing the conditions found and all corrective actions taken [§139.327 (c)].

5.2.1 Airports can use electronic record keeping programs specifically designed to meet self-inspection requirements. These must be available to the Administrator in an acceptable form during any inspection conducted by the FAA. The log of the regularly scheduled inspection checklists documents that safety inspection responsibilities are being met.

5.2.2 The operator must issue a Notice to Air Missions (NOTAM), as appropriate, reporting deficient conditions that could have an immediate and critical impact on the safety of aircraft operations. When corrective actions take place, the operator cancels the NOTAM. Certificated airports can use other notification systems and procedures in addition to the NOTAM system but not in lieu of NOTAMS, if acceptable to the Administrator.

CHAPTER 6. KNOWLEDGE AND EQUIPMENT FOR THE SELF-INSPECTION PROGRAM

6.1 Knowledge Requirements.

Airport inspection personnel who perform inspections must have a general knowledge of the ACM and a specific knowledge of the sections of the ACM that pertain to their duties and responsibilities [§139.303 (a)(c)]. The following areas require training at the specific airport at which they perform inspections:

1. Airport familiarization, including runway and taxiway configuration, airport marking, lighting, and sign systems, and the location and types of facilities that affect airside operations
2. Part 139 and the FAA AC standards and as applied specifically to the airport. The airport operator must provide training on these standards and provide access to these references [§139.303 (b)]
3. Procedures for conducting self-inspections and discrepancy reporting procedures as addressed in the Self-Inspection Program section of the ACM.
4. Procedures for access to, and operation in, movement areas and safety areas as specified under §139.329 at the specific airport
5. Airport communication procedures, including radio communication between air traffic control tower and personnel, use of the common traffic advisory frequency (CTAF) (aka UNICOM) as appropriate, and procedures for reporting unsafe airport conditions. During hours with no operational control tower, the operations inspector must also listen for aircraft and other vehicle operators.
6. At certificated airports, applicable sections of the approved ACM, as mentioned above, including the airport's:
7. Marking, Lighting, and Sign Plans
8. Airport Emergency Plan (AEP)
9. Wildlife Hazard Management Plan
10. Snow and Ice Control Plan (as applicable)
11. Construction Safety and Phasing Plan (CSPP) for projects (as applicable)
12. NOTAM requirements, notification, and distribution procedures (AC 150/5200-28, *Notice to Air Missions (NOTAMs) for Airport Operators)*

6.2 Records.

At certificated airports, the ACM must contain initial and recurrent training requirements for personnel conducting the airport inspections, and the certificate holder must maintain accurate records of the training received by the inspection personnel and the inspections they perform.

6.3 Equipment.

6.3.1 The self-inspection personnel performing inspections must have a two-way ground control radio capable of communicating with the Airport Traffic Control Tower on controlled airports and on the CTAF (aka UNICOM) at uncontrolled airports or at controlled airports when the tower is closed. Inspectors must know and use correct radio communication phraseology, procedures, and techniques, as referenced in the Aeronautical Information Manual (AIM). Airport police or others authorized to conduct all or part of the self-inspection must also know and use correct radio communication phraseology, procedures, and techniques as referenced in the AIM.

6.3.2 In addition, vehicles used during the inspection process must be equipped with:

1. A beacon for nighttime and low-visibility inspections; and
2. Either a beacon or orange-and-white checkered flag prominently posted on the vehicle for daytime inspections in order to provide maximum visibility.

6.4 Checklists.

Self-inspection personnel must document inspections on checklists that include all areas subject to inspection. A copy of the checklist from the previous inspection may be useful to provide information concerning deficiencies already noted/reported and/or corrective action taken. Uncorrected deficiencies should continue to be documented on inspection checklists until they are resolved. All conditions found must be documented on the inspection checklists, even if corrected during the inspection. All corrective actions must be documented, either on the checklist or on a work order.

CHAPTER 7. INSPECTION REQUIREMENTS BY TYPE

7.1 Daily Inspection.

The daily inspection of the airport's physical facilities concentrates on the areas described below. The inspector uses the airport diagram or an airport map and identifies deficiencies, including necessary details and locations, on it. The term "reporting" means that a comment is made on the checklist and, if applicable, marked on the airport diagram. Photographing the deficiency is an excellent method for documenting the condition in addition to noting the deficiency on the checklist.

7.1.1 §139.305, Paved Areas.

The inspection of pavement surface condition is critical to airport safety. Pavement inspection is conducted daily (e.g., in the early morning before flight operations begin). Additional inspections can be conducted as appropriate at the discretion of the airport operator to ensure pavement surfaces are clear. At airports with a history of pavement heaves, more frequent inspections are appropriate during high heat conditions. During the pavement inspection, the inspector:

7.1.1.1 Checks the pavement lips,—the area between full-strength pavement, and shoulders and between paved shoulders and safety areas. This observation has two purposes: first to check for water drainage problems due to turf damming, and, secondly, to assure that pavement lips do not exceed 3 inches. The inspection includes a check for vegetative growth along runway and taxiway edges that may impede drainage from the pavement surface.

7.1.1.2 Determines the presence of any cracks wide enough to cause loss of directional control in an aircraft. The inspector reports and marks location of cracks on the airport diagram for continued monitoring during future inspections. The inspection also includes the identification of holes that could cause directional control problems for an aircraft [Reference § 139.305 (a)(2)].

7.1.1.3 Checks the condition of pavement areas for cracks, scaling, spalling, bumps, low spots, and debris that could cause foreign object damage to aircraft.

7.1.1.4 Checks for low spots that are conducive to ponding during rainstorms and for areas where water may remain on the runway surface and cause hydroplaning.

7.1.1.5 Checks for mud, dirt, sand, loose aggregate, debris, foreign objects, rubber deposits, and other contaminants that must be removed promptly and as completely as possible.

7.1.1.6 Checks markings (see Par. 7.1.4). Refers to the ACs that contain methods and procedures for maintaining paved surfaces at the specific airport that are acceptable to the Administrator.

7.1.2 §139.307, Unpaved Areas.

At airports where applicable, the airport operator must maintain the condition of gravel, turf, or other unpaved runway, taxiway, or loading ramp and parking area on the airport, which is available for air carrier use, in a manner acceptable to the Administrator. Unpaved surfaces in the state of Alaska are predominantly involved in this Section of the regulation. During the inspection of unpaved areas, the inspector:

1. Checks the slope from the edge of the full-strength surface downward to the existing terrain and confirms that it is no steeper that 2:1.
2. Checks that the full-strength surfaces have an adequate crown or grade to assure sufficient drainage to prevent ponding.
3. Checks to ensure that the full-strength surfaces are adequately compacted and sufficiently stable to prevent rutting and loosening or build-up of surface material, which could impair directional control of aircraft or prevent drainage.
4. Checks that there are no holes or depressions that exceed 3 inches in depth or are of a breadth capable of impairing directional control or causing damage to an aircraft.
5. Checks for mud, dirt, sand, loose aggregate, debris, foreign objects, rubber deposits, and other contaminants that must be removed promptly and as completely as possible.
6. Refers to the ACs that contain methods and procedures for the maintenance and configuration of unpaved areas at the specific airport, which are acceptable to the Administrator.

7.1.3 §139.309, Safety Areas.

At certificated airports, the ACM must document the dimensions of the runway and taxiway safety areas. The inspector must know the dimensions of the runway and taxiway safety areas at the airport. During the safety area inspection, the inspector:

1. Inspects each safety area to ensure that it is cleared and graded and has no potentially hazardous ruts, humps, depressions, or other surface variations.
2. Inspects each safety area to ensure drainage by grading or storm sewers to prevent water accumulation.
3. Confirms that each safety area is capable under dry conditions of supporting aircraft rescue and firefighting (ARFF) personnel and equipment, snow removal equipment, and the occasional inadvertent aircraft excursion, without causing major damage to the aircraft.
4. Checks to ensure no object, except those fixed by function (such as runway lights, signs, or navigational aids), is located there. Objects in the safety areas must be constructed on frangibly mounted structures of the lowest practical height. At

certificated airports, the frangible point must be no higher than 3 inches above grade. Refer to Table 6-1 in AC 150/5300-13, *Airport Design*, current edition, for a list of NAVAID facilities authorized to be located in the RSA because they are fixed-by-function.

5. Determines that the base for any object located in safety areas is at grade level. This includes light fixtures, traffic and wind indicators, and NAVAIDs. This is especially important at airports subject to winter thaws. The inspector must check manhole and handhole covers to ensure they are at grade level and can support vehicles and the inadvertent aircraft excursion.

6. Identifies and documents any damage caused by wildlife. Documents evidence of wildlife activity, e.g., burrowing animals, birds, insects, mammals, etc., on the airport in accordance with part 139.337 and the ACM. Confirms wildlife hazard notification is accomplished through NOTAMS and other methods acceptable to the Administrator.

7. Notes equipment and objects, such as construction equipment or material that are temporarily located in a safety area. At certificated airports, this requires knowledge of the construction safety plan, which specifies locations of material and equipment. The inspection must confirm the airport has issued appropriate NOTAMs in accordance with §§139.309, .339, and .341.

8. Checks for any construction activity or vehicle/equipment located in the safety area. Keep in mind that during some construction projects the runway or taxiway may be restricted to small aircraft that do not need a full safety area for operations. Also keep in mind that in rare circumstances where a taxiway is indispensable for aircraft movement, a straight section of taxiway may be opened with trenches/excavations in the safety area, subject to restrictions. Self-inspection personnel should be familiar with the Construction Safety Phasing Plan (CSPP) for projects and identify any safety area issues related to construction activity that is not in accordance with the CSPP.

7.1.4 §139.311, Marking.

Airport markings provide information to pilots during takeoff, landing, and taxiing. Airport marking must be properly maintained and must comply with standards specified in AC 150/5340-1*, Standards for Airport Markings*, current edition. Part 139 regulations provide compliance with these standards is mandatory for operators of certificated airports and compliance may be required for airport operators of airports where Federal funds have been used for runway and taxiway construction/ rehabilitation and the grant assurances remain in effect. The inspector must be familiar with the appropriate marking required at the airport in the approved Marking Plan. During the inspection, the inspector:

1. Confirms that the marking of each runway meets the specifications for takeoff and landing minimums.

2. Confirms that each taxiway has a centerline and taxiway edge markings, as appropriate (AC 150/5340-1 specifies when edge marking is required).
3. Checks holding position marking for visibility and correct layout.
4. Checks ILS critical area/POFZ/APCH markings if installed on the airport.
5. Checks surface painted holding position signs (SPHPS) and enhanced taxiway centerline markings for visibility and correct layout.
6. Refers to the appropriate sections of AC 150/5340-1 for information regarding marking that differentiates movement area from non-movement area and the associated marking for operations in the non-movement area (e.g. vehicle roadways, taxi lanes, parking for fueling vehicles and other ramp marking).
7. Checks markings for correct color, peeling, blistering, chipping, fading, and obscuration because of rubber buildup and notes on the airport maps the location of any marking that is obscured, faded, or deteriorating.
8. During and after construction projects, checks new markings for compliance with marking standards.
9. Checks markings with glass beads during periods of darkness to determine if the reflectivity level is adequate at night. In addition, the inspector confirms that the glass beads are adequately embedded to avoid being ingested by aircraft engines.
10. Reports deviations from standard marking and their location on the airport map. Inspectors must monitor and document non-complying marking. New markings installed during construction projects must be checked for compliance to marking standards.

7.1.5 §139.311, Signs.

Signs provide important information to pilots while taxiing and to vehicle and equipment operators on the airport. Signs must be in accordance with the standards specified in the current versions of AC 150/5340-18*, Standards for Airport Sign Systems*, and AC 150/5345-44, *Specification for Runway and Taxiway Signs,* current editions. Part 139 regulations provide compliance with these standards is mandatory for operators of certificated airports and compliance may be required for airport operators of airports where Federal funds have been used for runway and taxiway construction/rehabilitation and the grant assurances remain in effect. The inspector must know the appropriate sign standards and specifications at the airport and ensure that signs comply with the approved Sign Plan. In addition, at Class I, II, and IV airports, the signs required by §139.311 (b)(1) must be internally illuminated. At Class III airports, the signs required by §139.311 (b)(1)(ii) and (b)(1)(iii) must be internally illuminated. During the inspection, the inspector:

1. Checks signs to ensure they are in accord with the approved Sign Plan and that they identify taxiways and runways correctly. Signs must be easy to read, located properly, and follow the color and retro-reflectivity standards.
2. Checks to ensure that all lighted signs are operational and not obscured by vegetation, dirt, snow, etc.

3. Checks to ensure that signs are properly tethered.
4. Checks signs to ensure they are frangibly mounted (the frangible mount being no greater than 3 inches above the base) and that the concrete bases are level, secure, and properly maintained at grade level.
5. Checks to see that sign panels are not missing, askew, cracked, broken, or otherwise damaged or compromised.
6. Most importantly, confirms that signs have the correct legend and arrow orientation as well as that all dividers are placed correctly and are the correct color.
7. During and after construction projects, checks new signs for compliance with sign standards and, at certificated airports, confirms they are in accordance with the approved Sign Plan.
8. During periods of darkness, checks to ensure that signs are properly illuminated and that mandatory instruction signs are illuminated with the associated runway lighting system. However, at some locations where runways are inactive, (lower priority runway during snow events or inactive runways during low visibility operations below 1200 RVR), holding position signs on taxiways crossing inactive runways may be connected to the taxiway circuit.
9. Checks signs for correct operational intensity settings and that they do not flicker or change intensity when runway light intensity is changed.
10. Check runway exit signs to ensure they are illuminated when the runway lights are illuminated. Runway exit signs are typically connected to the runway circuit, however, if they are connected to the taxiway circuit, there may be a local procedure to turn on the associated taxiway lights whenever the runway lights are turned on to meet this standard.
11. Reports non-standard signs or any sign that is not functioning properly, is faded, or is damaged. At certificated airports, the inspector ensures the airport has issued a NOTAM about any malfunctioning holding position sign or ILS critical area sign, per §139.339. Inspectors must document and monitor any non-standard sign.

7.1.6 §139.311, Lighting.

7.1.6.1 The airport operator is required to provide and maintain lighting systems for air carrier operations when the airport is open at night and during conditions below visual flight rules (VFR) minimums. Lighting is also required in Alaska during periods in which a prominent unlighted object cannot be seen from a distance of 3 statute miles or when the sun is more than six degrees below the horizon. The lighting systems required by §139.311 (c) consist of runway lighting, taxiway lighting, approach lighting (as authorized), an airport beacon, and obstruction lighting. Several ACs provide information and guidance on lighting and contain the lighting standards for certificated airports. During the inspection, the inspector checks the taxiway lighting/reflector system to ensure that they

are the proper color, oriented correctly and meet operational tolerance limits specified in AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities,* current edition. Taxiway lighting consists of one of the four following systems.

1. Centerline lights,
2. Centerline reflectors,
3. Edge lights, or
4. Edge reflectors.

7.1.6.2 During the inspection (which can be accomplished over a 24-hour period), the inspector will:

1. Check each runway lighting system to ensure that it meets the specifications for takeoff and landing minimums, as authorized by the Administrator. This can include runway centerline and touchdown zone lights, displaced threshold lights, if installed, lead-on/lead-off lights, Runway End Lights (RENLs), stop bars, LAHSO and Runway Status Lights and the runway threshold/runway end lighting system.
2. Check all runway lights and threshold/end lights, to ensure they are the proper color and oriented correctly, this includes the specified lighting configuration for ILS-capable runways.
3. Check all taxiway lights and runway guard lights, if installed, (both elevated and in-pavement) for meeting operating tolerance limits.
4. Check the approach lighting system for each runway to ensure that it meets the specifications for takeoff and landing minimums, as authorized by the Administrator, unless an entity other than the certificate holder provided and/or maintains the system. However, if the inspector notes and documents a deficiency in a system not owned by the airport, the owner of the system is notified so that corrections or repairs can be made as well as documented that the deficiency has been corrected.
5. Check the operation of the airport beacon and ensure the proper color is being reflected for airport type.
6. Check obstruction lighting and marking within the airport's authority to ensure correct and effective operation.
7. Check apron edge lights, if installed.
8. Check all lights, lighting fixtures, and lighting systems to ensure that they are free of vegetation and obscuration by deposits of foreign material.
9. Check the following for proper shielding, if installed:

10. Apron lights, vehicle parking area lights, lighting in fuel storage areas, roadways, buildings
11. Floodlights used in construction areas.
12. If inspector notes a deficiency with an approach lighting system, the deficiency is documented and the owner or entity responsible for maintenance is notified so that corrections can be made. Document all fixtures missing and lights that are not working (e.g., burned out) or appear dim.
13. Check that lights function properly through the manual or radio features and that photocell controls function properly, if installed.
14. Check all light bases to ensure proper alignment, correct height, and grading to prevent erosion and ensure that fixtures are frangibly mounted, the point of which is no more than 3 inches above the base.
15. For Low Visibility Operations/Surface Movement Guidance and Control System (LVO\SMGCS) operations below RVR1200, conduct an initial inspection of stop bar lights, if installed, runway guard lights, clearance bar lights, taxiway centerline lights, and taxiway edge lights installed on the low-visibility routes in accordance with the airport's LVO/SMGCS plan.
16. For operations below RVR1200 with any LVO/SMGCS lighting systems that are not electronically monitored, periodically inspect every 2 to 4 hours during low visibility operations. The inspections must be conducted according to the airport's LVO/SMGCS plan, which is referenced in the ACM.
17. For operations below RVR600 with any LVO/SMGCS lighting systems that are not electronically monitored, inspect every 2 hours. The inspections must be conducted according to the airport's LVO/SMGCS plan, which is referenced in the ACM.

7.1.6.3 Light inspections must occur during periods of darkness in order to evaluate lighting systems effectively. This is when they provide the primary visual aid for pilots. While the inspector observes airport lighting owned and maintained by the airport operator as a priority, the inspector must also document and report immediately any lighting discrepancy owned or operated by others to the appropriate, responsible owner, in the interest of safety. In Alaska, lighting systems must be inspected during periods of darkness or during periods in which a prominent unlighted object cannot be seen from a distance of three miles or the sun is more than six degrees below the horizon.

7.1.7 §139.313, Snow and Ice Control.

7.1.7.1 Snow and Ice Control Plans (SICP) are unique to each airport. Therefore, the inspector must be familiar with the contents of the plan for the specific

airport. AC 150/5200-30, *Airport Field Condition Assessments and Winter Operations Safety*, current edition, contains guidance and procedures for snow and ice removal. At airports where snow and ice occur throughout the winter season, preparation and tabletop exercises usually begin off-season. Familiarization with the Snow and Ice Plan can begin with the airport's off-season preparation especially when new techniques, equipment, and authorized materials are involved in the snow removal and ice control processes. Many airports conduct a "Lessons Learned" session or series of sessions after the winter season. These sessions can be helpful to the Inspector as well.

7.1.7.2 During the snow and ice control inspection, the inspector, in accordance with the SICP:

1. Checks runways and taxiways to ensure that snow banks and drifts next to the runways and taxiways provide clearance for aircraft wing tips, engines, and propellers.
2. Checks to ensure that snow is not piled across the runway threshold or across runway/runway intersections.
3. Checks runway and taxiway lights and signs to ensure that they are not obscured by snow or damaged by snow removal operations.
4. Checks for foreign objects that may have been left on the pavement from snow removal operations i.e. chunks of ice or debris from the snow removal equipment.
5. Checks taxiway intersections and access routes to ensure that snow removal operations have provided adequate clearances for ARFF equipment.
6. Checks to ensure that critical areas for the operation of electronic NAVAIDs are clear.
7. Checks for and reports slippery pavement conditions, using RCAM as described in AC 150/5200-30 to determine Runway Condition Codes or a MU value from a friction measurement device. There is no correlation between friction measurement numbers and braking action reports of Good, Fair, Poor, or Nil. These reports are transmitted to the ATCT.
8. Checks for snow and /or ice accumulation that the snow and ice removal operation has missed and for any condition resulting from removal operations that creates a hazard on the airside. The inspector must report such accumulations or conditions as a deficiency requiring corrective action. At certificated airports, the inspector must ensure the operator issued NOTAMs for snow, ice, slush, or water on the movement area or loading ramps and parking areas as specified under § 139.339.

7.1.8 §§ 139.315, .317, .319 Aircraft Rescue and Fire Fighting.

Sections 139.315, .317, and .319 address Index Determination, Equipment and Agents, and Operational Requirements. During the inspection of ARFF capabilities, the inspector:

1. Checks the status of ARFF response, which includes the availability of equipment, fire fighters, and extinguishing agent (s) to meet Index if applicable, and operational readiness. At certificated airports, the inspector ensures that ARFF capabilities comply with the index and provisions of the approved ACM. The inspector must report deficiencies for corrective action.
2. Ensures alarm and emergency notification communication systems are operable and verifies that it makes all of the appropriate notifications.
3. Checks for construction or maintenance activity on the movement area, which could require ARFF or affect response routes, and ensures that notification has been given to, and received by, the appropriate ARFF official.
4. Reports and monitors ARFF vehicle(s), equipment, extinguishing agent(s), and any ARFF personnel capability that is not available or inoperative as well as any change to the airport's critical aircraft that may require a change to ARFF Index. At certificated airports, the airport operator must notify the FAA Regional Airports Division if an ARFF vehicle required for Index is inoperative and cannot be replaced immediately, as specified in §139.319(g). The airport operator must also issue a NOTAM about the unavailability of any rescue and fire fighting capability, as specified under §139.339.

7.1.9 §139.321, Handling and storing of hazardous substances and materials.

This section requires the certificate holder or airport operator who acts a cargo handling agent to establish and maintain procedures for the protection of persons and property on the airport during the handling and storing of any material regulated by the Hazardous Materials Regulations (49 CFR 171through 180). The daily inspection of aircraft fueling operations, if certified, must focus on the requirements of §139.321 as well as the local fire code. This includes fuel storage areas and facilities, mobile fuelers, fuel hydrants, fueling cabinets, load racks, self-fueling and requirements for DPF equipped fuel service vehicles and the procedures and practices of fueling personnel. The inspection must also include security, fire protection, general housekeeping, and any other fuel dispensing facilities and procedures. The certificate holder must schedule the more detailed fueling operation inspection on a quarterly basis (see Quarterly Fueling Operations under Periodic Condition Inspection). The National Fire Protection Association publishes the document cited in AC 150/5230-4 (NFPA 407), which contains information about fueling procedures and practices at fuel storage facilities, fuel dispensing, and bonding.

7.1.9.1 During the daily inspection of aircraft fueling operations, the inspector:

1. Determines that fueling personnel are performing fueling operations in a safe and secure manner, in accordance with NFPA 407 and the

local fire code including ramp operations and refilling operations at the fuel storage facility.

2. Checks to ensure that the appropriate signs for the fuel farm are installed, that Emergency Shut-Off placards are installed at both the fuel farm and on mobile fuelers and any other location where required by NFPA 407 and the ACM.
3. Checks to ensure that the fuel storage facility is properly protected, that access is secured when not occupied by an authorized user.
4. Reports and monitors any unsafe fueling practice(s) and violation(s) of part 139, the ACM, and the local fire code. At certificated airports, the inspector must document and report non-compliance items.
5. Refers to NFPA 407 for a complete understanding and application of the standards and requirements for fueling operations and the handling and storing of hazardous materials and substances.

7.1.10 §139.323, Traffic and wind direction indicators.

The inspection of NAVAIDs concentrates on the visual navigational aids owned by the airport operator. However, the inspector must also observe the condition of any navigational aids owned or operated by others, including those owned by the FAA, and report any observed problems immediately to the NAVAID owner. During the inspection of NAVAIDs, the inspector:

1. Determines that a segmented circle, if installed, should be clear of obstructing vegetation that could impair the visibility of the circle elements.
2. Determines that the airport rotating beacon is visible and working properly.
3. Checks any wind cones to ensure they are situated correctly, swing freely, do not have faded or frayed cone fabric, and, if lighted, that all lights are operating.
4. Determines whether the Runway End Lights are flashing in proper sequence and mounted on frangible couplings.
5. Checks Visual Glide Slope Indicators (VASIs, PLASIs, or PAPIs) to ensure that the lights are working and mounted on frangible couplings.
6. Determines that the Approach Lighting Systems (ALS) are functioning properly.
7. Checks all installations for proper alignment.
8. Reports any NAVAID that is malfunctioning, inoperable or misaligned, damaged, or missing, to the owner or entity responsible for maintenance.
9. Refers to the appropriate ACs on airport NAVAIDS and their maintenance.

7.1.11 §139.325, Emergency Plan.

Operations personnel must be familiar with activities for which they are responsible in the Airport Emergency Plan, e.g., communications, gate access, coordination

procedures, and their role after an event on the airport [§139.325 (g)(3)(4)]. Inspection of facilities involved in the Emergency Plan, e.g., gates and access points for mutual aid, are integral elements of the daily checklist.

7.1.12 §139.331, Obstructions.

7.1.12.1 The operations personnel must perform a visual check of obstructions shown on the airport diagram or map and determine that they are properly marked and lighted. If an object is found and thought to create an obstruction, the inspector marks its approximate position on the airport diagram or map and reports this to the airport operator so that its status may be determined or if proper notification to the FAA, such as is required through part 77 or Airport Layout Plan review, has been provided.

7.1.12.2 During the inspection of obstructions, the inspector must also determine if vegetation or trees have grown to a height that necessitates additional further action. The inspection must also include, as appropriate:

1. A check on the airport for any construction equipment that may be penetrating protected airspace for flight operations. These obstructions can include piles of material in safety areas, cranes, heavy equipment, and pick-up trucks. If the construction safety plan allows materials and equipment in the safety areas, the inspector must check to ensure that there is no obstruction or derogation of navigation signals or negative effect on aircraft landing and takeoff operations.
2. A check off-airport for construction in the vicinity that could impact operations at the airport (e.g., cranes, radio towers). The inspector monitors off-airport construction and includes a comment on the checklist to alert others to be aware of potential penetrations of the airspace around the airport; this is coordinated with the ATCT, if appropriate.
3. Reporting and monitoring of any obstruction light that is missing, inoperative, or damaged and of any object that appears to be an obstruction and is not properly marked or lighted to the entity responsible for maintenance.
4. Reference to the ACs appropriate to obstructions and the methods for marking and lighting them and addressing them as potential hazards.

7.1.13 §139.333, Protection of NAVAIDs.

This section requires the certificate holder to ensure that the operation of an electronic or visual NAVAID and air traffic control facilities on the airport are not compromised. This requirement includes the protection of NAVAIDs from vandalism and theft, and if the NAVAIDS are owned by an entity other than the certificate holder, assistance in

protecting them. The inspector must check NAVAIDs to confirm there is no derogation of signal and no impediment to a visual aid.

7.1.14 §139.335, Public protection.

7.1.14.1 During the inspection, the inspector checks gates, fencing, locks, and other safeguards that prevent inadvertent entry by unauthorized persons and vehicles onto airport property, especially onto movement area. In addition, protection from jet blast by the use of blast fencing requires inspection to ensure that the fencing is in place and is intact. The inspector reports and monitors any damaged or missing safeguard.

7.1.14.2 In accordance with the airport's security plan, the inspector must report any unauthorized persons or vehicles in the movement area. Airports regulated by the Transportation Security Administration may have additional requirements for reporting and responding to unauthorized persons and vehicles or suspicious activity.

7.1.15 §139.337, Wildlife hazard management.

7.1.15.1 Because of damage to aircraft and the potential loss of life associated with wildlife strikes, operations personnel must be vigilant in checking for evidence of insect, bird, and animal activity on the airport. During inspections of runways and taxiways and their associated safety areas, the inspector must identify and locate on the airport diagram or map any activity that indicates the presence of wildlife. If the inspector observes wildlife of a size, or in numbers, capable of causing an event described in §139.337 (b)(1-3), then the inspector must inform the airport operator and document evidence of wildlife activity, e.g., loafing, burrowing, nesting, perching, feeding, or using the airport as a throughway or flyway. This evidence should be documented in a wildlife log; in accordance with federal, state and local wildlife permit requirements as described in a Wildlife Hazard Management Plan. The inspector must also be aware of the proximity of wildlife attractants, such as landfills, parks, golf courses, construction, ponds and/or other water sources, etc., as potential sources of wildlife visits to the airport.

7.1.15.2 Evidence of wildlife activity found during the daily self-inspection must be properly documented and also reported to the appropriate authority on the airport, e.g., the wildlife biologist. All dead wildlife found and all wildlife aircraft strikes must be reported to the Regional Office Airports Division and on the FAA Form 5200-7, *Bird/Other Wildlife Strike Report.* This form may be obtained from the FAA website, http://www.faa.gov. Additionally, the inspector must check fencing and gates for wildlife accessibility to the airport and ensure that wildlife control equipment is available and operational.

7.1.16 §139.339, Airport condition reporting.

During periods of time when a condition on the airport requires notification, the inspector must monitor for changes that will require action on the part of the airport certificate holder (e.g., that snow plowing operations are being conducted in accordance with the SICP). Each certificate holder must prepare and keep, for at least 12 consecutive calendar months, a record of each dissemination of airport condition to air carriers (§139.339 (d)).

7.1.17 §139.341, Construction and other unserviceable areas.

Operations personnel must be familiar with the construction safety procedures and guidance provided in AC 150/5370-2, *Operational Safety on Airports During Construction*, current edition. At certificated airports, the inspector must also be familiar with the construction safety procedures contained in the ACM and in the specific approved Construction Safety Phasing Plan (CSPP). During the construction inspection, the inspector must:

1. Check all construction adjacent to movement areas to ensure these areas are identified with conspicuous marking and lighting.
2. Determine that stockpiled material and construction materials are properly stored and not left in safety areas or movement area unless properly secured. Any material remaining on the airside must be secure from being moved by wind, jet blast, or prop wash.
3. Determine that construction equipment (such as bulldozers, cranes, etc.) are marked and lighted and parked clear of the safety areas.
4. Ensure construction barricades are properly positioned to define the limits of construction and hazardous areas and, check to ensure lights are working properly and are positioned correctly.
5. Check to ensure that debris and foreign objects are continuously being picked up around construction areas.
6. Check for open trenches in the safety areas or adjacent to movement areas and that barricades, as required, are in place to prevent mishaps.
7. Check operation of lighting in areas adjacent to construction before the construction crews depart for the day. In particular, ensure that mandatory instruction signs remain lighted with the associated runway lights.
8. Check NOTAMs daily during construction projects to ensure they accurately reflect the conditions on the airport.
9. Verify that closed taxiways or runways are properly marked and lighted to include lighted Xs.
10. Report and monitor any dangerous condition created by construction activity, including damage to signs, lights, markings, and NAVAIDs, or equipment and supplies left in movement areas and safety areas.

7.2 **Continuous Surveillance Inspection.**

Continuous surveillance inspections are conducted any time inspection personnel are in an area designated as subject to continuous inspection in the ACM. This inspection also monitors conditions from previous inspections. It consists of a general observation of activities for compliance with part 139 and airport rules and regulations, procedures, etc., as well as to find deficiencies in the physical facilities, which are readily apparent. Appendix B contains a sample Continuous Inspection Checklist. Continuous surveillance of airport physical facilities and activities can involve any of the activities of the daily inspection but must cover at least the areas described below.

7.2.1 §139.329, Pedestrians and ground vehicles.

The inspector:

1. Determines if vehicle drivers are following the airport regulations for procedures on the airside and monitors their communications. This includes the operations of all ground vehicles, maintenance vehicles, mowing equipment, and other vehicles and equipment that may be in the safety areas. Attention to these activities is critical during construction, winter operations, special events, and unusual conditions.
2. Reports and monitors any vehicle operator who is not complying with part 139 and the airport rules and regulations.
3. Reports any ground vehicle incident or accident observed and any ground vehicle signs and markings that are damaged, missing, or obscured.

7.2.2 §139.321, Handling and storing of hazardous substances and materials.

The inspector must:

1. Observe that proper bonding is being used, deadman controls are not blocked, no smoking prohibitions are in effect (this can include a random check of vehicles to ensure that smoking trays and lighters have been removed), and aircraft are not being fueled inside hangars.
2. Check for proper parking of mobile fuelers to ensure these vehicles are at least 10 feet apart and 50 feet from buildings.
3. Check for fuel leaks or spills in the fuel storage area, in hydrants, and around mobile fuelers.
4. Determine that the fuel farm is secure and free of flammable materials, including litter and vegetation.
5. Report and monitors previously reported unsafe fueling conditions/fueling operations discussed above and other violations of the local fire code and the airport's specific fuel fire safety procedures.

7.2.3 §139.313, Snow and Ice Control.

During the continuous surveillance inspection of snow and ice removal operations, the inspector must:

1. Check snow and ice-covered pavements and reports and monitors all surfaces where snow and ice may affect the safety of aircraft operations.
2. Monitor snow and ice removal NOTAMs to ensure they remain current and issues timely corrections, as necessary. If the airport uses other means to notify tenants of snow and ice removal operations, e.g., faxed or electronic messages, the inspector monitors this information for accuracy.

7.2.4 §139.341 Identifying, marking, and lighting construction and other unserviceable areas.

Operations personnel must monitor construction projects continuously to ensure airport safety, since many construction projects include workers who are not familiar with aviation operations. The inspector must:

1. Check construction projects to ensure that the contractor is following the construction safety plan.
2. Report any of the following conditions:
3. Unauthorized use of runways, taxiways, and aprons by construction personnel and equipment.
4. Conditions that can result in runway incursions. This includes ensuring that construction areas are properly barricaded and that cones, markings, lights, etc., are properly positioned to provide warnings to pilots and vehicle operators.
5. Construction equipment that is being operated in the ILS/MLS critical area(s), unless coordinated with the ATCT.
6. Open, unlocked, and/or unattended perimeter gates; construction vehicles and personnel not following access and escort procedures.
7. Construction vehicles not properly marked or missing appropriate flags and/or beacons.
8. Foreign object debris on haul roads adjacent to movement areas, which can be tracked onto taxiways, aprons, and ramp areas.
9. Confusing or missing signs, marking, or lighting that could potentially confuse or mislead pilots or vehicle operators.

7.2.5 §139.335, Public Protection.

Operations personnel must follow instructions regarding gate closures when leaving and entering the airside, to prevent illegal “piggybacking.” They must also be more aware of activities during special airport events and construction projects. Safeguards to protect the public and to protect the airport require extra vigilance, because they are imposed at a level above the normal routine to accommodate an activity that is not part of the airport’s normal routine. The inspector must:

1. Check for unauthorized personnel, vehicles, and animals, particularly in areas reserved for aircraft passengers, when the general public is present or has access to the air carrier ramp and other portions of the movement area, e.g., remote aircraft parking locations.

2. Check for inoperable or blocked gates, particularly those that would impede access by aircraft rescue and firefighting equipment or mutual aid.
3. Check for open or unlocked gates and missing or damaged signs posted to prevent unauthorized access to the airfield.
4. Check for damaged or missing jet blast fences.

7.2.6 §139.337, Wildlife Hazard Management.

The continuous inspection is especially important with respect to the identification of wildlife hazards, and the inspector must check for and report the following conditions:

1. Any animal, bird, or condition on or adjacent to the runways, taxiways, aprons, and ramps, which serves as evidence of wildlife activity. The inspector must report any wildlife activity to the appropriate office (e.g., wildlife biologist, airport operator) for follow-up action to determine if there is a potential wildlife hazard problem.
2. Potential hazards created by existing or proposed landfills, golf courses, parks, or natural conditions and noted on the wildlife log.
3. Wildlife strikes and carcasses found on the airfield. The inspector reports these on FAA Form 5200-7, Bird/Other Wildlife Strike Report, which is available on the FAA website at www.faa.gov.

7.2.7 §139.305, .307, 309, Foreign Object Debris (FOD).

The inspector must continuously check for and remove any debris in movement areas, non-movement areas, aircraft parking areas, and loading ramps.

7.3 Periodic Condition Inspection.

Periodic condition inspections consist of specific checks of physical facilities on a regularly scheduled basis. Usually these inspections occur on a weekly or quarterly basis. Checks can require use of equipment (e.g., Walker Bar to measure VASI glide slope angles, a transit to survey approach slopes, or continuous friction measurement equipment). It can also involve checking specific features of physical facilities. Periodic inspection of airport physical facilities and activities must include at least the areas described in this section and those included in the ACM. A basic checklist is included in Appendix B.

7.3.1 §139.305, Pavement areas.

The inspector must check pavement surfaces, including grooved pavement that facilitates drainage, for rubber buildup, polishing, loose aggregate, or other items that can affect friction. The inspector must report rubber build-up that must be removed in the interest of maintaining the pavement integrity of the touchdown zone area.

7.3.2 §139.31,1 Marking, signs and lighting.

The inspector must check marking for conspicuity during daylight and hours of darkness. Marking with glass beads must be check for effectiveness and for age, when

beads can become loose and act as debris and a hazard to aircraft engines. The inspector notes pavement marking to ensure they are correct and visible and that marking on concrete or faded asphalt is outlined with a black border when conspicuity is at issue.

7.3.2.1 The inspector must check signs for accuracy, position, and to determine the integrity of the base and the frangible mount. The inspector also checks sign faces for peeling, color fading, cracks, and other deterioration. The inspector reports any deficiency for correction.

7.3.2.2 The inspector must check runway and taxiway lights for intensity and color and the integrity of the cans, the fixtures, and associated bases to ensure that electrical connections are secure and not compromised either by winter operations of mowing activities.

7.3.3 §139.321, Three month Fueling inspections.

Operations personnel at certificated airports are required to ensure that fire safety standards, contained in NFPA 407 are being observed. These inspections should be conducted every three consecutive months. During the inspections of the fueling facilities, the inspector also ensures that the local fire code is being observed as well. The fire safety standards for fueling operations must be listed in the ACM, and the three month inspections must confirm that fueling operations comply with the appropriate section of the ACM. Sample inspection checklists for fuel storage areas and mobile fuelers are included in Appendix B. Certificated airports must maintain records of the three month inspections for 12 consecutive calendar months. At fuel storage areas ("fuel farms") and loading/unloading stations, the inspector must:

1. Check fuel storage areas for adequate fencing and security to prevent unauthorized access or tampering.
2. Check for "No Smoking" placards that are clearly visible from all sides.
3. Check fuel storage areas for materials such as trash or vegetation that could contribute to the spread of fire and for equipment malfunctions, leaks, or activities that could be ignition sources.
4. Check fueling equipment to ensure that it is in good operating condition and free of fuel leaks.
5. Check piping for reasonable protection from damage by vehicles, if piping is above ground.
6. Check fuel storage areas for at least two accessible and serviceable fire extinguishers.
7. Check hoses to ensure correct procedures are being used and that abrasion of the hoses is avoided. Where the open hose discharge capacity of the equipment is more than 200 gallons per minute, at least one wheeled extinguisher with at least 125 lbs. of agent is also required.
8. Check for explosion-proof equipment, switches, and wiring that is reasonably protected from heat, abrasion, or impact, which could cause an ignition source.

9. Check for piping, filters, tanks, and pumps being electrically bonded together and interconnected to an adequate grounding rod.
10. Check for a serviceable bond/ground wire with clip at each loading/unloading facility for grounding tankers and mobile fuelers.
11. Check loading stations for deadman control features.
12. Ensure that there is boldly marked emergency cutoff placarding and that the emergency shutoff is capable of stopping all fuel flow with one physical movement. The emergency cutoff must be located outside the probable fuel spill area near the route that normally is used to leave the spill area or to reach the fire extinguishers.
13. Check for clearly visible coding and/or labeling of fuel products.

7.3.4 Mobile fuelers.

During the three month inspection, the inspector inspects all mobile fuelers or a random sample of mobile fuelers at large facilities each quarter. The inspector must track any samples used so that all mobile fuelers in a fleet are inspected in the course of a year. The inspector must:

1. Ensure they meet fire safety standards and ensure that they are in good operating condition and free of fuel leaks.
2. Check mobile fuelers for parking at least 50 feet from a building and at least 10 feet from each other. At airports with a mobile fueler maintenance building, the inspector must ensure it is compliance with directives issued by the local fire marshal.
3. Check for flammability decals on all sides (Lettering should be at least 3 inches high), check for hazardous materials placards on all sides (Hazmat number for Jet A mobile fuelers is #1863 and for 100LL mobile fuelers #1203), check the cab for a “No Smoking” sign, and confirm that ash trays, cigarette lighters, and any other smoking equipment have been removed.
4. Check for two fire extinguishers, accessible from each side of the mobile fueler. Fire extinguishers must be charged, sealed, and tagged from the last fire extinguisher inspection.
5. Check dry chemical extinguishers to ensure they are only B-C rated. (ABC rated multi-purpose dry chemical extinguishers are not to be used on mobile fuelers, as they are highly corrosive to aircraft and can cause significant damage to aircraft engines.)
6. Check emergency fuel cutoff valves to ensure markings are large and legible and the valves are operable. Emergency fuel cutoff must be accessible from both sides.
7. Check electrical equipment, switches, wiring, and tail light lens covers for explosion proof construction and reasonable protection from heat, abrasion, or impact, which could be an ignition source. Crazed lens covers indicate age and deterioration and must be replaced.

8. Check for serviceable bonding wires and clamps.
9. Check nozzles for deadman control feature.
10. Check the vehicle exhaust system for exhaust leaks and for adequate shielding if it extends under the fuel tank portion of the vehicle.
11. As appropriate, check hydrant fueling stations for product leaks and proper maintenance.

7.3.5 Hydrant Fuelers.

As appropriate, the inspector must check hydrant fueling stations for product leaks and proper maintenance.

7.4 Traffic and Wind Direction Indicators and the Protection of NAVAIDs, §139.323 and §139.333 Navigational Aids (NAVAIDs).

The inspector must check for alignment and monitor for calibration NAVAIDs on and owned by the airport, where applicable. For equipment not owned by the airport, the inspector must contact the owner and report any malfunction or problem.

7.4.1 § 139.323, Navigational Aids (NAVAIDs).

The inspector must check the aiming of Runway End Lights and Visual Glide Slope Indicators owned by the airport.

7.4.2 § 139.333, Navigational Aids (NAVAIDs).

7.4.2.1 **Lighting.**

The inspector must check lighting and lighting controls and:

1. Determine whether power generator and circuit resistance tests are being conducted, as scheduled.
2. Ensure lights with adjustable optical systems are checked for proper aiming, as scheduled.

7.5 § 139.331, Obstructions.

7.5.1 The inspector must check to ensure there is adequate protection from overhead power lines adjacent to aircraft parking areas.

7.5.2 The inspector must continually monitor trees, vegetation, and structures near the airport that could affect approach surfaces to the runways, encroach on safety areas, or penetrate part 77 surfaces.

7.6 **§ 139.317 and § 139.319 Aircraft Rescue and Fire Fighting.**

ARFF, while a special discipline in its own right, must be inspected to ensure for readiness in terms of the airport's Index and requirements under the regulation. The inspector must:

1. Periodically determine if ARFF personnel and equipment are capable of meeting response times, as required by part 139 and in accordance with the provision of the ACM.
2. Ensure that recurrent training and hot-fire drills are being conducted as required by part 139.319(i)(2) and as described in the ACM. The documentation of training must meet the requirements of § 319.301(b)(2).
3. Check to ensure that equipment, equipment changes, and additions of equipment are included in the ACM as required by part 139.

7.7 **Special Condition Inspections.**

Special condition inspections occur after a complaint is made or an unusual condition, weather, or other event occurs. See chapter 4 above in this AC. A special inspection must be conducted after an accident or incident and must be conducted prior to the end of construction activity, so that the responsible construction personnel can take corrective action can be taken by. Depending on circumstances, special condition inspections may include the inspection of any of the specific facilities or activities under the other three inspection types. A special condition inspection of airport physical facilities and activities must include at least the areas described in this section, which are also included in Appendix B.

7.7.1 §139.305, Pavement Areas.

After a rain or thunderstorm, the inspector checks the pavement areas for ponding and edge damming.

7.7.2 §139.311, Markings and Signs.

The inspector must:

1. Determine if markings are visible at night especially when the pavement is wet following heavy rain.
2. After construction or maintenance operations, ensure that new pavement markings are correct (e.g., precision vs. non-precision runway marking).

7.7.3 §139.309, Safety Areas.

The inspector must:

1. Check the storm sewer system, verify that inlets are not clogged and drainage channels are free of debris, and mark the location on the airport diagram or map of any standing water. This includes checking that all inlet covers are in place and sewer covers are at grade level.

2. Check construction and maintenance activities to ensure that no hazardous conditions have been created (equipment left in safety areas, unacceptable pavement lips created by ground alteration work, ruts from construction equipment or from mowing equipment, etc.), before reopening a runway or taxiway when the construction or maintenance activity has been performed in the adjacent safety area(s).
3. When an aircraft has left the pavement and entered a safety area, check to ensure that no ruts or holes have been made by the aircraft tires or by personnel and equipment during the recovery operation and if present, ensure that corrections are made as soon as practicable.
4. Inspect engineered materials arresting system (EMAS), if installed, for damage and for deterioration.
5. Physically drive or walk the safety areas to check for deficiencies.

7.7.4 §139.313, Snow and Ice.

Several special inspections may be needed during a winter storm until the airport is back to a normal operation. The inspector must:

1. After snow and ice removal operations, check to ensure that no foreign objects remain on the areas where snow removal operations have occurred. If a friction measurement device is used, issue the appropriate numbers obtained from the equipment. Operations personnel are not authorized to correlate friction measurement numbers with braking action reports. If a friction measurement device is not available, issue braking action reports to Air Traffic.
2. Conduct a special sign inspection after snow and ice storms for signs that are obscured by snow or ice or that may have been damaged by plows or by snow thrown by blowers.

7.8 **Construction.**

7.8.1 §139.341, Construction.

The inspector must:

1. Ensure that construction areas are barricaded and lighted properly.
2. Check construction equipment to ensure that they are parked within the pre-arranged areas.
3. Conduct night inspections to ensure barricades, warning lighting, and reflectors are adequate to keep aircraft away from the construction area.
4. Check the location of construction material and stockpiles to ensure that they are outside of safety areas and do not block any signs.
5. Check any movement areas adjacent to construction areas or movement areas traversed by construction vehicles to ensure there is no FOD present.

6. Check movement areas around construction sites for potentially confusing marking, lighting, and signs that could cause pilot confusion or result in a runway incursion.

7.8.2 §139.339, Condition Reporting.

The inspector must ensure that notification of airport conditions is disseminated to airport users.

7.8.2.1 The inspector ensures that appropriate NOTAMs are issued for unsafe airport conditions that are identified during an inspection but cannot be corrected immediately. After issuing NOTAMs, follow-up is required to ensure that the NOTAMs have been processed and published.

7.8.2.2 The inspector must check that NOTAMs issued are also canceled at the appropriate time.

APPENDIX A. REFERENCE AND RELATED READING MATERIAL

A.1 This AC contains safety practices for all airports. The current versions of the documents listed below provide further detail.

A.2 **Related Reading Material.**

- 14 CFR part 139, Certification of Airports, February 10, 2004 (As amended May 3, 2004 and June 4, 2004)
- 14 CFR part 77, Objects Affecting Navigable Airspace
- NFPA 407, Standards for Aircraft Fuel Servicing

A.3 **FAA Advisory Circulars.**

FAA ACs are available on the FAA website at http://www.faa.gov/regulations_policies/advisory_circulars/.

- AC 150/5200-33, *Hazardous Wildlife Attractants on or Near Airports*
- AC 150/5210-22, *Airport Certification Manual (ACM).* This reference is pertinent for certificated airports only.
- AC 150/5370-10, *Standards for Specifying Construction of Airports*

- **Airport Emergencies**
  - AC 150/5200-31, *Airport Emergency Plan*
  - AC 150/5210-13, *Airport Water Rescue Plans, and Equipment*
- **Aircraft Rescue and Fire Fighting (ARFF)**
  - AC 150/5200-12, *First Responders' Responsibility for Protecting Evidence at the Scene of an Aircraft Accident/Incident*
  - AC 150/5210-6, *Aircraft Fire and Rescue Facilities and Extinguishing Agents*
  - AC 150/5210-7, *Aircraft Rescue and Firefighting Communications*
  - AC 150/5210-13, *Airport Water Rescue Plans and Equipment*
  - AC 150/5210 14, *Aircraft Rescue Fire Fighting Equipment, Tools and Clothing*
  - AC 150/5210 15, *Aircraft Rescue and Firefighting Station Building Design*
  - AC 150/5210-17, *Programs for Training of Aircraft Rescue and Firefighting Personnel*
  - AC 150/5210-19, *Driver's Enhanced Vision System (DEVS)*
  - AC 150/5210-23, *ARFF Vehicle and High Reach Extendable Turret (HRET) Operation Training and Qualifications*
  - AC 150/5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection*

- AC 150/5220-10, *Guide Specification for Aircraft Rescue and Fire Fighting Vehicles*
- AC 150/5220-17, *Design Standards for an Aircraft Rescue and Fire Fighting (ARFF) Training Facility*

- **Ground Vehicles**
  - AC 90-67, *Light Signals from the Control Tower for Ground Vehicles, Equipment, and Personnel*
  - AC 150/5210-5, *Painting, Marking and Lighting of Vehicles Used on an Airport*
  - AC 150/5210-20, *Ground Vehicle Operations on Airports*
- **Hazardous Materials**
  - AC 20-43, *Aircraft Fuel Control*
  - AC 150/5230-4, *Aircraft Fuel Storage, Handling, and Dispensing on Airports*
- **Marking, Signs, and Lighting**
  - AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*
  - AC 150/5340-1, *Standards for Airport Markings*
  - AC 150-5340-5, *Segmented Circle Airport Marker System*
  - AC 150/5340-18, *Standards for Airport Sign Systems*
  - AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities*
  - AC 150/5345-28, *Precision Approach Path Indicator (PAPI) Systems*
  - AC 150/5345-43, *Specification for Obstruction Lighting Equipment*
  - AC 150/5345-44, *Specification for Taxiway and Runway Signs*

Note: ACs in the 150/5345 series provide additional detailed information about lighting.

- **Paved Areas**
  - AC 150/5210-24, *Airport Foreign Object Debris FOD Management*
  - AC 150/5320-6, *Airport Pavement Design and Evaluation*
  - AC 150/5380-6, *Guidelines and Procedures for Maintenance of Airport Pavements*
- **Safety Areas**
  - AC 150/5220-22, *Engineered Material Arresting Systems (EMAS) for Aircraft Overruns*
  - AC 150/5300-13, *Airport Design*
  - AC 150/5370-2, *Operational Safety on Airports During Construction*

- **Self-Inspection Program**
  - AC 150/5210-18, *Systems for Interactive Training of Airport Personnel*
- **Snow and Ice Control**
  - AC 150/5200-28, *Notice to Air Missions (NOTAMs) for Airport Operators*
  - AC 150/5200-30, *Airport Winter Safety and Operations*
  - AC 150/5220-20, *Airport Snow and Ice Control Equipment*
- **Traffic and Wind Direction Indicators**
  - AC 150/5340-5, *Segmented Circle Airport Marker System*
  - AC 150/5345-27, *Specification for Wind Cone Assemblies*

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APPENDIX B. SUGGESTED AIRPORT SAFETY SELF-INSPECTION CHECKLISTS

B.1 An airport safety self-inspection checklist should cover the condition of the facilities and equipment on the airport for it to be a part of a good safety inspection program. The checklist should be useful for the airport and its operation. An airfield map or airport diagram of the airport is highly recommended on the back of the checklist; it can help readily identify the location of problems found during the daily inspection.

B.2 The suggested checklists consist of a listing of facilities and equipment and a series of conditions that are inspected. Two examples of daily self-inspection checklists are provided. The first is intended to be used electronically and contains more information on conditions to be inspected that can be readily accessed on an electronic device. The second example is intended for those airport operators that use a paper checklist and it has been condensed so it can be printed on a single sheet of paper, with the airport map printed on the other side.

B.3 The blank squares indicate the conditions the inspector will evaluate for each facility. A check (√) in one of these squares indicates the condition of the facility and equipment is satisfactory. On the other hand, an "x" in one of these squares indicates the condition of the facility and equipment is unsatisfactory.

B.4 When a condition is unsatisfactory, the inspector:

1. Enters an "x" for each applicable square;
2. Provides a note in the Remark/Action Taken section;
3. The location of the condition should be identified in the airport map or diagram; and
4. Initiates appropriate follow-up action, including NOTAMs. The inspector should document corrective action on either the self-inspection checklists or on a separate work order system.

Note: These checklists are ideal for electronic conversion to PDAs and laptop computers and are available online as appendices in this AC (https://www.faa.gov/airports/resources/advisory_circulars/).

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AIRPORT DAILY SAFETY SELF-INSPECTION CHECKLIST

DATE: _____ **DAY**: _____ √ Satisfactory
X Unsatisfactory

Day Inspector/Time: _____ **Night Inspector/Time:** _____

FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Date/Initials)
§139.305 Paved areas	Pavement lips over 3"				
	Hole – 5" diam. 3" deep				
	Cracks/spalling/heaves				
	FOD: gravel/debris/sand				
	Rubber deposits				
	Ponding/edge dams				
	Drainage				
	Vegetative growth				
	Surface variations				
§139.307 Unpaved areas	Slope from edge				
	Full strength compaction				
	Holes, depressions				
	FOD, loose aggregate				
§139.309 Safety areas	Ruts/humps/erosion				
	Drainage/construction				
	Support equipment/aircraft				
	Frangible bases, grading				
	Unauthorized objects				
	Wildlife damage/evidence				
	Construction equipment/material				
§139.311 Marking	Clearly visible/standard				
	Runway markings Correct? Color?				
	Taxiway markings Correct? Color?				
	Holding position markings				
	Glass beads				
	Movement/non-movement area separation markings				

FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Date/Initials)
§139.311 Signs	Standard/meet sign plan location/position				
	Obscured/operable				
	Damaged/retroreflective				
	Faded, color				
	Tethers intact				
§139.311 Lighting	Obscured/dirty/operable				
	Consistent intensity				
	Damaged/missing				
	Faulty aim/adjustment				
	Runway lighting x				
	Precision runway lighting				
	Taxiway lighting				
	Pilot control lighting				
	Appropriate shielding				
139.313 Snow & ice control	Surface conditions				
	Snowbank clearances				
	Lights & signs obscured				
	NAVAIDs free and clear				
	Emergency ARFF access				
	Braking conditions				
§139.315; .317; .319 Aircraft rescue and fire fighting	Equipment/crew availability				
	Communications/alarms				
	Response routes affected				
§139.321 Handling and storing of hazardous substances and materials (Fueling Operations)	Fencing/gates/signs				
	Fuel marking/labeling				
	Fire extinguishers				
	Frayed wires				
	Fuel leaks/vegetation				
	Abraded hoses				
	Condition of mobile fuelers				
§139.331 Obstructions	Obstruction lights operable				
	Cranes/trees				
	Vegetation				

FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Date/Initials)
§139.333 Protection of NAVAIDs	Rotating beacon operable				
	Wind indicators: Number? Lighted at night?				
	RENLs/VGSI systems				
	Electronic components operational				
§139.335 Public protection	Fencing/gates/signs				
	Jet blast problems				
§139.337 Wildlife hazard management	Wildlife present/location				
	Complying with WHMP				
	Dead birds/other evidence				
§139.341 Identifying, marking, and lighting construction and other unserviceable areas	Barricades/lights				
	Equipment parking				
	Material stockpiles				
	Confusing signs/markings				
	Index capability				

Comments/Remarks: _____

Airfield map on reverse

AIRPORT DAILY SAFETY SELF-INSPECTION CHECKLIST

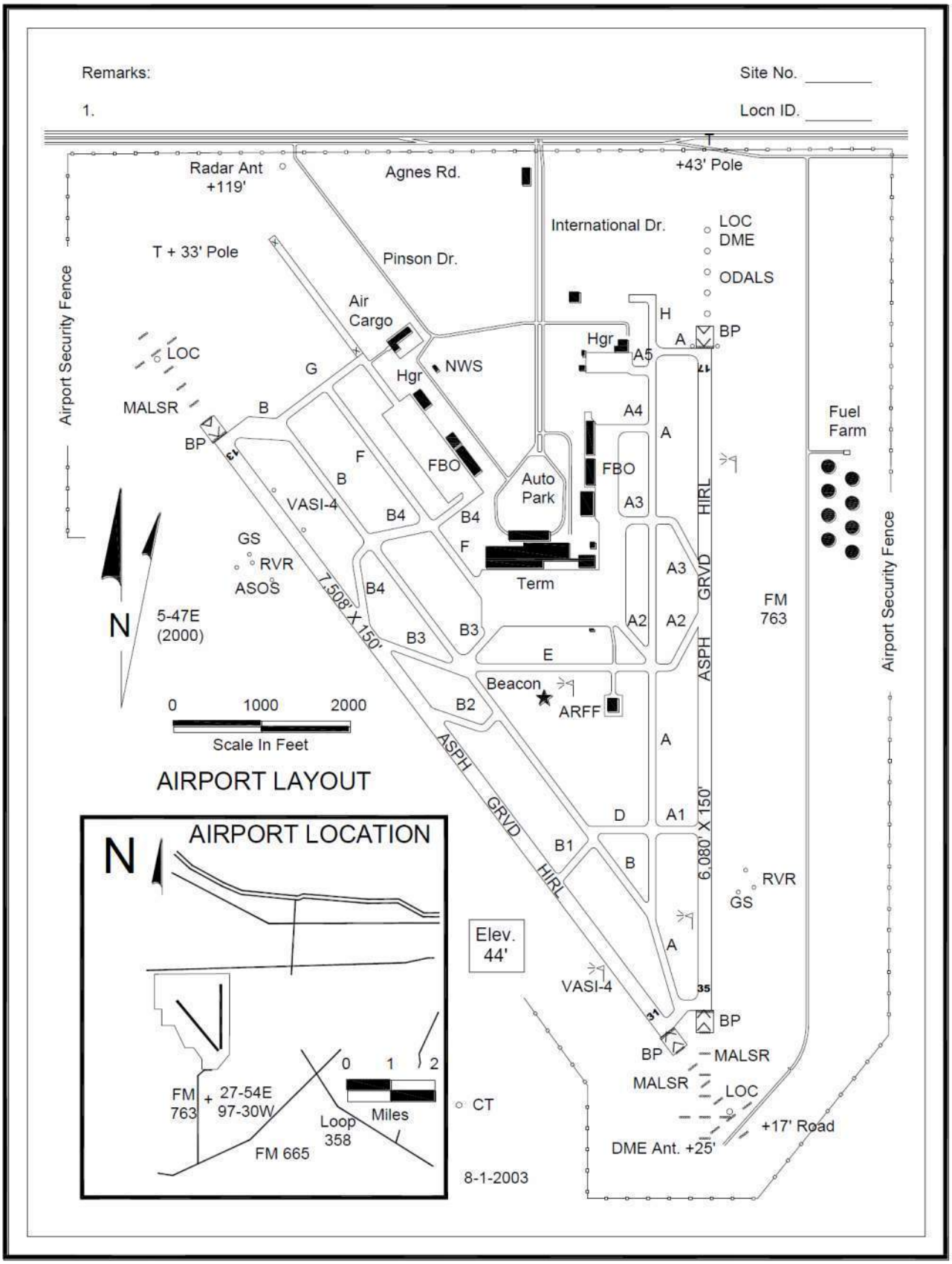
DATE:_____ **DAY**:_____ ✔ Satisfactory ✕ Unsatisfactory

Day Inspector/Time: _____ **Night Inspector/Time:** _____

FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Initial & date)
Pavement Areas	Pavement lip over 3"				
	Hole - 5" diam. 3" deep				
	Cracks/spalling/heaves				
	FOD: gravel/debris/sand				
	Ponding/edge dams				
Safety Areas	Ruts/humps/erosion				
	Drainage/construction				
	Support equipment/aircraft				
	Frangible bases				
	Unauthorized objects				
Markings	Clearly visible/standard				
	Runway markings				
	Taxiway markings				
	Holding position markings				
	SPHPS/ETCL markings				
	Glass beads				
Signs	Standard/IAW Sign Plan				
	Obscured/inoperable				
	Damaged/retroreflective				
Lighting	Obscured/dirty/inoperable				
	Damaged/missing/aiming				
	Lighting systems inoperable				
	IAW FAA standards				
	Pilot Control Lighting				
NAVAIDS	Rotating beacon inoperable				
	Wind indicators				
	VASI/PAPI/REIL systems				
	FAA ILS system/ALS/VGSI				
Obstructions	Obstruction lights operable				
	New cranes not reported				
Snow & Ice	Surface conditions				
	Snowbank clearance				
	Signs obscured				
	NAVAID interference				
	NOTAMs current				
Public Protection	Fencing/gates/signs				
	Jet blast problems				
Wildlife Hazards	Wildlife present/location				
	Complying with WHMP				

Airfield Map/Airport Diagram on Reverse

Sample Airfield Map/Airport Diagram



CONTINUOUS SURVEILLANCE INSPECTION CHECKLIST

DATE: _____ **DAY:** _____ √ **Satisfactory**
TIME: _____ **INSPECTOR:** _____ **X Unsatisfactory**

FACILITIES	CONDITIONS	√	REMARKS/ACTIONS TAKEN
§139.313 Snow & ice control	**Surface conditions**		
	Snow banks		
	NOTAMS		
§139.321 Handling and storage of hazardous substances and materials (Fueling Operations)	**Fire/explosion hazards, spills**		
	Signing/no smoking		
	Fueling equipment:		
	• **hydrants**		
	• **mobile fuelers**		
	• **fuel farm**		
	Use of bonding & deadman		
§139.335 Public protection	**Unauthorized persons**		
	Unauthorized vehicles		
	Gates secure and locked		
§139.337 Wildlife hazard management	**Birds/animals**		
	Evidence (describe)		
§139.341 Identifying, marking, and lighting construction and other unserviceable areas	**Safety plan**		
	Runway incursions		
	Runway & taxiway use		
	FOD		
Miscellaneous: **§139.329 Pedestrians and ground vehicles** **§139.335 Public protection** **§139.305; .307; .311**	**Pedestrians in movement areas**		
	Passenger Load/Unload procedures		
	Debris in movement area/safety area		

Additional Remarks: _____

_____

_____

_____

_____

_____

Airfield map on reverse

PERIODIC CONDITION INSPECTION CHECKLIST

DATE: _____ **DAY: _____** **√ Satisfactory**
TIME: _____ **INSPECTOR: _____** **X Unsatisfactory**

FACILITIES	CONDITIONS	√	REMARKS/ACTIONS TAKEN
§139.305 Paved areas	Rubber deposits – Friction deterioration		
	Pavement Polishing/Rutting		
	Pavement Lips/Turf damming		
§139.311 Marking and signs	Visible/night conspicuity/glass beads		
	Condition of markings - Runways		
	Condition of markings - Taxiways		
§139.311 Lighting	Standby Power Generator Check		
	Circuit Resistance Test		
	Aim/Adjustment of lighting fixtures		
	Condition of lenses – Cleaning needed		
§139.319 Aircraft rescue and fire fighting: Operational requirements	Response Times		
	Live Fire Drills		
	Training		
	ARFF truck maintenance		
§139.321 Handling and storing of hazardous substances and materials (Fueling Operations)	Hydraulic fluid; deicing materials – proper handling		
	Exhaust leaks		
	Fuel storage area		
	Fire extinguishers – Fuel storage area		
	Access secured		
	Hoses – no abraded		
	Fuel labeling		
	Emergency fuel shutoff		
	Mobile fuelers		
	Fire Extinguishers – Fuel trucks		
	Fuel Marking/Labeling		
	Frayed Wiring		
	Abraded hoses		
	Proper Fuel Storage Procedures		
	Fire extinguishers – Apron		
§139.333 Protection of NAVAIDS	RENLs/VGSI Aiming		
	Electronic equipment		
§139.331 Obstructions	Surveyed Trees/Structures		
	Overhead Power Lines		
	Construction cranes		
Additional Remarks:			

Airfield map on reverse

SPECIAL INSPECTION CHECKLIST

DATE:_____ **TIME:** _____ **INSPECTOR:**_____

TYPE INSPECTION: Accident Weather Maintenance Snow Wildlife

REASON FOR INSPECTION: _____

_____

Check Conditions Applicable to the Special Inspection

FACILITIES	CONDITIONS	✓ X	REMARKS	RESOLVED BY (Initial & date)
Pavement Areas	FOD/débris/Ponding			
	Cracks/heaves/blowups			
	Surface conditions			
	Snowbanks/windrows			
Safety Areas	Ruts/surface variations			
	Drainage/construction			
	Débris			
	Unauthorized objects			
Markings	Clearly visible			
	IAW FAA standards			
	Hold Positions			
	Glass beads			
Signs	Obscured/inoperable			
	Damaged/Missing			
	IAW Sign & Marking Plan			
	IAW FAA standards/spec.			
Lighting	Inoperable, damaged, or missing			
	Obscured			
	IAW FAA standards			
	Faulty aim/adjustment			
	Lighting systems operational			
	Pilot Control Lighting			
NAVAIDS	Rotating beacon			
	Wind indicators/Obst lights			
	VASI/PAPI/REIL systems			
	FAA ILS & approach lights			
Wildlife Hazards	Wildlife present/location			
	Complying with WHMP			
Fencing	Damaged/Erosion problem			
NOTAMS	Issued as appropriate/current			

Airfield Map on Reverse

CONSTRUCTION IN PROGRESS INSPECTION CHECKLIST

Airport Name:	Inspection Date:	Construction Project:
Inspector:	Inspection Time:	S=Satisfactory U=Unsatisfactory N/A = Not Applicable Remarks Required

Area: Runway	S	U	N/A	REMARKS
1. **Closed runway** - Yellow X or lighted X properly located and functional				
2. **Temporary displaced threshold** marking/lighting, marking removal is correct				
3. **Partial runway closure** marking/lighting, marking removal is correct				
4. **Runway Distance Remaining signs** relocated or covered in appropriate direction for partial runway closure				
5. **Runway Caution Zone lighting** adjusted for partial runway closure				
6. **Closed Runway Exit** – Lead-off line obliterated for high speed exit and other long term exit closure, Yellow X adjacent to runway, barricades at hold position, runway exit signs covered, taxiway lights off or covered				
7. **Barricades** – At hold position, easily collapsible, orange/white reflective, less than 18" high, 4' spacing or continuously linked, secured, red lights spacing 10' or less				
8. **Runway Object Free Area** – No parked equipment in ROFA and no stockpiled material unless necessary and FAA approved				
9. **Crossing Taxiways for Closed Runway** – Hold signs illuminated for night operations				
10. **No construction activity in RSA** of active runway, unless aircraft restriction in effect for smaller RSA				
11. **Part time runway closure** – RSA meets Part 139 requirements before opening – declared distance				
12. Construction related **NOTAMS** issued and current				

Area: Closed Taxiways	S	U	N/A	REMARKS
1. **Taxiway centerlines obliterated** to closed areas for long term closures				
2. **Barricades** are easily collapsible, have orange/white diagonal reflective stripes and are secured				
• **Barricades** are located outside TSA and are less than 18" high, not counting red lights/flags				
• **Barricade** spacing for aircraft 30 ft – minimum 3 barricades for closed taxiway where Const. not present				
• **Barricade** spacing 4' for vehicles/equipment or continuously linked to exclude pedestrians				
• **Barricade red lights** spacing 10' or less and maintained operable				
3. **Taxiway direction signs** for closed taxiways do not need to be covered as they provide info to pilots				
4. **Outbound runway destination signs** are covered for closed runways where appropriate				
5. **Orange Construction Signs** – IAW standards				
6. **No construction activity in TSA** of active taxiway, unless aircraft restriction in effect for smaller TSA				
7. **Straight Taxiway Open with excavations in TSA** Restrictions in place/no equipment or objects in TSA				
8. **Taxiway object free area** – Clear of equipment if necessary to protect aircraft wing tip clearance				
9. **Taxiway lights** are disconnected or covered in closed areas				
10. **Construction crossing points** on active taxiways are controlled by flag persons, have FOD control				
11. Construction related **NOTAMS** issued and current				

POST CONSTRUCTION INSPECTION CHECKLIST

Airport Name:	Inspection Date:	Construction Project:
Inspector:	Inspection Time:	S=Satisfactory U=Unsatisfactory N/A = Not Applicable Remarks Required

Area:	S	U	N/A	REMARKS
1. **Paved areas swept and free of FOD**				
2. **No pavement lips** over 3"				
3. **Pavement is sufficiently drained** to prevent ponding that could affect directional control of aircraft or obscure markings				
4. **No Potentially hazardous surface variations** present in the safety areas/ graded				
5. **No Objects in the safety areas** except those that are required and are frangibly mounted				
6. **Safety areas are adequately drained** to prevent water accumulations				
7. **No exposed concrete bases** located in the safety areas (potentially hazardous surface variation)				
8. **Old markings** which are no longer needed are removed IAW Marking AC standards				
9. **Required markings and glass beads** are provided and are IAW Marking AC standards				
10. **Required signs** are provided and are IAW Sign AC standards/Sign & Marking Plan				
11l. **Required SPHPS** are provided and are IAW Marking AC standards				
12. **Required lighting** is provided and is IAW lighting AC standards				
13. **Supplemental wind cone** is provided at the takeoff end of runways and do not have logos				
14.				
15.				

Other	S	U	N/A	REMARKS
1. **ACM/Sign & Marking Plan** updated if needed				
2. **5010 data** updated if needed				
3. **Airport Diagram Change** submitted to NFDC website if needed				
4.				
5.				

Remarks

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FAA
Airports

Errata Sheet for Advisory Circular (AC) 150/5200-18D, Airport Safety Self-Inspection

Last Update: 8/29/2023

This errata sheet logs content errors and required updates identified after the Advisory Circular was signed on September 27, 2022. These errors have been corrected in the PDF version of the AC available on the FAA website.

#	Description of Correction	Location in Document	Rationale	Date Error Corrected
1	Adds three additional sentences to paragraph, explaining the purpose of the two daily self-inspection checklists provided in Appendix B.	Par. B.2	Clarifies purpose of different versions of the daily self-inspection checklist.	2/23/2023
2	In item 4, removes the phrase “(RENLs, formerly known as Runway End Identifier Lights)”.	Par. 7.1.10	Removes incorrect statement. RENLs are not Runway End Identifier Lights.	8/29/2023
3	Removes the phrase “(RENLs, formerly known as Runway End Identifier Lights)”.	Par. 7.4.1	Removes incorrect statement. RENLs are not Runway End Identifier Lights.	8/29/2023

U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: Painting, Marking, and Lighting of Vehicles Used on an Airport	**Date:** April 1, 2010	**AC No:** AC 150/5210-5D
	Initiated by: AAS-100	**Change:**

1. PURPOSE. This advisory circular (AC) provides guidance, specifications, and standards for painting, marking, and lighting of vehicles operating in the airport air operations area (AOA). The approved lights, colors, and markings herein assure the conspicuity of vehicles operating in the AOA from both the ground and the air.

2. CANCELLATION. This AC cancels AC 150/5210-5C, Painting, Marking, and Lighting of Vehicles Used on an Airport, dated August 31, 2007.

3. APPLICATION. The Federal Aviation Administration (FAA) recommends the guidelines and standards in this Advisory Circular for vehicles operating in the airport AOA. In general, use of this AC is not mandatory. ***However***, use of this AC is mandatory for vehicles funded with federal grant monies through the Airport Improvement Program (AIP) and/or with revenue from the Passenger Facility Charges (PFC) Program. See Grant Assurance No. 34, "Policies, Standards, and Specifications," and PFC Assurance No. 9, "Standard and Specifications."

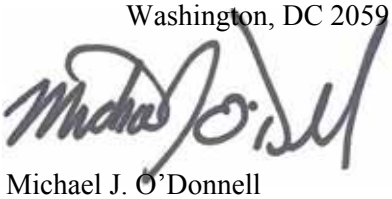
Vehicles covered by this AC that do not meet this standard may be used until the vehicle is repainted or replaced, but no later than **December 31, 2010.**

4. PRINCIPAL CHANGES. This AC contains new specifications and recommendations for the painting, marking, and lighting of Towbarless Tow Vehicles (TLTVs).

5. METRIC UNITS. To promote an orderly transition to metric units, this AC includes both English and metric dimensions. The metric conversions may not be exact equivalents, and until there is an official changeover to the metric system, the English dimensions will govern.

6. COMMENTS OR SUGGESTIONS for improvements to this AC should be sent to:

Manager, Airport Engineering Division
Federal Aviation Administration
ATTN: AAS-100
800 Independence Avenue, S.W.
Washington, DC 20591



Michael J. O'Donnell
Director of Airport Safety and Standards

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PAINTING, MARKING, AND LIGHTING OF VEHICLES USED ON AN AIRPORT

1. SOURCES OF APPLICABLE DOCUMENTS.

a. American National Standards Institute, Inc. (ANSI), 25 West 43rd St. 4th Floor, New York, NY 10036. Website: **www.ansi.org**

b. American Society for Testing & Materials (ASTM), ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959. Website: **www.astm.org**

c. The National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, Massachusetts 02169-7471. Website: **www.nfpa.org**

d. The U. S. General Services Administration (GSA), Centralized Mailing List Services, 501 West Felix Street, Whse 9, South End P.O. Box 6477, Fort Worth, Texas 76115-6477. Website: **www.gsa.gov**

e. The Superintendent of Documents, U.S. Government Printing Office, 732 North Capitol St. NW, Washington, DC 20401.

f. Society of Automotive Engineers, Inc. (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001. Website: **www.sae.org**

g. FAA Advisory Circulars: U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Ave., Landover, MD 20785. Website: **www.faa.gov**

h. FAA Engineering Briefs: **www.faa.gov/airports/engineering/engineering_briefs/**

2. DEFINITIONS.

The following definitions apply in this AC:

a. **Vehicle –** All conveyances, except aircraft, used on the ground to transport persons, cargo, equipment or those required to perform maintenance, construction, service, and security duties.

b. **Air Operations Area (AOA) –** The portion of airport that encompasses the landing, take off, taxiing, and parking areas for aircraft.

c. **Airport Emergency Vehicles** – Vehicles that are authorized in the AOA for emergency purposes (e.g., ambulances, aircraft rescue and fire fighting (ARFF) vehicles and emergency response vehicles) as authorized by the airport traffic control tower (ATCT) or an authorized on-site accident/incident commander.

d. **Airport Operations Vehicles –** Vehicles routinely used by airport operations personnel for airport inspection and duties associated with airfield operations (such as airfield condition reporting and Incident Command) on the AOA and Movement Area.

e. **Airport Security Vehicles –** Vehicles that are authorized in the AOA for security purposes, as needed (e.g. police cars).

f. Airfield Service Vehicles – Vehicles that are routinely used in the AOA for airfield service, maintenance, or construction (e.g. snow blowers, snowplows, maintenance trucks, and tractors).

g. Aircraft Support Vehicles – Vehicles that are routinely used in the AOA to support aircraft operations (e.g. aircraft pushback tractors, baggage/cargo tractors or trucks, air conditioning and aviation fuel trucks). These vehicles are typically owned by airlines, vendors, or contractors and are not eligible for Federal funding.

h. Reduced Visibility – Prevailing visibility is less than one statute mile (1609 meters) and/or the runway visual range (RVR) is less than 6,000 feet (1830 meters).

i. Movement Area – The runways, taxiways, and other areas of an airport/heliport that are used for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with an operating airport traffic control tower (ATCT), specific approval for entry onto the movement area must be obtained from air traffic control (ATC).

j. Other Vehicles – Vehicles that are not routinely authorized in the AOA (e.g. construction vehicles). These vehicles are typically owned by airlines, vendors, or contractors and are not eligible for Federal funding.

k. Peak Intensity – Peak intensity, for purposes of this document, means the maximum magnitude of luminescence as measured in candela.

l. Towbarless Tow Vehicle (TLTV) – a type of aircraft support vehicle whose main purpose is to tow aircraft in the AOA by way of nose gear capture.

3. VEHICLE PAINTING.

NOTE: *Airport vehicle paint and markings are a safety of flight requirement. The approved colors/markings herein assure conspicuity of vehicles operating in the AOA from both the ground and air.*

a. Airport Emergency Vehicles.

(1) Ambulances. Ambulance vehicles are painted per the most current version of Federal Specification KKK-A-1822, *Federal Specification for the Star-of-Life Ambulance*. Ambulances are not considered vehicles routinely operating on the AOA.

(2) Aircraft Rescue and Fire Fighting (ARFF) Vehicles. Yellowish-green is the vehicle color standard. Color specifications are per Appendix A.

NOTE: *A yellowish-green color provides optimum visibility during all light levels encountered during a 24-hour day and under variations of light that result from weather and seasonal changes.*

b. Airport Operations Vehicles. Airport operations vehicles may be painted in colors designated by the airport operator. The characteristics must be coordinated with the respective ATCT and identified in the tower letter of agreement.

c. Airport Security Vehicles. Comply with specific state or local requirements.

d. Airfield Service Vehicles. Chrome yellow is the vehicle color standard. Color specifications are per Appendix A. When vehicles are equipped with bumper bars 8 inches (200 mm) or more in depth, the bars must be painted in alternate stripes 4 inches (100 mm) in width of chrome yellow and black inclined 45° to the vertical.

e. Aircraft Support Vehicles.

(1) Any color or combination of colors other than yellowish-green or chrome yellow. The bumper bar paint scheme in paragraph 3.d (of alternating chrome yellow and black stripe) is recommended.

(2) TLTVs. International orange is the vehicle color standard. Retroreflective tape covering more than 25 percent of the vehicle's vertical surfaces may be used as a temporary measure to meet this standard prior to scheduled vehicle painting.

f. Other Vehicles. Any color or combination of colors other than solid black or white.

4. VEHICLE MARKING.

a. Airport Emergency Vehicles.

(1) Ambulances. Ambulances are marked per the most current version of Federal Specification KKK-A-1822.

(2) ARFF Vehicles. Emergency rescue and fire fighting vehicles are marked with the letters "ARFF, "Fire," or "Rescue" and in accordance with 4.c.(1)-(5) of this AC.

b. Airport Operations Vehicles. Airport operations vehicles may be marked as designated by the airport operator. Marking must be coordinated with the respective ATCT and identified in the tower letter of agreement.

c. Airfield Service Vehicles and Aircraft Support Vehicles.

(1) Airport operator owned vehicles must display an identification number on each side and on the roof (the hood should be used if the vehicle has no roof).

(2) Side numbers will be a minimum of 16 inches (410 mm) in height and conspicuously located.

(3) Roof numbers will be a minimum of 24 inches (610 mm) in height and affixed with their bases toward the front of the vehicle. The identification numbers should provide sharp color contrast to the vehicle color.

(4) In addition to the identification numbers, airport operator-owned vehicles must display either the name of the airport and/or the airport insignia.

(5) To further improve night-time recognition of vehicles, a minimum 8 inch (200 mm) wide horizontal band of high gloss white paint or white reflective tape (Retroreflective, ASTM-D 4956-09, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Type III & above) must be used around the vehicle's surface. Figures 1, 2, and 3 show suggested locations for the horizontal reflective band.

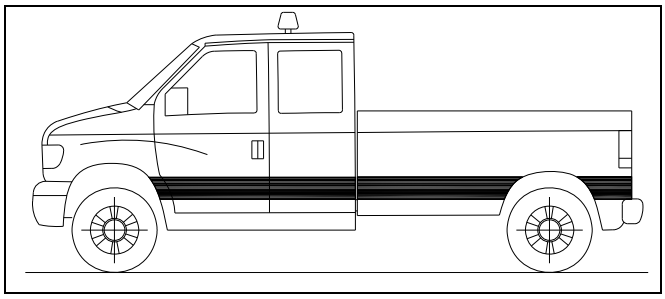

Figure 1: Suggested location for the horizontal reflective band, Option 1

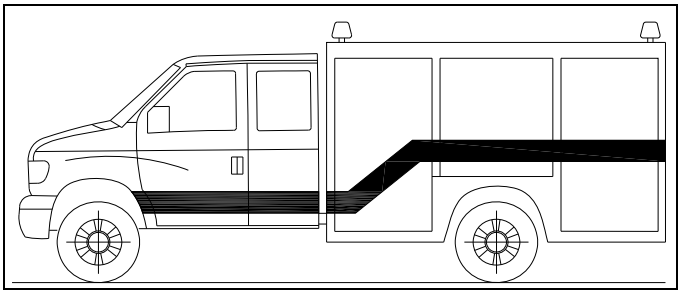

Figure 2: Suggested location for the horizontal reflective band, Option 2

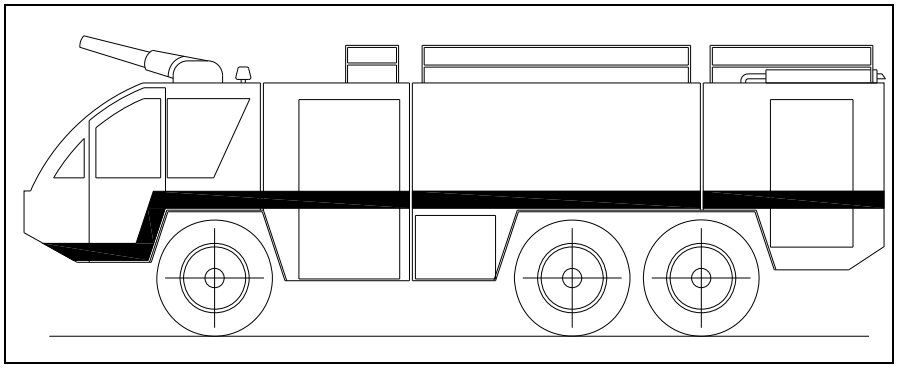

Figure 3: Suggested location for the horizontal reflective band, Option 3

(6) TLTVs. Retroreflective tape is used to outline the shape of a TLTV. If the vertical edge of the vehicle is rounded, the tape should be placed on the rounded portion to reflect light in both the horizontal and vertical planes. Where the placement of the tape may interfere with, or may be worn down by, maintenance or operational activities, tape is not required. Suggested locations for the retroreflective bands are shown in Figure 4.

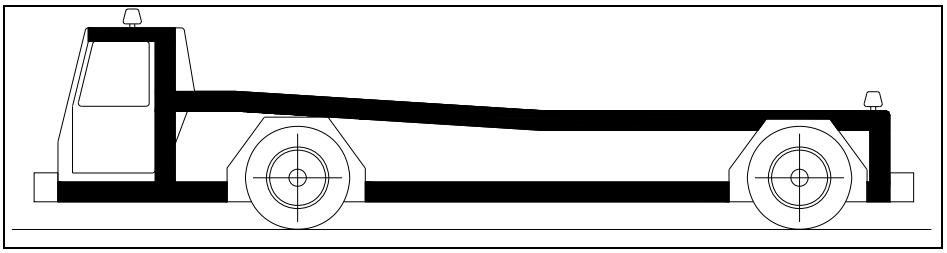

Figure 4: Suggested placement of retroreflective tape on a TLTV

d. Airport Security and Other Vehicles.

(1) Vehicles other than those that routinely traverse any portion of the AOA under the control of ATC, which are not escorted by a vehicle in constant two-way radio communication with ATC and properly equipped and authorized to operate in the AOA, must be provided with a flag on a staff attached to the vehicle so that the flag will be readily visible.

(2) At airports without air traffic control facilities, flags must be provided on all vehicles.

(3) The flag must be at least a 3-foot by 3-foot (0.9 meter by 0.9 meter) square having a checkered pattern of international orange and white squares at least 1 foot (300 mm) on each side (see Appendix A for the fabric color specification).

5. VEHICLE LIGHTING.

a. Airfield Service, Aircraft Support, and Airport Operations Vehicles.

(1) The standard for identification lighting is a yellow flashing light that is mounted on the uppermost part of the vehicle structure. A steady yellow light designates vehicles limited to non-movement areas.

(2) The light must be visible from any direction, day and night, including from the air.

(3) Color specifications for vehicle identification lights are per Appendix B.

(4) TLTVs. An LED light bar placed above the operator's cab may be used in place of the rotating yellow flashing light. In addition, a yellow flashing light (of any type) must be installed on the upper left-rear and right-rear corners of the TLTV, and must be activated when an aircraft is in tow. The size of the rear flashing lights must be large enough to meet the requirements of Section 5.c, but not so large as to interfere with the normal or towing operations of the TLTV.

b. Airport Emergency, Security, and Other Vehicles, which are not escorted by a properly lighted vehicle, must be identified during periods of low visibility by a light.

c. Characteristics of Flashing Lights:

(1) Ambulance lights must meet the specifications in the most current version of Federal Specification KKK-A-1822, and ARFF vehicles must meet NFPA, state, and local requirements.

(2) Lights must have peak intensity within the range of 40 to 400 candelas (effective) from 0^{o} (horizontal) up to 10^{o} above the horizontal and for 360^{o} horizontally. The upper limit of 400 candelas (effective) is necessary to avoid damage to night vision.

(3) From 10^{o} to 15^{o} above the horizontal plane, the light output must be $1/10^{th}$ of peak intensity or between 4 and 40 candelas (effective).

(4) Lights must flash at 75 ± 15 flashes per minute.

NOTES:

1. The effective intensity of a flashing light is equal to the intensity of a steady-burning (fixed) light of the same color that produces the same visual range under identical conditions of observation.

2. If xenon flashtubes are used, refer to AC 150/5345-43, Specification for Obstruction Lighting Equipment, for guidance concerning methods of calculating effective intensity.

d. Light Colors.

(1) Airport Emergency Vehicles.

(a) **Ambulances.** Per the most current version of Federal Specification KKK-A-1822.

(b) **ARFF Vehicles.** Red or a combination of red-and-white flashing lights per the chromaticity requirements in Appendix B.

(2) Airport Security Vehicles. Signal blue or a combination of red and signal blue flashing light per the chromaticity requirements in Appendix B.

(3) Airfield Service, Aircraft Support, Airport Operations, and Other Vehicles. Yellow flashing light per the chromaticity requirements in Appendix B.

APPENDIX A. COLOR SPECIFICATIONS

A-1. SPECIFICATIONS. Colors specified in Table A-1 are per the Commission Internationale de l'Eclairage (CIE) L*a*b* system of color specification. For a description of this system, refer to American Society for Testing & Materials (ASTM) D 2244, *Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.*

Table A-1. Specification for vehicle and flag colors

Standard Illuminant D65 Usage	Chrome Yellow			Yellowish-Green			International Orange		
	Vehicle Paint			Vehicle Paint			Vehicle Paint / Flag Fabric		
CIELAB DATA	**L***	**a***	**b***	**L***	**a***	**b***	**L***	**a***	**b***
Centroid Color	72.8	24.4	77.6	78.3	-10.2	80.4	45.0	53.5	52.0
Point 1	72.8	31.8	82.9	78.3	-9.0	92.0	45.0	61.4	47.8
Point 2	72.8	25.5	66.7	78.3	-7.6	73.2	45.0	53.9	41.4
Point 3	72.8	18.0	69.3	78.3	-11.0	69.3	45.0	53.5	53.4
Point 4	72.8	22.4	86.0	78.3	-13.4	86.2	45.0	49.7	60.4
Light Limit	77.8			83.3			49.9		
Dark Limit	67.8			73.3			41.6		
Max ΔE	11.1			11.7			10.7		

A-2. COLOR TESTS. Acceptable colors are those that meet the gloss rating test and either a visual or an instrumental color test as follows:

NOTE: *Flag fabric colors must meet either the instrumental tests in Table A-1 or the visual method described in paragraph A-2b(1).*

a. Gloss Rating Test. This test is performed per ASTM D 523, *Standard Test Method for Specular Gloss,* on a paint sample of the color to be applied on the vehicle. An acceptable color sample is high gloss with a minimum gloss rating of 70 units, for 60° geometry.

b. Color Test Methods:

(1) Visual. Prepare a master specimen of the color (per Table A-1) and gloss (per paragraph A-2a). This specimen will be the master color and be used as the basis of comparison per ASTM D 5531-05, *Standard Guide for the Preparation, Maintenance, and Distribution of Physical Product Standards for Color and Geometric Appearance of Coatings.* To verify the paint color of a vehicle visually, vehicle paint samples must be

prepared and viewed per ASTM D 1729-96 (Reapproved 2009), *Standard Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials.*

(2) Instrumental. This test requires a test specimen sample and reference to Table A-1. All test specimen measurements should be conducted per ASTM E 1164-09a *Standard Practice for Obtaining Spectrometric Data for Object-Color Evaluation.* Test specimen tolerances must be per Table A-1 per the following:

(a) Plot the centroid color using the a* and b* CIELAB coordinate data from Table A-1 on graph paper or by entry of the coordinate data into a computer program. Plot and connect points 1 through 4 from the same table to form a quadrilateral; noting that the centroid color is within this figure. See Figure A-1 for plots of all three color specifications in Table A-1.

(b) Perform color sample measurements per ASTM E 1164-09a. If necessary, convert measurements to CIELAB L*, a*, and b* color space. See ASTM E 308-08, *Standard Practice for Computing the Colors of Objects by Using the CIE System,* for color space conversion formulae.

(c) An acceptable color is one that meets:

(i) the chromaticity requirements of the color samples a* and b* CIELAB coordinate data by falling within the quadrilateral;

(ii) the L* data lightness requirement by falling within the range defined by the light and dark data of Table A-1;

(iii) the total color difference (ΔE) by not exceeding the limits in Table A-1 when the CIELAB data are computed in the following formula:

$$\Delta E = (\Delta L^{*2} + \Delta a^{*2} + \Delta b^{*2})^{\frac{1}{2}}$$

where ΔL*, Δa*, and Δb* values are the differences between those values for the centroid color in Table A-1 and those of the color sample measurements.

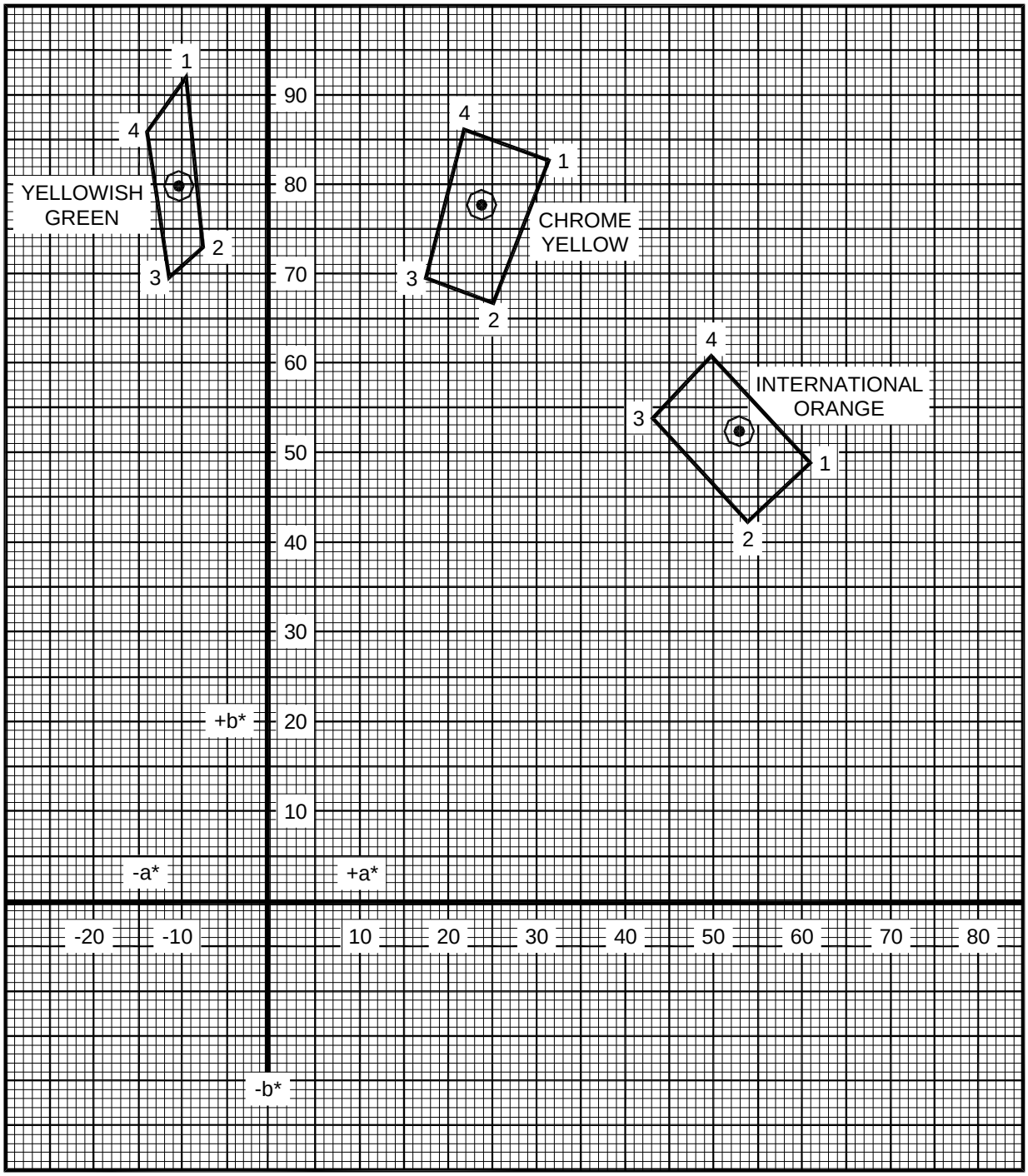

Figure A-1. Plot of selected color paint specifications

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APPENDIX B. COLOR SPECIFICATIONS FOR VEHICLE IDENTIFICATION LIGHTS

B-1. SPECIFICATIONS. The Society of Automotive Engineers (SAE) Standard J578 Revised December 2006, *Color Specification*, defines the acceptable color boundary limits and measurement of emitted red, white, signal blue, and yellow light for vehicle lights. This standard applies to the overall emitted color of light from the device in lieu of emitted light from any small area of the lens. The color of emitted light must fall within the color boundaries per SAE J578 Revised December 2006 (color boundary equations are in the standard) using color measurement methods detailed in the standard. See FAA Engineering Brief #67, Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures, for additional information and Alternative Lighting Devices.

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U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Operational Safety on Airports During Construction	**Date:** 12/13/2017 **Initiated By:** AAS-100	**AC No:** 150/5370-2G **Change:**

1 **Purpose.**

This AC sets forth guidelines for operational safety on airports during construction.

2 **Cancellation.**

This AC cancels AC 150/5370-2F, *Operational Safety on Airports during Construction*, dated September 29, 2011.

3 **Application.**

This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports*. For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP). See Grant Assurance No. 34, *Policies, Standards, and Specifications*. While we do not require non-certificated airports without grant agreements or airports using Passenger Facility Charge (PFC) Program funds for construction projects to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.

4 **Related Documents.**

ACs and Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version. Appendix A contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

5 **Principal Changes.**

The AC incorporates the following principal changes:

1. Notification about impacts to both airport owned and FAA-owned NAVAIDs was added. See paragraph 2.13.5.3, NAVAIDs.

2. Guidance for the use of orange construction signs was added. See paragraph 2.18.4.2, Temporary Signs.
3. Open trenches or excavations may be permitted in the taxiway safety area while the taxiway is open to aircraft operations, subject to restrictions. See paragraph 2.22.3.4, Excavations.
4. Guidance for temporary shortened runways and displaced thresholds has been enhanced. See Figure 2-1 and Figure 2-2.
5. Figures have been improved and a new Appendix F on the placement of orange construction signs has been added.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the "ALT" and " ←" keys simultaneously.

Figures in this document are schematic representations and are not to scale.

6 **Use of Metrics.**

Throughout this AC, U.S. customary units are used followed with "soft" (rounded) conversion to metric units. The U.S. customary units govern.

7 **Where to Find this AC.**

You can view a list of all ACs at http://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at http://www.faa.gov/regulations_policies/faa_regulations/.

8 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.

John R. Dermody
Director of Airport Safety and Standards

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CHAPTER 1. PLANNING AN AIRFIELD CONSTRUCTION PROJECT

1.1 Overview.

Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

1.2 Plan for Safety.

Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified and their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

1.2.1 Identify Affected Areas.

The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

1.2.2 Describe Current Operations.

Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) of the airplanes that operate on each runway; the ADG and Taxiway Design Group (TDG)[1] for each affected taxiway; designated approach visibility minimums;

[1] Find Taxiway Design Group information in AC 150/5300-13, *Airport Design.*

available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System (SMGCS) plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

1.2.3 Allow for Temporary Changes to Operations.

To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport's most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways, and other changes. An example of a table showing temporary operations versus current operations is shown in Appendix E.

1.2.4 Take Required Measures to Revise Operations.

Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary widely among airports, this AC presents general guidance on those subjects.

1.2.5 Manage Safety Risk.

The FAA is committed to incorporating proactive safety risk management (SRM) tools into its decision-making processes. FAA Order 5200.11, *FAA Airports (ARP) Safety Management System (SMS)*, requires the FAA to conduct a Safety Assessment for certain triggering actions. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA determine whether a Safety Assessment is required prior to FAA approval of the CSPP. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for a Safety Risk Assessment. If the FAA requires an assessment, the airport operator must at a minimum:

1. Notify the appropriate FAA Airports Regional or District Office during the project "scope development" phase of any project requiring a CSPP.
2. Provide documents identified by the FAA as necessary to conduct SRM.
3. Participate in the SRM process for airport projects.
4. Provide a representative to participate on the SRM panel.

5. Ensure that all applicable SRM identified risks elements are recorded and mitigated within the CSPP.

1.3 **Develop a Construction Safety and Phasing Plan (CSPP).**

Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix A for a list of related reading material.

1.3.1 List Requirements.

A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or located on an airport certificated under Part 139. For on-airfield construction projects at Part 139 airports funded without AIP funds, the preparation of a CSPP represents an acceptable method the certificate holder may use to meet Part 139 requirements during airfield construction activity. As per FAA Order 5200.11, projects that require Safety Assessments do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA's Safety Risk Management procedures (see paragraph 1.2.5).

1.3.2 Prepare a Safety Plan Compliance Document (SPCD).

The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor's points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

1.3.3 Assume Responsibility for the CSPP.

The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.

1.4 Who Is Responsible for Safety During Construction?

1.4.1 Establish a Safety Culture.

Everyone has a role in operational safety on airports during construction: the airport operator, the airport's consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others, such as military personnel at any airport supporting military operations (e.g. national guard or a joint use facility). Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

1.4.2 Assess Airport Operator's Responsibilities.

An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:

1.4.2.1 Develop a CSPP that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.

1.4.2.2 Require, review and approve the SPCD by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.

1.4.2.3 Convene a preconstruction meeting with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects.* (Note "FAA" refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)

1.4.2.4 Ensure contact information is accurate for each representative/point of contact identified in the CSPP and SPCD.

1.4.2.5 Hold weekly or, if necessary, daily safety meetings with all affected parties to coordinate activities.

1.4.2.6 Notify users, ARFF personnel, and FAA ATO personnel of construction and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.

1.4.2.7 Ensure construction personnel know applicable airport procedures and changes to those procedures that may affect their work.

1.4.2.8 Ensure that all temporary construction signs are located per the scheduled list for each phase of the project.

1.4.2.9 Ensure construction contractors and subcontractors undergo training required by the CSPP and SPCD.

1.4.2.10 Ensure vehicle and pedestrian operations addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.

1.4.2.11 At certificated airports, ensure each CSPP and SPCD is consistent with Part 139.

1.4.2.12 Conduct inspections sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.2.13 Take immediate action to resolve safety deficiencies.

1.4.2.14 At airports subject to 49 CFR Part 1542, *Airport Security*, ensure construction access complies with the security requirements of that regulation.

1.4.2.15 Notify appropriate parties when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).

1.4.2.16 Ensure prompt submittal of a Notice of Proposed Construction or Alteration (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.

1.4.2.17 Ensure prompt transmission of the Airport Sponsor Strategic Event Submission, FAA Form 6000-26, located at https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT_SPONSOR_STRATEGIC_EVENT_SUBMISSION_FORM.pdf, to assure proper coordination for NAS Strategic Interruption per Service Level Agreement with ATO.

1.4.2.18 Promptly notify the FAA Airports Regional or District Office of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. The FAA Airports Regional or District office will determine if further coordination within the FAA is needed. Coordinate with appropriate local and other federal government agencies, such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Transportation Security Administration (TSA), and the state environmental agency.

1.4.3 Define Construction Contractor's Responsibilities.

The contractor is responsible for complying with the CSPP and SPCD. The contractor must:

1.4.3.1 Submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how it will comply with the requirements of the CSPP and supply any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor, indicating an understanding of the operational safety requirements of the CSPP and the assertion of compliance with the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.

1.4.3.2 Have available at all times copies of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.

1.4.3.3 Ensure that construction personnel are familiar with safety procedures and regulations on the airport. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Many projects will require 24-hour coverage.

1.4.3.4 Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.

1.4.3.5 Conduct sufficient inspections to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.3.6 Restrict movement of construction vehicles and personnel to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.

1.4.3.7 Ensure that no contractor employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.

1.4.3.8 Ensure prompt submittal through the airport operator of Form 7460-1 for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

1.4.3.9 Ensure that all necessary safety mitigations are understood by all parties involved, and any special requirements of each construction phase will be fulfilled per the approved timeframe.

1.4.3.10 Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

1.4.4 Define Tenant's Responsibilities.

If planning construction activities on leased property, Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction are strongly encouraged to:

1. Develop, or have a consultant develop, a project specific CSPP and submit it to the airport operator. The airport operator may forgo a complete CSPP submittal and instead incorporate appropriate operational safety principles and measures addressed in the advisory circular within their tenant lease agreements.
2. In coordination with its contractor, develop an SPCD and submit it to the airport operator for approval issued prior to issuance of a Notice to Proceed.
3. Ensure that construction personnel are familiar with safety procedures and regulations on the airport during all phases of the construction.
4. Provide a point of contact of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.
5. Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
6. Ensure that no tenant or contractor employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.
7. Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, as specified in the CSPP and SPCD.
8. Ensure prompt submittal through the airport operator of Form 7460-1 for conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.
9. Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

CHAPTER 2. CONSTRUCTION SAFETY AND PHASING PLANS

2.1 Overview.

Aviation safety is the primary consideration at airports, especially during construction. The airport operator's CSPP and the contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

2.2 Assume Responsibility.

Operational safety on the airport remains the airport operator's responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator's responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

2.3 Submit the CSPP.

Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5 × 11 inch or 11 × 17 inch format for compatibility with the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

2.3.1 Submit an Outline/Draft.

By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

2.3.2 Submit a CSPP.

The CSPP should be formally submitted for FAA approval when the project design is 80 percent to 90 percent complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.

2.3.3 Submit an SPCD.

The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

2.3.4 Submit CSPP Revisions.

All revisions to a previously approved CSPP must be re-submitted to the FAA for review and approval/disapproval action.

2.4 Meet CSPP Requirements.

2.4.1 To the extent possible, the CSPP should address the following as outlined in Chapter 3, Guidelines for Writing a CSPP. Details that cannot be determined at this stage are to be included in the SPCD.

1. Coordination.
    a. Contractor progress meetings.
    b. Scope or schedule changes.
    c. FAA ATO coordination.
2. Phasing.
    a. Phase elements.
    b. Construction safety drawings.
3. Areas and operations affected by the construction activity.
    a. Identification of affected areas.
    b. Mitigation of effects.
4. Protection of navigation aids (NAVAIDs).
5. Contractor access.
    a. Location of stockpiled construction materials.
    b. Vehicle and pedestrian operations.
6. Wildlife management.
    a. Trash.
    b. Standing water.
    c. Tall grass and seeds.
    d. Poorly maintained fencing and gates.
    e. Disruption of existing wildlife habitat.
7. Foreign Object Debris (FOD) management.
8. Hazardous materials (HAZMAT) management.
9. Notification of construction activities.

a. Maintenance of a list of responsible representatives/ points of contact.

b. NOTAM.

c. Emergency notification procedures.

d. Coordination with ARFF Personnel.

e. Notification to the FAA.

10. Inspection requirements.

a. Daily (or more frequent) inspections.

b. Final inspections.

11. Underground utilities.

12. Penalties.

13. Special conditions.

14. Runway and taxiway visual aids. Marking, lighting, signs, and visual NAVAIDs.

a. General.

b. Markings.

c. Lighting and visual NAVAIDs.

d. Signs, temporary, including orange construction signs, and permanent signs.

15. Marking and signs for access routes.

16. Hazard marking and lighting.

a. Purpose.

b. Equipment.

17. Work zone lighting for nighttime construction (if applicable).

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces.

a. Runway Safety Area (RSA).

b. Runway Object Free Area (ROFA).

c. Taxiway Safety Area (TSA). Provide details for any adjustments to Taxiway Safety Area width to allow continued operation of smaller aircraft. See paragraph 2.22.3.

d. Taxiway Object Free Area (TOFA). Provide details for any continued aircraft operations while construction occurs within the TOFA. See paragraph 2.22.4.

e. Obstacle Free Zone (OFZ).

f. Runway approach/departure surfaces.

19. Other limitations on construction.

a. Prohibitions.

b. Restrictions.

2.4.2 The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, "I, (Name of Contractor), have read the (Title of Project) CSPP, approved on (Date), and will abide by it as written and with the following additions as noted:"). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, "No supplemental information," should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

1. Coordination. Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
2. Phasing. Discuss proposed construction schedule elements, including:
   a. Duration of each phase.
   b. Daily start and finish of construction, including "night only" construction.
   c. Duration of construction activities during:
      i. Normal runway operations.
      ii. Closed runway operations.
      iii. Modified runway "Aircraft Reference Code" usage.
3. Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.
4. Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.
5. Contractor access. Provide the following:
   a. Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
   b. Listing of individuals requiring driver training (for certificated airports and as requested).
   c. Radio communications.
      i. Types of radios and backup capabilities.
      ii. Who will be monitoring radios.
      iii. Who to contact if the ATCT cannot reach the contractor's designated person by radio.

d. Details on how the contractor will escort material delivery vehicles.

6. Wildlife management. Discuss the following:
   a. Methods and procedures to prevent wildlife attraction.
   b. Wildlife reporting procedures.
7. Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.
8. Hazardous Materials (HAZMAT) management. Discuss equipment and methods for responding to hazardous spills.
9. Notification of construction activities. Provide the following:
   a. Contractor points of contact.
   b. Contractor emergency contact.
   c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.
   d. Batch plant details, including 7460-1 submittal.
10. Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.
11. Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.
12. Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.
13. Special conditions. Discuss proposed actions for each special condition identified in the CSPP.
14. Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:
   a. Equipment and methods for covering signage and airfield lights.
   b. Equipment and methods for temporary closure markings (paint, fabric, other).
   c. Temporary orange construction signs.
   d. Types of temporary Visual Guidance Slope Indicators (VGSI).
15. Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.
16. Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.
17. Work zone lighting for nighttime construction (if applicable). Discuss proposed equipment, locations, aiming, and shielding to prevent interference with air traffic control and aircraft operations.

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:
    a. Equipment and methods for maintaining Taxiway Safety Area standards.
    b. Equipment and methods to ensure the safe passage of aircraft where Taxiway Safety Area or Taxiway Object Free Area standards cannot be maintained.
    c. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
19. Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

2.5 **Coordination.**

Airport operators, or tenants responsible for design, bidding and conducting construction on their leased properties, should ensure at all project developmental stages, such as predesign, prebid, and preconstruction conferences, they capture the subject of airport operational safety during construction (see AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects*). In addition, the following should be coordinated as required:

2.5.1 Progress Meetings.

Operational safety should be a standing agenda item for discussion during progress meetings throughout the project developmental stages.

2.5.2 Scope or Schedule Changes.

Changes in the scope or duration at any of the project stages may require revisions to the CSPP and review and approval by the airport operator and the FAA (see paragraph 1.4.2.17).

2.5.3 FAA ATO Coordination.

Early coordination with FAA ATO is highly recommended during the design phase and is required for scheduling Technical Operations shutdowns prior to construction. Coordination is critical to restarts of NAVAID services and to the establishment of any special procedures for the movement of aircraft. Formal agreements between the airport operator and appropriate FAA offices are recommended. All relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, should be coordinated with FAA ATO and may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See paragraph 2.13.5.3.2 for required FAA notification regarding FAA-owned NAVAIDs.)

2.6 **Phasing.**

Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In this case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

2.6.1 Phase Elements.

For each phase the CSPP should detail:

- Areas closed to aircraft operations.
- Duration of closures.
- Taxi routes and/or areas of reduced TSA and TOFA to reflect reduced ADG use.
- ARFF access routes.
- Construction staging, disposal, and cleanout areas.
- Construction access and haul routes.
- Impacts to NAVAIDs.
- Lighting, marking, and signing changes.
- Available runway length and/or reduced RSA and ROFA to reflect reduced ADG use.
- Declared distances (if applicable).
- Required hazard marking, lighting, and signing.
- Work zone lighting for nighttime construction (if applicable).
- Lead times for required notifications.

2.6.2 Construction Safety Drawings.

Drawings specifically indicating operational safety procedures and methods in affected areas (i.e., construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should also be included in the contract drawing package.

2.7 **Areas and Operations Affected by Construction Activity.**

Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA ATO will support operational simulations. See Appendix E for an example of a table showing temporary operations versus current operations. The tables in Appendix E can be useful for coordination among all interested parties, including FAA Lines of Business.

2.7.1 Identification of Affected Areas.

Identifying areas and operations affected by the construction helps to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See paragraph 2.6.2.) Of particular concern are:

2.7.1.1 **Closing, or Partial Closing, of Runways, Taxiways and Aprons, and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or takeoff in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is normally available for take-off in the direction of the displacement and for landing and takeoff in the opposite direction. Misunderstanding this difference, may result in issuance of an inaccurate NOTAM, and can lead to a hazardous condition.

2.7.1.1.1 Partially Closed Runways.

The temporarily closed portion of a partially closed runway will generally extend from the threshold to a taxiway that may be used for entering and exiting the runway. If the closed portion extends to a point between taxiways, pilots will have to back-taxi on the runway, which is an undesirable operation. See Figure 2-1 for a desirable configuration.

2.7.1.1.2 Displaced Thresholds.

Since the portion of the runway pavement between the permanent threshold and a standard displaced threshold is available for takeoff and for landing in the opposite direction, the temporary displaced threshold need not be located at an entrance/exit taxiway. See Figure 2-2.

2.7.1.2 Closing of aircraft rescue and fire fighting access routes.

2.7.1.3 Closing of access routes used by airport and airline support vehicles.

2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

2.7.1.5 Approach/departure surfaces affected by heights of objects.

2.7.1.6 Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.

Figure 2-1. Temporary Partially Closed Runway

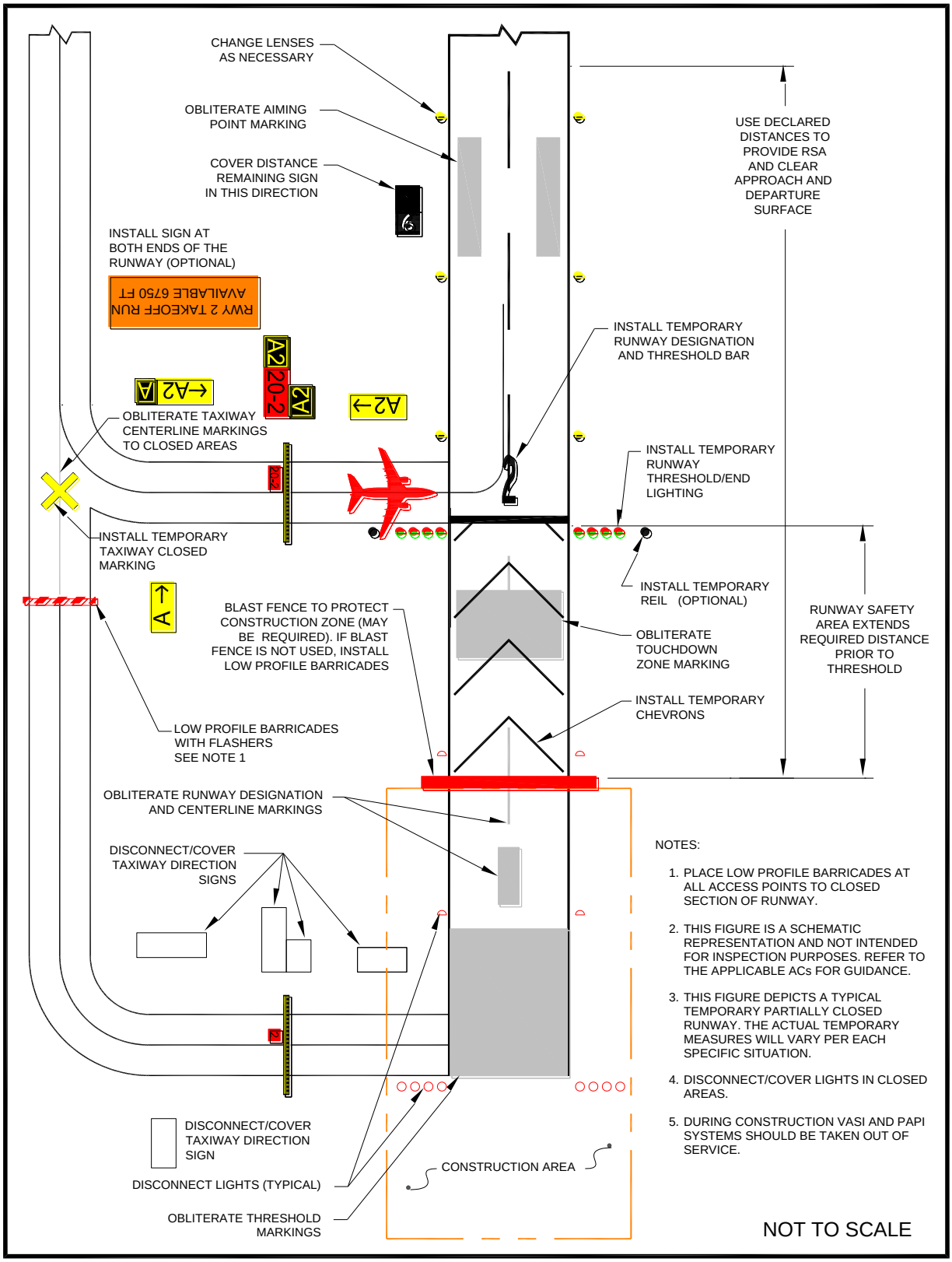
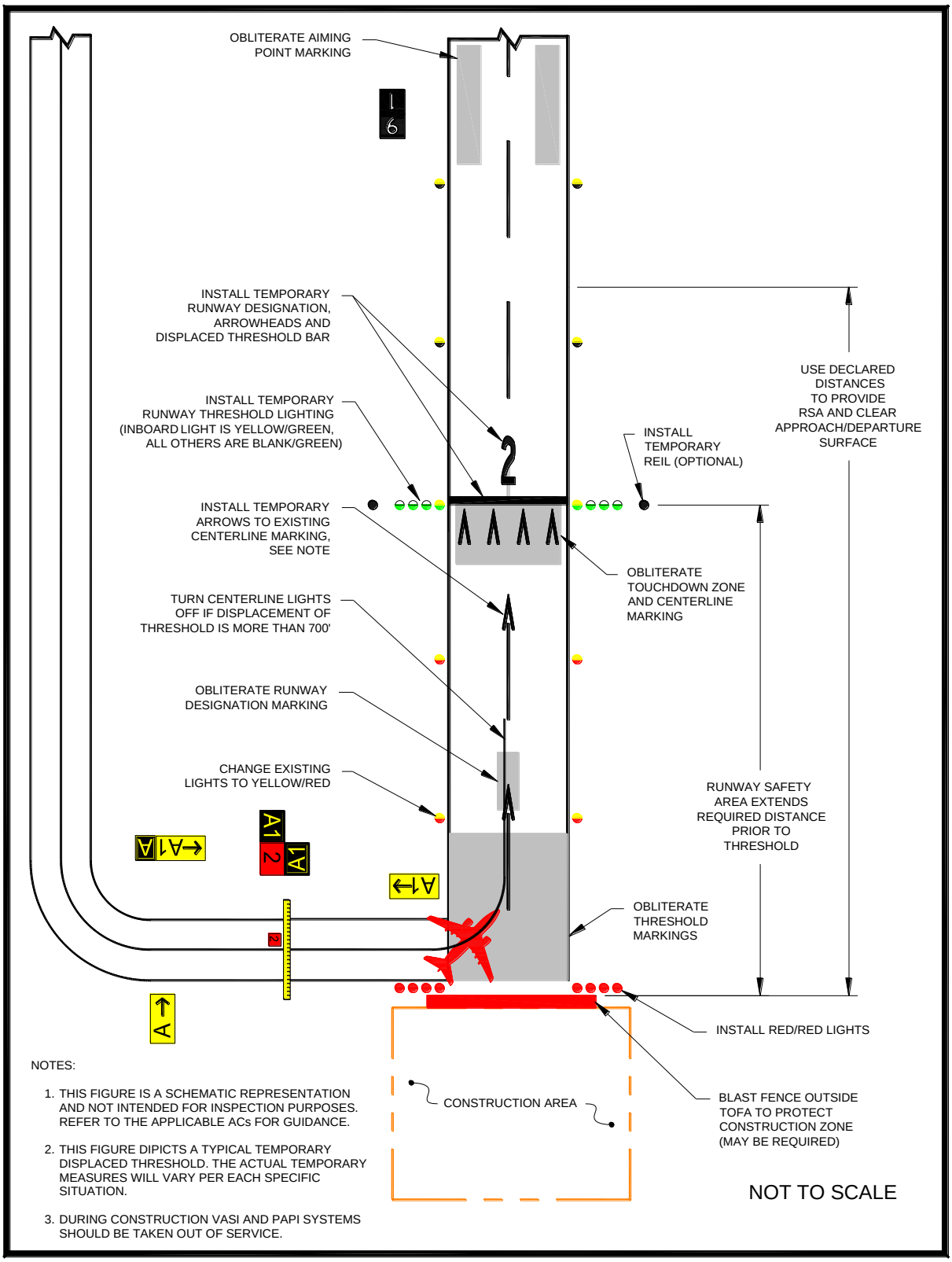


Figure 2-2. Temporary Displaced Threshold



Note: See paragraph 2.18.2.5.

2.7.2 Mitigation of Effects.

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

2.7.2.1 Temporary changes to runway and/or taxi operations.

2.7.2.2 Detours for ARFF and other airport vehicles.

2.7.2.3 Maintenance of essential utilities.

2.7.2.4 Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.

2.8 Navigation Aid (NAVAID) Protection.

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 2.13.5.3.) Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the "critical area" associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 2.13.2). 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. (See paragraph 2.13.5.3.)

2.9 Contractor Access.

The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

2.9.1 Location of Stockpiled Construction Materials.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. 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. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. (See paragraph 2.18.2.) This includes determining and

verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage from blowing or tracked material. See paragraphs 2.10 and 2.11.

2.9.2 Vehicle and Pedestrian Operations.

The CSPP should include specific vehicle and pedestrian requirements. 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 operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, with associated training requirements:

2.9.2.1 **Construction Site Parking.**

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the AOA. These areas should provide reasonable contractor employee access to the job site.

2.9.2.2 **Construction Equipment Parking.**

Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph 2.13.1 for further information.

2.9.2.3 **Access and Haul Roads.**

Determine the construction contractor’s access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention 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 does not interfere with NAVAIDs or approach surfaces of operational runways. Address whether access gates will be blocked or inoperative or if a rally point will be blocked or inaccessible.

2.9.2.4 Marking and lighting of vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*

2.9.2.5 Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.

2.9.2.6 Required escorts.

2.9.2.7 **Training Requirements for Vehicle Drivers to Ensure Compliance with the Airport Operator's Vehicle Rules and Regulations.**

Specific training should be provided to vehicle operators, including those providing escorts. See AC 150/5210-20, *Ground Vehicle Operations on Airports*, for information on training and records maintenance requirements.

2.9.2.8 **Situational Awareness.**

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. At non-towered airports, all aircraft movements and flight operations rely on aircraft operators to self-report their positions and intentions. However, there is no requirement for an aircraft to have radio communications. Because aircraft do not always broadcast their positions or intentions, visual checking, radio monitoring, and situational awareness of the surroundings is critical to safety.

2.9.2.9 **Two-Way Radio Communication Procedures.**

2.9.2.9.1 General.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:

1. Airport operations
2. ATCT

3. Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.
4. Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and "shortened" runways on the ATIS frequency.

2.9.2.9.2 Areas Requiring Two-Way Radio Communication with the ATCT.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport.

2.9.2.9.3 Frequencies to be Used.

The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

2.9.2.9.4 Proper radio usage, including read back requirements.

2.9.2.9.5 Proper phraseology, including the International Phonetic Alphabet.

2.9.2.9.6 Light Gun Signals.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure. See the FAA safety placard "Ground Vehicle Guide to Airport Signs and Markings." This safety placard may be downloaded through the Runway Safety Program Web site at http://www.faa.gov/airports/runway_safety/publications/ (see "Signs & Markings Vehicle Dashboard Sticker") or obtained from the FAA Airports Regional Office.

2.9.2.10 **Maintenance of the secured area of the airport, including:**

2.9.2.10.1 Fencing and Gates.

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people. Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit "piggybacking" behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-

00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

2.9.2.10.2 Badging Requirements.

Airports subject to 49 CFR Part 1542, *Airport Security*, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel.

2.10 Wildlife Management.

The CSPP and SPCD must be in accordance with the airport operator's wildlife hazard management plan, if applicable. See AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports,* and CertAlert 98-05, *Grasses Attractive to Hazardous Wildlife.* 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, such as:

2.10.1 Trash.

Food scraps must be collected from construction personnel activity.

2.10.2 Standing Water.

2.10.3 Tall Grass and Seeds.

Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, *Standards for Specifying Construction of Airports,* Item T-901, Seeding. Contact the local office of the United Sates Department of Agriculture Soil Conservation Service or the State University Agricultural Extension Service (County Agent or equivalent) for assistance and recommendations. These agencies can also provide liming and fertilizer recommendations.

2.10.4 Poorly Maintained Fencing and Gates.

See paragraph 2.9.2.10.1.

2.10.5 Disruption of Existing Wildlife Habitat.

While this will frequently be unavoidable due to the nature of the project, the CSPP should specify under what circumstances (location, wildlife type) contractor personnel should immediately notify the airport operator of wildlife sightings.

2.11 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) or covers 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.*

2.12 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 or hydraulic fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. See AC 150/5320-15, *Management of Airport Industrial Waste.*

2.13 Notification of Construction Activities.

The CSPP and SPCD must detail procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport. It must address the notification actions described below, as applicable.

2.13.1 List of Responsible Representatives/points of contact for all involved parties, and procedures for contacting each of them, including after hours.

2.13.2 NOTAMs.

Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must either enter the NOTAM into NOTAM Manager, or 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 operator must file and maintain a list of authorized representatives with the FSS. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators,* for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. See paragraph 2.7.1.1 about issuing NOTAMs for partially closed runways versus runways with displaced thresholds.

2.13.3 Emergency notification procedures for medical, fire fighting, and police response.

2.13.4 Coordination with ARFF.

The CSPP must detail procedures for coordinating through the airport sponsor with ARFF personnel, mutual aid providers, and other emergency services if construction requires:

1. The deactivation and subsequent reactivation of water lines or fire hydrants, or
2. The rerouting, blocking and restoration of emergency access routes, or
3. The use of hazardous materials on the airfield.

2.13.5 Notification to the FAA.

2.13.5.1 **Part 77.**

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, other equipment) on airports. FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, can be used for this purpose and submitted to the appropriate FAA Airports Regional or District Office. See Appendix A to download the form. Further guidance is available on the FAA web site at oeaaa.faa.gov.

2.13.5.2 **Part 157.**

With some exceptions, Title 14 CFR Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airports*, requires that the airport operator 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. See Appendix A to download the form.

2.13.5.3 **NAVAIDs.**

For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDs, contact: 866-432-2622.

2.13.5.3.1 Airport Owned/FAA Maintained.

If construction operations require a shutdown of 24 hours or greater in duration, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown, using Strategic Event Coordination (SEC) Form 6000.26 contained within FAA Order 6000.15, *General Maintenance Handbook for National Airspace System (NAS) Facilities*.

2.13.5.3.2 FAA Owned.

1. The airport operator must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDs, using SEC Form 6000.26.
2. Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs. Refer to active Service Level Agreement with ATO for specifics.

2.14 **Inspection Requirements.**

2.14.1 Daily Inspections.

Inspections should be conducted at least daily, but more frequently if necessary to ensure conformance with the CSPP. A sample checklist is provided in Appendix D, Construction Project Daily Safety Inspection Checklist. See also AC 150/5200-18, *Airport Safety Self-Inspection.* Airport operators holding a Part 139 certificate are required to conduct self-inspections during unusual conditions, such as construction activities, that may affect safe air carrier operations.

2.14.2 Interim Inspections.

Inspections should be conducted of all areas to be (re)opened to aircraft traffic to ensure the proper operation of lights and signs, for correct markings, and absence of FOD. The contractor should conduct an inspection of the work area with airport operations personnel. The contractor should ensure that all construction materials have been secured, all pavement surfaces have been swept clean, all transition ramps have been properly constructed, and that surfaces have been appropriately marked for aircraft to operate safely. Only if all items on the list meet with the airport operator's approval should the air traffic control tower be notified to open the area to aircraft operations. The contractor should be required to retain a suitable workforce and the necessary equipment at the work area for any last minute cleanup that may be requested by the airport operator prior to opening the area.

2.14.3 Final Inspections.

New runways and extended runway closures may require safety inspections at certificated airports prior to allowing air carrier service. Coordinate with the FAA Airport Certification Safety Inspector (ACSI) to determine if a final inspection will be necessary.

2.15 **Underground Utilities.**

The CSPP and/or SPCD must include procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas. This may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that "One Call" or "Miss Utility" services do not include FAA ATO/Technical Operations.

2.16 **Penalties.**

The CSPP should detail penalty provisions for noncompliance with airport rules and regulations and the safety plans (for example, if a vehicle is involved in a runway incursion). Such penalties typically include rescission of driving privileges or access to the AOA.

2.17 **Special Conditions.**

The CSPP must detail any special conditions that affect the operation of the airport and will require the activation of any special procedures (for example, low-visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, Vehicle / Pedestrian Deviation (VPD) and other activities requiring construction suspension/resumption).

2.18 **Runway and Taxiway Visual Aids.**

This includes marking, lighting, signs, and visual NAVAIDs. The CSPP must ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual NAVAIDs that are to continue to perform their functions during construction remain in place and operational. Visual NAVAIDs that are not serving their intended function during construction must be temporarily disabled, covered, or modified as necessary. The CSPP must address the following, as appropriate:

2.18.1 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, and other wind currents and constructed of materials that will minimize damage to an aircraft in the event of inadvertent contact. Items used to secure such markings must be of a color similar to the marking.

2.18.2 Markings.

During the course of construction projects, temporary pavement markings are often required to allow for aircraft operations during or between work periods. During the design phase of the project, the designer should coordinate with the project manager,

airport operations, airport users, the FAA Airports project manager, and Airport Certification Safety Inspector for Part 139 airports to determine minimum temporary markings. The FAA Airports project manager will, wherever a runway is closed, coordinate with the appropriate FAA Flight Standards Office and disseminate findings to all parties. Where possible, the temporary markings on finish grade pavements should be placed to mirror the dimensions of the final markings. Markings must be in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*, except as noted herein. Runways and runway exit taxiways closed to aircraft operations are marked with a yellow X. The preferred visual aid to depict temporary runway closure is the lighted X signal placed on or near the runway designation numbers. (See paragraph 2.18.2.1.2.)

2.18.2.1 **Closed Runways and Taxiways.**

2.18.2.1.1 Permanently Closed Runways.

For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place an X at each end and at 1,000-foot (300 m) intervals. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X.

2.18.2.1.2 Temporarily Closed Runways.

For runways that have been temporarily closed, place an X at each end of the runway directly on or as near as practicable to the runway designation numbers. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X. See Figure 2-3. See also paragraph 2.18.3.3.

2.18.2.1.3 Partially Closed Runways and Displaced Thresholds.

When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, the markings must comply with AC 150/5340-1. An X is not used on a partially closed runway or a runway with a displaced threshold. See paragraph 2.7.1.1 for the difference between partially closed runways and runways with displaced thresholds. Because of the temporary nature of threshold displacement due to construction, it is not necessary to re-adjust the existing runway centerline markings to meet standard spacing for a runway with a visual approach. Some of the requirements below may be waived in the cases of low-activity airports and/or short duration changes that are measured in days rather than weeks. Consider whether the presence of an airport traffic

control tower allows for the development of special procedures. Contact the appropriate FAA Airports Regional or District Office for assistance.

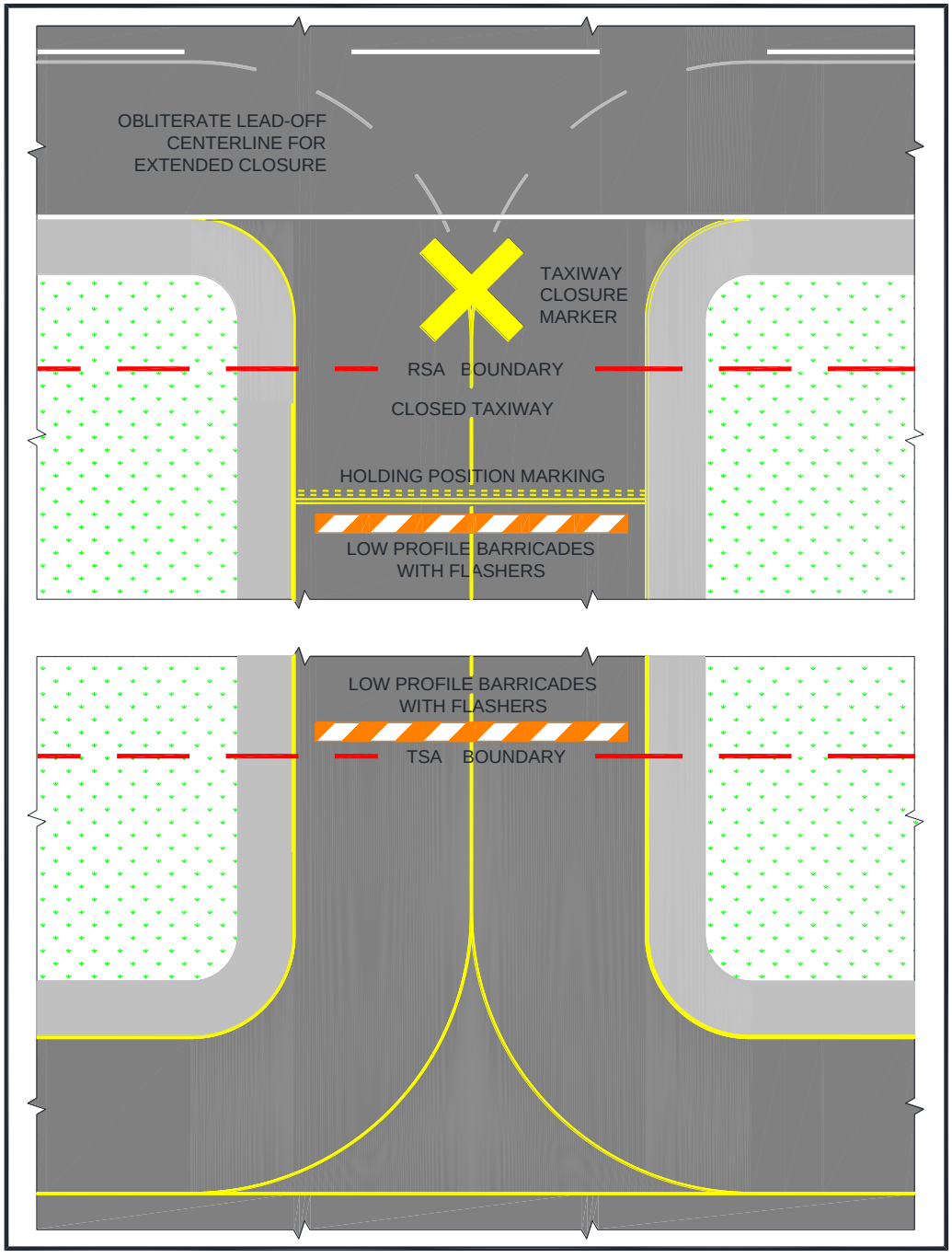
Figure 2-3. Markings for a Temporarily Closed Runway

1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see AC 150/5340-1). Obliterate or cover markings prior to the moved threshold. Existing touchdown zone markings beyond the moved threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-4.
2. **Displaced Thresholds.** Pavement markings for a displaced threshold consist of a runway threshold bar, runway designation, and white arrowheads with and without arrow shafts. These markings are required to identify the portion of the runway before the displaced threshold to provide centerline guidance for pilots during approaches, takeoffs, and landing rollouts from the opposite direction. See AC 150/5340-1. Obliterate markings prior to the displaced threshold. Existing touchdown zone markings beyond the displaced threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-2.

2.18.2.1.4 Taxiways.

1. **Permanently Closed Taxiways.** AC 150/5300-13 *Airport Design*, notes that it is preferable to remove the pavement, but for pavement that is to remain, place an X at the entrance to both ends of the closed section. Obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed taxiway. See Figure 2-4.

Figure 2-4. Temporary Taxiway Closure



2. **Temporarily Closed Taxiways.** Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway. If the taxiway will be closed for an extended period, obliterate taxiway centerline markings, including runway leadoff lines and taxiway to taxiway turns, leading to the closed section. Always obliterate runway lead-off lines for high speed exits, regardless of the duration of the closure. If the centerline markings will be reused upon reopening the taxiway, it is preferable to paint over the marking. This will result in less damage to the pavement when the upper layer of paint is ultimately removed. See Figure 2-4.

2.18.2.1.5 Temporarily Closed Airport.

When the airport is closed temporarily, mark all the runways as closed.

2.18.2.2 If unable to paint temporary markings on the pavement, construct them from any of the following materials: fabric, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents. Items used to secure such markings must be of a color similar to the marking.

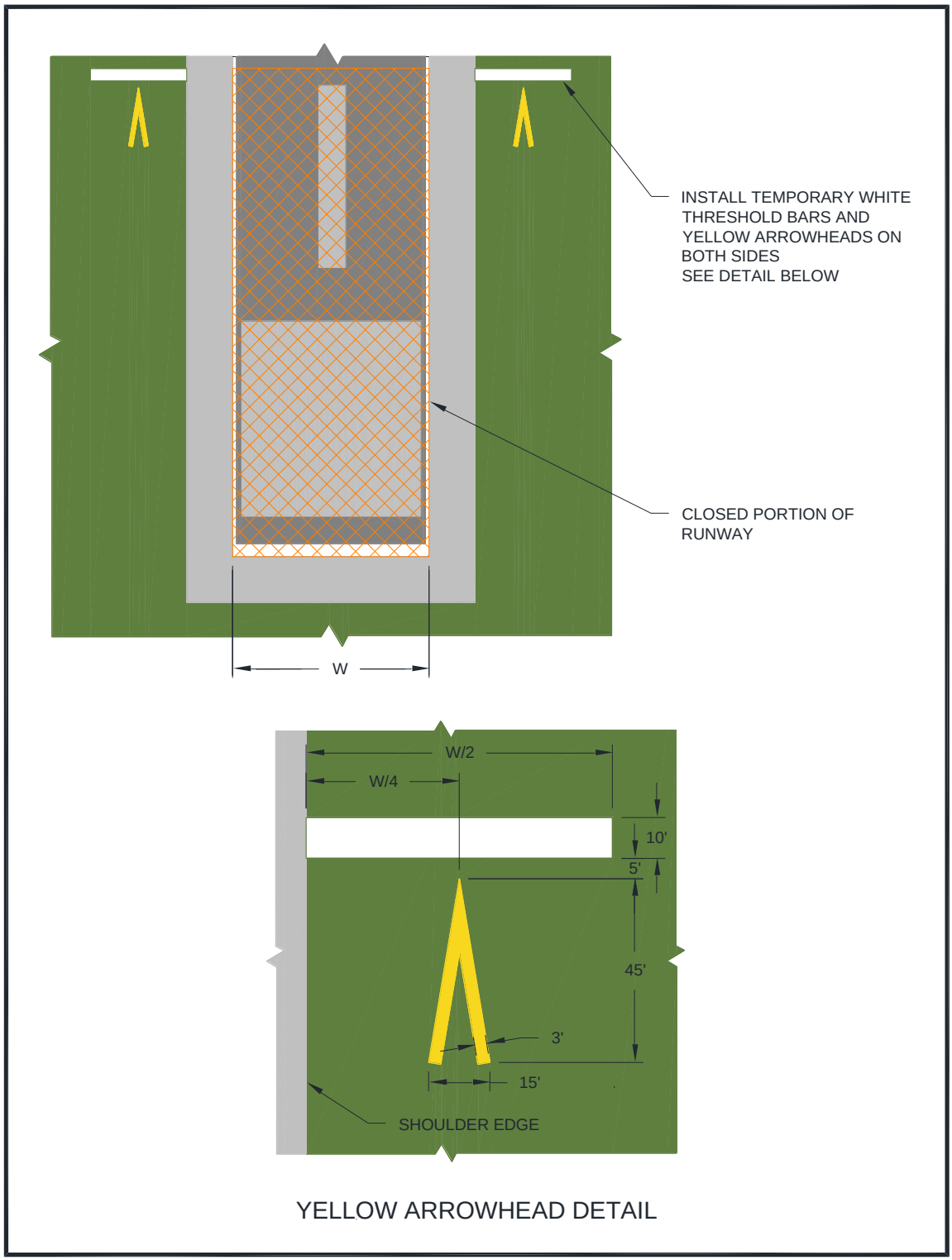
2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. When removing runway markings, apply the same treatment to areas between stripes or numbers, as the cleaned area will appear to pilots as a marking in the shape of the treated area.

2.18.2.4 If it is not possible to install threshold bars, chevrons, and arrows on the pavement, "temporary outboard white threshold bars and yellow arrowheads", see Figure 2-5, may be used. Locate them outside of the runway pavement surface on both sides of the runway. The dimensions must be as shown in Figure 2-5. If the markings are not discernible on grass or snow, apply a black background with appropriate material over the ground to ensure they are clearly visible.

2.18.2.5 The application rate of paint to mark a short-term temporary runway and 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. When applying temporary markings at night, it is recommended that the fast curing, Type II paint be used to help offset the higher humidity and cooler temperatures often experienced at night. Diluting the paint will substantially increase cure time and is not recommended. Glass beads are not recommended for temporary markings. Striated markings may also be used for certain temporary markings. AC

150/5340-1, *Standards for Airport Markings*, has additional guidance on temporary markings.

Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads



2.18.3 Lighting and Visual NAVAIDs.

This paragraph refers to standard runway and taxiway lighting systems. See below for hazard lighting. Lighting installation must be in conformance with AC 150/5340-30, *Design and Installation Details for Airport Visual Aids,* and fixture design in conformance with AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights.* When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. See AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities*, for disconnect procedures and safety precautions. Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value. Secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources. Maintain mandatory hold signs to operate normally in any situation where pilots or vehicle drivers could mistakenly be in that location. At towered airports certificated under Part 139, holding position signs are required to be illuminated on open taxiways crossing to closed or inactive runways. If the holding position sign is installed on the runway circuit for the closed runway, install a jumper to the taxiway circuit to provide power to the holding position sign for nighttime operations. Where it is not possible to maintain power to signs that would normally be operational, install barricades to exclude aircraft. Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4 illustrate temporary changes to lighting and visual NAVAIDs.

2.18.3.1 **Permanently Closed Runways and Taxiways.**

For runways and taxiways that have been permanently closed, disconnect the lighting circuits.

2.18.3.2 **Temporarily Closed Runways and New Runways Not Yet Open to Air Traffic.**

If available, use a lighted X, both at night and during the day, placed at each end of the runway on or near the runway designation numbers facing the approach. (Note that the lighted X must be illuminated at all times that it is on a runway.) The use of a lighted X is required if night work requires runway lighting to be on. See AC 150/5345-55, *Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure.* For runways that have been temporarily closed, but for an extended period, and for those with pilot controlled lighting, disconnect the lighting circuits or secure switches to prevent inadvertent activation. For runways that will be opened periodically, coordinate procedures with the FAA air traffic manager or, at airports without an ATCT, the airport operator. Activate stop bars if available. Figure 2-6 shows a lighted X by day. Figure 2-7 shows a lighted X at night.

Figure 2-6. Lighted X in Daytime

Figure 2-7. Lighted X at Night

2.18.3.3 **Partially Closed Runways and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing and landing or taking off in either direction. A displaced threshold, by contrast, is put in place to ensure obstacle clearance by landing aircraft. The pavement prior to the displaced threshold is available for takeoff in the direction of the displacement, and for landing and takeoff in the opposite direction. Misunderstanding this difference and issuance of a subsequently inaccurate NOTAM can result in a hazardous situation. For both partially

closed runways and displaced thresholds, approach lighting systems at the affected end must be placed out of service.

2.18.3.3.1 Partially Closed Runways.

Disconnect edge and threshold lights on that part of the runway at and behind the threshold (that is, the portion of the runway that is closed). Alternately, cover the light fixtures in such a way as to prevent light leakage. See Figure 2-1.

2.18.3.3.2 Temporary Displaced Thresholds.

Edge lighting in the area of the displacement emits red light in the direction of approach and yellow light (white for visual runways) in the opposite direction. If the displacement is 700 feet or less, blank out centerline lights in the direction of approach or place the centerline lights out of service. If the displacement is over 700 feet, place the centerline lights out of service. See AC 150/5340-30 for details on lighting displaced thresholds. See Figure 2-2.

2.18.3.3.3 Temporary runway thresholds and runway ends must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions.

2.18.3.3.4 A temporary threshold on an unlighted runway may be marked by retroreflective, elevated markers in addition to markings noted in paragraph 2.18.2.1.3. Markers seen by aircraft on approach are green. Markers at the rollout end of the runway are red. At certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR Part 139.309). At non-certificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39, *Specification for L-853, Runway and Taxiway Retroreflective Markers.*

2.18.3.3.5 Temporary threshold lights and runway end lights and related visual NAVAIDs are installed outboard of the edges of the full-strength pavement only when they cannot be installed on the pavement. They are installed with bases at grade level or as low as possible, but not more than 3 inch (7.6 cm) above ground. (The standard above ground height for airport lighting fixtures is 14 inches (35 cm)). When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage. See AC 150/5370-10.

2.18.3.3.6 Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-30. Battery powered, solar, or portable lights that meet the criteria in AC 150/5345-50 may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operations but may

be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

2.18.3.3.7 When runway thresholds are temporarily displaced, reconfigure yellow lenses (caution zone), as necessary, and place the centerline lights out of service.

2.18.3.3.8 Relocate the Visual Glide Slope Indicator (VGSI), such as Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI); other airport lights, such as Runway End Identifier Lights (REIL); and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI, coordinate its installation or disabling with the local ATO/Technical Operations Office. Relocation of such visual aids will depend on the duration of the project and the benefits gained from the relocation, as this can result in great expense. See FAA JO 6850.2, *Visual Guidance Lighting Systems,* for installation criteria for FAA owned and operated NAVAIDs.

2.18.3.3.9 Issue a NOTAM to inform pilots of temporary lighting conditions.

2.18.3.4 **Temporarily Closed Taxiways.**

If possible, deactivate the taxiway lighting circuits. When deactivation is not possible (for example other taxiways on the same circuit are to remain open), cover the light fixture in a way as to prevent light leakage.

2.18.4 Signs.

To the extent possible, signs must be in conformance with AC 150/5345-44, *Specification for Runway and Taxiway Signs*, and AC 150/5340-18, *Standard for Airport Sign Systems.*

2.18.4.1 **Existing Signs.**

Runway exit signs are to be covered for closed runway exits. Outbound destination signs are to be covered for closed runways. Any time a sign does not serve its normal function or would provide conflicting information, it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed. For long term construction projects, consider relocating signs, especially runway distance remaining signs.

2.18.4.2 **Temporary Signs.**

Orange construction signs comprise a message in black on an orange background. Orange construction signs may help pilots be aware of changed conditions. The airport operator may choose to introduce these signs as part of a movement area construction project to increase situational awareness when needed. Locate signs outside the taxiway safety limits and ahead of construction areas so pilots can take timely action. Use temporary signs judiciously, striking a balance between the need for information and the increase in pilot workload. When there is a concern of pilot "information overload," the applicability of mandatory hold signs must take precedence over orange construction signs recommended during construction. Temporary signs must meet the standards for such signs in Engineering Brief 93, *Guidance for the Assembly and Installation of Temporary Orange Construction Signs.* Many criteria in AC 150/5345-44, *Specification for Runway and Taxiway Signs*, are referenced in the Engineering Brief. Permissible sign legends are:

1. CONSTRUCTION AHEAD,
2. CONSTRUCTION ON RAMP, and
3. RWY XX TAKEOFF RUN AVAILABLE XXX FT.

Phasing, supported by drawings and sign schedule, for the installation of orange construction signs must be included in the CSPP or SPCD.

2.18.4.2.1 Takeoff Run Available (TORA) signs.

Recommended: Where a runway has been shortened for takeoff, install orange TORA signs well before the hold lines, such as on a parallel taxiway prior to a turn to a runway hold position. See EB 93 for sign size and location.

2.18.4.2.2 Sign legends are shown in Figure F-1.

Note: See Figure E-1, Figure E-2, Figure E-3, Figure F-2, and Figure F-3 for examples of orange construction sign locations.

2.19 **Marking and Signs for Access Routes.**

The CSPP should indicate that pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23, *Frangible Connections*, which may require modification to size and height guidance in the MUTCD.

2.20 **Hazard Marking, Lighting and Signing.**

2.20.1 Hazard marking, lighting, and signing prevent pilots from entering areas closed to aircraft, and prevent construction personnel from entering areas open to aircraft. The CSPP must specify prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Hazard marking and lighting must also be specified to identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

2.20.2 Equipment.

2.20.2.1 **Barricades.**

Low profile barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. Careful consideration must be given to selecting 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. The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude aircraft, gaps between barricades must be smaller than the wingspan of the smallest aircraft to be excluded; if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 feet (1.2 meters). Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.

2.20.2.2 **Lights.**

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 feet (3 meters). 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.

2.20.2.3 **Supplement Barricades with Signs (for example) As Necessary.**

Examples are “No Entry” and “No Vehicles.” Be aware of the increased effects of wind and jet blast on barricades with attached signs.

2.20.2.4 **Air Operations Area – General.**

Barricades are not permitted in any active safety area or on the runway side of a runway hold line. Within a runway or taxiway object free area, and on aprons, use orange traffic cones, flashing or steady burning red lights as noted above, highly reflective collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 inch (50 by 50 cm) square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway / taxilane 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, and 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 inch (7.6 cm) above the ground. Figure 2-8 and Figure 2-9 show sample barricades with proper coloring and flags.

Figure 2-8. Interlocking Barricades

Figure 2-9. Low Profile Barricades

2.20.2.5 **Air Operations Area – Runway/Taxiway Intersections.**

Use highly reflective barricades with lights to close taxiways leading to closed runways. 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 is appropriate for short duration closures.

2.20.2.6 **Air Operations Area – Other.**

Beyond 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 railroad ties, sawhorses, jersey barriers, or barrels.

2.20.2.7 **Maintenance.**

The construction specifications must 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 airport operator. Lighting should be checked for proper operation at least once per day, preferably at dusk.

2.21 Work Zone Lighting for Nighttime Construction.

Lighting equipment must adequately illuminate the work area if the construction is to be performed during nighttime hours. Refer to AC 150/5370-10 for minimum illumination levels for nighttime paving projects. Additionally, it is recommended that all support equipment, except haul trucks, be equipped with artificial illumination to safely

illuminate the area immediately surrounding their work areas. The lights should 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 ATCT cabs and 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. Construction lighting units should be identified and generally located on the construction phasing plans in relationship to the ATCT and active runways and taxiways.

2.22 **Protection of Runway and Taxiway Safety Areas.**

Runway and taxiway safety areas, OFZs, OFAs, and approach surfaces are described in AC 150/5300-13. Protection of these areas includes limitations on the location and height of equipment and stockpiled material. An FAA airspace study may be required. Coordinate with the appropriate FAA Airports Regional or District Office if there is any doubt as to requirements or dimensions (see paragraph 2.13.5) as soon as the location and height of materials or equipment are known. The CSPP should include drawings showing all safety areas, object free areas, obstacle free zones and approach departure surfaces affected by construction.

2.22.1 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 (see AC 150/5300-13). Construction activities within the existing RSA are subject to the following conditions:

2.22.1.1 No construction may occur within the existing 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). The temporary use of declared distances and/or partial runway closures may provide the necessary RSA under certain circumstances. Coordinate with the appropriate FAA Airports Regional or District Office to have declared distances information published, and appropriate NOTAMs issued. See AC 150/5300-13 for guidance on the use of declared distances.

2.22.1.2 The airport operator must coordinate the adjustment of RSA dimensions as permitted above with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.

2.22.1.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations.

2.22.1.4 **Excavations.**

2.22.1.4.1 Open trenches or excavations are not permitted within the RSA while the runway is open. Backfill trenches before the runway is opened. If backfilling excavations before the runway 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 runway across the trench without damage to the aircraft.

2.22.1.4.2 Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.1.5 **Erosion Control.**

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 fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.2 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.

2.22.3 Taxiway Safety Area (TSA).

2.22.3.1 A 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. (See AC 150/5300-13.) Since the width of the TSA is equal to the wingspan of the design aircraft, no construction may occur within the TSA while the taxiway is open for aircraft operations. The TSA dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a TSA that is equal to the TSA width available during construction. Give special consideration to TSA dimensions at taxiway turns and intersections. (see AC 150/5300-13).

2.22.3.2 The airport operator must coordinate the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager and issue a NOTAM.

2.22.3.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations.

2.22.3.4 **Excavations.**

1. Curves. Open trenches or excavations are not permitted within the TSA while the taxiway is open. Trenches should be backfilled before the taxiway is opened. 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.
2. Straight Sections. Open trenches or excavations are not permitted within the TSA while the taxiway is open for unrestricted aircraft operations. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations to allow the safe passage of ARFF equipment and of the heaviest aircraft operating on the taxiway across the trench without causing damage to the equipment or aircraft. In rare circumstances where the section of taxiway is indispensable for aircraft movement, open trenches or excavations may be permitted in the TSA while the taxiway is open to aircraft operations, subject to the following restrictions:
    a. Taxiing speed is limited to 10 mph.
    b. Appropriate NOTAMs are issued.
    c. Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
    d. Low mass, low-profile lighted barricades are installed.
    e. Appropriate temporary orange construction signs are installed.
3. Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.3.5 **Erosion control.**

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.4 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. Except as provided below, no construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

2.22.4.1 The taxiway object free area dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a taxiway object free area that is equal to the taxiway object free area width available. Give special consideration to TOFA dimensions at taxiway turns and intersections.

2.22.4.2 Offset taxiway centerline and edge pavement markings (do not use glass beads) may be used as a temporary measure to provide the required taxiway object free area. Where offset taxiway pavement markings are provided, centerline lighting, centerline reflectors, or taxiway edge reflectors are required. Existing lighting that does not coincide with the temporary markings must be taken out of service.

2.22.4.3 Construction activity, including open excavations, may be accomplished without adjusting the width of the taxiway object free area, subject to the following restrictions:

2.22.4.3.1 Taxiing speed is limited to 10 mph.

2.22.4.3.2 NOTAMs issued advising taxiing pilots of hazard and recommending reduced taxiing speeds on the taxiway.

2.22.4.3.3 Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.

2.22.4.3.4 If desired, appropriate orange construction signs are installed. See paragraph 2.18.4.2 and Appendix F.

2.22.4.3.5 Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the usable pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.

2.22.4.3.6 Flaggers furnished by the contractor must be used to direct and control construction equipment and personnel to a pre-established setback distance for safe passage of aircraft, and airline and/or airport personnel. Flaggers must also be used to direct taxiing aircraft. Due to liability issues, the airport operator should require airlines to provide flaggers for directing taxiing aircraft.

2.22.5 Obstacle Free Zone (OFZ).

In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If a penetration to the OFZ is necessary, it may be possible to continue aircraft operations through operational restrictions. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6 Runway Approach/Departure Areas and Clearways.

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in AC 150/5300-13. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6.1 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 (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

2.22.6.2 **Caution About Partial Runway Closures.**

When filing a NOTAM for a partial runway closure, clearly state that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold). There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition).

2.22.6.3 **Caution About Displaced Thresholds.**

Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, or other work within the existing RSA of any usable runway end, do not implement a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

2.23 **Other Limitations on Construction.**

The CSPP must specify any other limitations on construction, including but not limited to:

2.23.1 Prohibitions.

2.23.1.1 No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.

2.23.1.2 No use of open flame welding or torches unless fire safety precautions are provided and the airport operator has approved their use.

2.23.1.3 No use of electrical blasting caps on or within 1,000 feet (300 meters) of the airport property. See AC 150/5370-10.

2.23.2 Restrictions.

2.23.2.1 Construction suspension required during specific airport operations.

2.23.2.2 Areas that cannot be worked on simultaneously.

2.23.2.3 Day or night construction restrictions.

2.23.2.4 Seasonal construction restrictions.

2.23.2.5 Temporary signs not approved by the airport operator.

2.23.2.6 Grades changes that could result in unplanned effects on NAVAIDs.

CHAPTER 3. GUIDELINES FOR WRITING A CSPP

3.1 General Requirements.

The CSPP is a standalone document written to correspond with the subjects outlined in paragraph 2.4. The CSPP is organized by numbered sections corresponding to each subject listed in paragraph 2.4, and described in detail in paragraphs 2.5 - 2.23. Each section number and title in the CSPP matches the corresponding subject outlined in paragraph 2.4 (for example, 1. Coordination, 2. Phasing, 3. Areas and Operations Affected by the Construction Activity, and so on). With the exception of the project scope of work outlined in Section 2. Phasing, only subjects specific to operational safety during construction should be addressed.

3.2 Applicability of Subjects.

Each section should, to the extent practical, focus on the specific subject. Where an overlapping requirement spans several sections, the requirement should be explained in detail in the most applicable section. A reference to that section should be included in all other sections where the requirement may apply. For example, the requirement to protect existing underground FAA ILS cables during trenching operations could be considered FAA ATO coordination (Coordination, paragraph 2.5.3), an area and operation affected by the construction activity (Areas and Operations Affected by the Construction Activity, paragraph 2.7.1.4), a protection of a NAVAID (Protection of Navigational Aids (NAVAIDs), paragraph 2.8), or a notification to the FAA of construction activities (Notification of Construction Activities, paragraph 2.13.5.3.2). However, it is more specifically an underground utility requirement (Underground Utilities, paragraph 2.15). The procedure for protecting underground ILS cables during trenching operations should therefore be described in 2.4.2.11: "The contractor must coordinate with the local FAA System Support Center (SSC) to mark existing ILS cable routes along Runway 17-35. The ILS cables will be located by hand digging whenever the trenching operation moves within 10 feet of the cable markings." All other applicable sections should include a reference to 2.4.2.11: "ILS cables shall be identified and protected as described in 2.4.2.11" or "See 2.4.2.11 for ILS cable identification and protection requirements." Thus, the CSPP should be considered as a whole, with no need to duplicate responses to related issues.

3.3 Graphical Representations.

Construction safety drawings should be included in the CSPP as attachments. When other graphical representations will aid in supporting written statements, the drawings, diagrams, and/or photographs should also be attached to the CSPP. References should be made in the CSPP to each graphical attachment and may be made in multiple sections.

3.4 **Reference Documents.**

The CSPP must not incorporate a document by reference unless reproduction of the material in that document is prohibited. In that case, either copies of or a source for the referenced document must be provided to the contractor. Where this AC recommends references (e.g. as in paragraph 3.9) the intent is to include a reference to the corresponding section in the CSPP, not to this Advisory Circular.

3.5 **Restrictions.**

The CSPP should not be considered as a project design review document. The CSPP should also avoid mention of permanent ("as-built") features such as pavements, markings, signs, and lighting, except when such features are intended to aid in maintaining operational safety during the construction.

3.6 **Coordination.**

Include in this section a detailed description of conferences and meetings to be held both before and during the project. Include appropriate information from AC 150/5370-12. Discuss coordination procedures and schedules for each required FAA ATO Technical Operations shutdown and restart and all required flight inspections.

3.7 **Phasing.**

Include in this section a detailed scope of work description for the project as a whole and each phase of work covered by the CSPP. This includes all locations and durations of the work proposed. Attach drawings to graphically support the written scope of work. Detail in this section the sequenced phases of the proposed construction. Include a reference to paragraph 3.8, as appropriate.

3.8 **Areas and Operations Affected by Construction.**

Focus in this section on identifying the areas and operations affected by the construction. Describe corresponding mitigation that is not covered in detail elsewhere in the CSPP. Include references to paragraphs below as appropriate. Attach drawings as necessary to graphically describe affected areas and mechanisms proposed. See Appendix F for sample operational effects tables and figures.

3.9 **NAVAID Protection.**

List in this section all NAVAID facilities that will be affected by the construction. Identify NAVAID facilities that will be placed out of service at any time prior to or during construction activities. Identify individuals responsible for coordinating each shutdown and when each facility will be out of service. Include a reference to paragraph 3.6 for FAA ATO NAVAID shutdown, restart, and flight inspection coordination. Outline in detail procedures to protect each NAVAID facility remaining in service from interference by construction activities. Include a reference to paragraph 3.14 for the

issuance of NOTAMs as required. Include a reference to paragraph 3.16 for the protection of underground cables and piping serving NAVAIDs. If temporary visual aids are proposed to replace or supplement existing facilities, include a reference to paragraph 3.19. Attach drawings to graphically indicate the affected NAVAIDS and the corresponding critical areas.

3.10 **Contractor Access.**

This will necessarily be the most extensive section of the CSPP. Provide sufficient detail so that a contractor not experienced in working on airports will understand the unique restrictions such work will require. Due to this extent, it should be broken down into subsections as described below:

3.10.1 Location of Stockpiled Construction Materials.

Describe in this section specific locations for stockpiling material. Note any height restrictions on stockpiles. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify stockpiles. Include a reference to paragraph 3.11 for provisions to prevent stockpile material from becoming wildlife attractants. Include a reference to paragraph 3.12 for provisions to prevent stockpile material from becoming FOD. Attach drawings to graphically indicate the stockpile locations.

3.10.2 Vehicle and Pedestrian Operations.

While there are many items to be addressed in this major subsection of the CSPP, all are concerned with one main issue: keeping people and vehicles from areas of the airport where they don't belong. This includes preventing unauthorized entry to the AOA and preventing the improper movement of pedestrians or vehicles on the airport. In this section, focus on mechanisms to prevent construction vehicles and workers traveling to and from the worksite from unauthorized entry into movement areas. Specify locations of parking for both employee vehicles and construction equipment, and routes for access and haul roads. In most cases, this will best be accomplished by attaching a drawing. Quote from AC 150/5210-5 specific requirements for contractor vehicles rather than referring to the AC as a whole, and include special requirements for identifying HAZMAT vehicles. Quote from, rather than incorporate by reference, AC 150/5210-20 as appropriate to address the airport's rules for ground vehicle operations, including its training program. Discuss the airport's recordkeeping system listing authorized vehicle operators.

3.10.3 Two-Way Radio Communications.

Include a special section to identify all individuals who are required to maintain communications with Air Traffic (AT) at airports with active towers, or monitor CTAF at airports without or with closed ATCT. Include training requirements for all individuals required to communicate with AT. Individuals required to monitor AT frequencies should also be identified. If construction employees are also required to communicate by radio with Airport Operations, this procedure should be described in detail. Usage of vehicle mounted radios and/or portable radios should be addressed. Communication procedures for the event of disabled radio communication (that is, light

signals, telephone numbers, others) must be included. All radio frequencies should by identified (Tower, Ground Control, CTAF, UNICOM, ATIS, and so on).

3.10.4 Airport Security.

Address security as it applies to vehicle and pedestrian operations. Discuss TSA requirements, security badging requirements, perimeter fence integrity, gate security, and other needs. Attach drawings to graphically indicate secured and/or Security Identification Display Areas (SIDA), perimeter fencing, and available access points.

3.11 **Wildlife Management.**

Discuss in this section wildlife management procedures. Describe the maintenance of existing wildlife mitigation devices, such as perimeter fences, and procedures to limit wildlife attractants. Include procedures to notify Airport Operations of wildlife encounters. Include a reference to paragraph 3.10 for security (wildlife) fence integrity maintenance as required.

3.12 **FOD Management.**

In this section, discuss methods to control and monitor FOD: worksite housekeeping, ground vehicle tire inspections, runway sweeps, and so on. Include a reference to paragraph 3.15 for inspection requirements as required.

3.13 **HAZMAT Management.**

Describe in this section HAZMAT management procedures: fuel deliveries, spill recovery procedures, Safety Data Sheet (SDS), Material Safety Data Sheet (MSDS) or Product Safety Data Sheet (PSDS) availability, and other considerations. Any specific airport HAZMAT restrictions should also be identified. Include a reference to paragraph 3.10 for HAZMAT vehicle identification requirements. Quote from, rather than incorporate by reference, AC 150/5320-15.

3.14 **Notification of Construction Activities.**

List in this section the names and telephone numbers of points of contact for all parties affected by the construction project. We recommend a single list that includes all telephone numbers required under this section. Include emergency notification procedures for all representatives of all parties potentially impacted by the construction. Identify individual representatives – and at least one alternate – for each party. List both on-duty and off-duty contact information for each individual, including individuals responsible for emergency maintenance of airport construction hazard lighting and barricades. Describe procedures to coordinate immediate response to events that might adversely affect the operational safety of the airport (such as interrupted NAVAID service). Explain requirements for and the procedures for the issuance of Notices to Airmen (NOTAMs), notification to FAA required by 14 CFR Part 77 and Part 157 and in the event of affected NAVAIDs. For NOTAMs, identify an individual, and at least one alternate, responsible for issuing and cancelling each specific type of Notice to

Airmen (NOTAM) required. Detail notification methods for police, fire fighting, and medical emergencies. This may include 911, but should also include direct phone numbers of local police departments and nearby hospitals. Identify the E911 address of the airport and the emergency access route via haul roads to the construction site. Require the contractor to have this information available to all workers. The local Poison Control number should be listed. Procedures regarding notification of Airport Operations and/or the ARFF Department of such emergencies should be identified, as applicable. If airport radio communications are identified as a means of emergency notification, include a reference to paragraph 3.10. Differentiate between emergency and nonemergency notification of ARFF personnel, the latter including activities that affect ARFF water supplies and access roads. Identify the primary ARFF contact person and at least one alternate. If notification is to be made through Airport Operations, then detail this procedure. Include a method of confirmation from the ARFF department.

3.15 **Inspection Requirements.**

Describe in this section inspection requirements to ensure airfield safety compliance. Include a requirement for routine inspections by the resident engineer (RE) or other airport operator's representative and the construction contractors. If the engineering consultants and/or contractors have a Safety Officer who will conduct such inspections, identify this individual. Describe procedures for special inspections, such as those required to reopen areas for aircraft operations. Part 139 requires daily airfield inspections at certificated airports, but these may need to be more frequent when construction is in progress. Discuss the role of such inspections on areas under construction. Include a requirement to immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

3.16 **Underground Utilities.**

Explain how existing underground utilities will be located and protected. Identify each utility owner and include contact information for each company/agency in the master list. Address emergency response procedures for damaged or disrupted utilities. Include a reference to paragraph 3.14 for notification of utility owners of accidental utility disruption as required.

3.17 **Penalties.**

Describe in this section specific penalties imposed for noncompliance with airport rules and regulations, including the CSPP: SIDA violations, VPD, and others.

3.18 **Special Conditions.**

Identify any special conditions that may trigger specific safety mitigation actions outlined in this CSPP: low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, VPD, and other activities requiring construction suspension/resumption. Include a reference to paragraph 3.10 for compliance with airport safety and security measures and for radio communications as required. Include

a reference to paragraph 3.14 for emergency notification of all involved parties, including police/security, ARFF, and medical services.

3.19 **Runway and Taxiway Visual Aids.**

Include marking, lighting, signs, and visual NAVAIDS. Detail temporary runway and taxiway marking, lighting, signs, and visual NAVAIDs required for the construction. Discuss existing marking, lighting, signs, and visual NAVAIDs that are temporarily, altered, obliterated, or shut down. Consider non-federal facilities and address requirements for reimbursable agreements necessary for alteration of FAA facilities and for necessary flight checks. Identify temporary TORA signs or runway distance remaining signs if appropriate. Identify required temporary visual NAVAIDs such as REIL or PAPI. Quote from, rather than incorporate by reference, AC 150/5340-1, *Standards for Airport Markings;* AC 150/5340-18, *Standards for Airport Sign Systems;* and AC 150/5340-30, as required. Attach drawings to graphically indicate proposed marking, lighting, signs, and visual NAVAIDs.

3.20 **Marking and Signs for Access Routes.**

Detail plans for marking and signs for vehicle access routes. To the extent possible, signs should be in conformance with the Federal Highway Administration MUTCD and/or State highway specifications, not hand lettered. Detail any modifications to the guidance in the MUTCD necessary to meet frangibility/height requirements.

3.21 **Hazard Marking and Lighting.**

Specify all marking and lighting equipment, including when and where each type of device is to be used. Specify maximum gaps between barricades and the maximum spacing of hazard lighting. Identify one individual and at least one alternate responsible for maintenance of hazard marking and lighting equipment in the master telephone list. Include a reference to paragraph 3.14. Attach drawings to graphically indicate the placement of hazard marking and lighting equipment.

3.22 **Work Zone Lighting for Nighttime Construction.**

If work is to be conducted at night, specify all lighting equipment, including when and where each type of device is to be used. Indicate the direction lights are to be aimed and any directions that aiming of lights is prohibited. Specify any shielding necessary in instances where aiming is not sufficient to prevent interference with air traffic control and aircraft operations. Attach drawings to graphically indicate the placement and aiming of lighting equipment. Where the plan only indicates directions that aiming of lights is prohibited, the placement and positioning of portable lights must be proposed by the Contractor and approved by the airport operator’s representative each time lights are relocated or repositioned.

3.23 **Protection of Runway and Taxiway Safety Areas.**

This section should focus exclusively on procedures for protecting all safety areas, including those altered by the construction: methods of demarcation, limit of access, movement within safety areas, stockpiling and trenching restrictions, and so on. Reference AC 150/5300-13, as required. Include a reference to paragraph 3.10 for procedures regarding vehicle and personnel movement within safety areas. Include a reference to paragraph 3.10 for material stockpile restrictions as required. Detail requirements for trenching, excavations, and backfill. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify open excavations as required. If runway and taxiway closures are proposed to protect safety areas, or if temporary displaced thresholds and/or revised declared distances are used to provide the required Runway Safety Area, include a reference to paragraphs 3.14 and 3.19. Detail procedures for protecting the runway OFZ, runway OFA, taxiway OFA and runway approach surfaces including those altered by the construction: methods of demarcation, limit of cranes, storage of equipment, and so on. Quote from, rather than incorporate by reference, AC 150/5300-13, as required. Include a reference to paragraph 3.24 for height (i.e., crane) restrictions as required. One way to address the height of equipment that will move during the project is to establish a three-dimensional "box" within which equipment will be confined that can be studied as a single object. Attach drawings to graphically indicate the safety area, OFZ, and OFA boundaries.

3.24 **Other Limitations on Construction.**

This section should describe what limitations must be applied to each area of work and when each limitation will be applied: limitations due to airport operations, height (i.e., crane) restrictions, areas which cannot be worked at simultaneously, day/night work restrictions, winter construction, and other limitations. Include a reference to paragraph 3.7 for project phasing requirements based on construction limitations as required.

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APPENDIX A. 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/.

Table A-1. FAA Publications

Number	Title and Description
AC 150/5200-28	*Notices to Airmen (NOTAMs) for Airport Operators* Guidance for using the NOTAM System in airport reporting.
AC 150/5200-30	*Airport Field Condition Assessments and Winter Operations Safety* 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	*Hazardous Wildlife Attractants On or Near Airports* Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
AC 150/5210-5	*Painting, Marking, and Lighting of Vehicles Used on an Airport* Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
AC 150/5210-20	*Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports* Guidance to airport operators on developing ground vehicle operation training programs.
AC 150/5300-13	*Airport Design* 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 150/5210-24	*Airport Foreign Object Debris (FOD) Management* Guidance for developing and managing an airport foreign object debris (FOD) program

Number	Title and Description
AC 150/5320-15	*Management of Airport Industrial Waste* 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	*Standards for Airport Markings* FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5340-18	*Standards for Airport Sign Systems* FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5345-28	*Precision Approach Path Indicator (PAPI) Systems* FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.
AC 150/5340-30	*Design and Installation Details for Airport Visual Aids* 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	*Specification for Runway and Taxiway Signs* FAA specifications for unlighted and lighted signs for taxiways and runways.
AC 150/5345-53	*Airport Lighting Equipment Certification Program* Details on the Airport Lighting Equipment Certification Program (ALECP).
AC 150/5345-50	*Specification for Portable Runway and Taxiway Lights* 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	*Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure*

Number	Title and Description
AC 150/5370-10	*Standards for Specifying Construction of Airports* Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
AC 150/5370-12	*Quality Management for Federally Funded Airport Construction Projects*
EB 93	*Guidance for the Assembly and Installation of Temporary Orange Construction Signs*
FAA Order 5200.11	FAA Airports (ARP) Safety Management System (SMS) 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	*Grasses Attractive to Hazardous Wildlife* Guidance on grass management and seed selection.
FAA Form 7460-1	Notice of Proposed Construction or Alteration
FAA Form 7480-1	Notice of Landing Area Proposal
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://www.ecfr.gov/.

Table A-2. Code of Federal Regulation

Number	Title
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/.

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APPENDIX B. TERMS AND ACRONYMS

Table B-1. Terms and Acronyms

Term	Definition
Form 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 https://oeaaa.faa.gov.) The form may be downloaded at http://www.faa.gov/airports/resources/forms/, or filed electronically at: https://oeaaa.faa.gov.
Form 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 http://www.faa.gov/airports/resources/forms/.
Form 6000-26	Airport Sponsor Strategic Event Submission Form
AC	Advisory Circular
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Air Operations Area, as defined in 14 CFR Part 107. Means a portion of an airport, specified in the airport security program, in which security measures are carried out. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas, and any adjacent areas (such as general aviation areas) that are not separated by adequate security systems, measures, or procedures. This area does not include the secured area of the airport terminal building.
ARFF	Aircraft Rescue and Fire Fighting
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
AT	Air Traffic
ATCT	Airport 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

Term	Definition
	the authority of 14 CFR Part 139, *Certification of Airports*.
CFR	Code of Federal Regulations
Construction	The presence of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
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
FAA	Federal Aviation Administration
FOD	Foreign Object Debris/Damage
FSS	Flight Service Station
GA	General Aviation
HAZMAT	Hazardous Materials
HMA	Hot Mix Asphalt
IAP	Instrument Approach Procedures
IFR	Instrument Flight Rules
ILS	Instrument Landing System
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.

Term	Definition
NOTAM	Notices to Airmen
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OCC	Operations Control Center
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
OTS	Out of Service
P&R	Planning and Requirements Group
NPI	NAS Planning & Integration
PAPI	Precision Approach Path Indicator
PFC	Passenger Facility Charge
PLASI	Pulse Light Approach Slope Indicator
Project Proposal Summary	A clear and concise description of the proposed project or change that is the object of Safety Risk Management.
RA	Reimbursable Agreement
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.
SDS	Safety Data Sheet
SIDA	Security Identification Display Area
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
SSC	System Support Center
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, or Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicator
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicator (PAPI), visual approach slope indicator (VASI), and pulse light approach slope indicator (PLASI).
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation

APPENDIX C. SAFETY AND PHASING PLAN CHECKLIST

This appendix is keyed to Chapter 2. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix.

This checklist is intended as an aid, not a required submittal.

Table C-1. CSPP Checklist

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
General Considerations					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	2.5				
Operational safety is a standing agenda item for construction progress meetings.	2.5				
Scheduling of the construction phases is properly addressed.	2.6				
Any formal agreements are established.	2.5.3				
Areas and Operations Affected by Construction Activity					
Drawings showing affected areas are included.	2.7.1				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	2.7.1.1				
Access routes used by ARFF vehicles affected by the project are addressed.	2.7.1.2				
Access routes used by airport and airline support vehicles affected by the project are addressed.	2.7.1.3				
Underground utilities, including water supplies for firefighting and drainage.	2.7.1.4				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	2.7.1.5				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	2.7.1				
Temporary changes to taxi operations are addressed.	2.7.2.1				
Detours for ARFF and other airport vehicles are identified.	2.7.2.2				
Maintenance of essential utilities and underground infrastructure is addressed.	2.7.2.3				
Temporary changes to air traffic control procedures are addressed.	2.7.2.4				
NAVAIDs					
Critical areas for NAVAIDs are depicted on drawings.	2.8				
Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.	2.8				
Protection of NAVAID facilities is addressed.	2.8				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	2.8				
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				
Contractor Access					
The CSPP addresses areas to which contractor will have access and how	2.9				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
the areas will be accessed.					
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	2.9				
The location of stockpiled construction materials is depicted on drawings.	2.9.1				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	2.9.1				
Requirements for proper stockpiling of materials are included.	2.9.1				
Construction site parking is addressed.	2.9.2.1				
Construction equipment parking is addressed.	2.9.2.2				
Access and haul roads are addressed.	2.9.2.3				
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				
Proper vehicle operations, including requirements for escorts, are described.	2.9.2.5, 2.9.2.6				
Training requirements for vehicle drivers are addressed.	2.9.2.7				
Two-way radio communications procedures are described.	2.9.2.9				
Maintenance of the secured area of the airport is addressed.	2.9.2.10				
Wildlife Management					
The airport operator's wildlife management procedures are addressed.	2.10				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Foreign Object Debris Management					
The airport operator's FOD management procedures are addressed.	2.11				
Hazardous Materials Management					
The airport operator's hazardous materials management procedures are addressed.	2.12				
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				
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				
A list of local ATO/Technical Operations personnel is included.	2.13.1				
A list of ATCT managers on duty is included.	2.13.1				
A list of authorized representatives to the OCC is included.	2.13.2				
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				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	2.13.2				
Emergency notification procedures for medical, fire fighting, and police	2.13.3				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	2.13.4				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	2.13.5				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	2.13.5.3.2				
Inspection Requirements					
Daily and interim inspections by both the airport operator and contractor are specified.	2.14.1, 2.14.2				
Final inspections at certificated airports are specified when required.	2.14.3				
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	2.15				
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	2.16				
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	2.17				
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				
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				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with AC 150/5340-1, *Standards for Airport Markings*, is specified.	2.18.2				
Detailed specifications for materials and methods for temporary markings are provided.	2.18.2				
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				
The use of a lighted X is specified where appropriate.	2.18.2.1.2, 2.18.3.2				
The requirement for signs to conform to AC 150/5345-44, *Specification for Runway and Taxiway Signs;* AC 50/5340-18, *Standards for Airport Sign Systems;* and AC 150/5345-53, *Airport Lighting Certification Program*, is specified.	2.18.4				
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				
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				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	2.20.1				
The CSPP considers less obvious construction-related hazards.	2.20.1				
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				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	2.20.2.1				
Red lights meeting the luminance requirements of the State Highway Department are specified.	2.20.2.2				
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.	2.20.2.3				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	2.20.2.3				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	2.20.2.5				
Markings for temporary closures are specified.	2.20.2.5				
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				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Work Zone Lighting for Nighttime Construction					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	2.21				
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				
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	2.22.1.2, 2.22.3.2				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	2.22.3.3				
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions.	2.22.1.4				
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				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	2.22.1.4				
Grading and soil erosion control to maintain RSA/TSA standards are	2.22.3.5				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	2.22.2				
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				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	2.22.4				
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				
Provisions for protection of runway approach/departure areas and clearways are included.	2.22.6				
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				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	2.23.1.3				

APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and		

Item	Action Required (Describe)	No Action Required (Check)
approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		
Obliterated or faded temporary markings on active operational areas.		
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		

Item	Action Required (Describe)	No Action Required (Check)
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		
Lack of radio communications with construction vehicles in airport movement areas.		
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		

Item	Action Required (Describe)	No Action Required (Check)
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		
Site burning, which can cause possible obscuration.		
Construction work taking place outside of designated work areas and out of phase.		

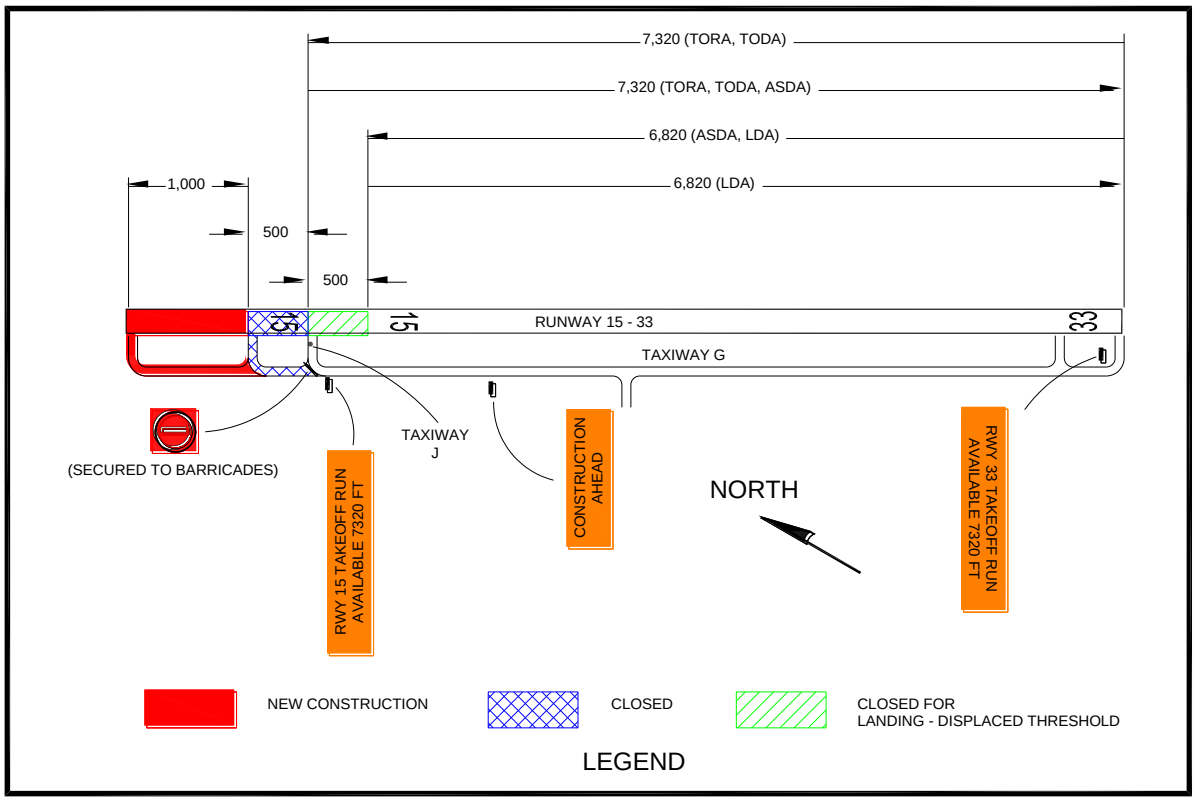
APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE

E.1 Project Description.

Runway 15-33 is currently 7820 feet long, with a 500 foot stopway on the north end. This project will remove the stopway and extend the runway 1000 feet to the north and 500 feet to the south. Finally, the existing portion of the runway will be repaved. The runway 33 glide slope will be relocated. The new runway 33 localizer has already been installed by FAA Technical Operations and only needs to be switched on. Runway 15 is currently served only by a localizer, which will remain in operation as it will be beyond the future RSA. Appropriate NOTAMS will be issued throughout the project.

E.1.1 During Phase I, the runway 15 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 15 takeoff and the departure end of runway 33 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 33 will be adjusted to provide the required RSA and applicable departure surface. Excavation near Taxiway G will require its ADG to be reduced from IV to III. See Figure E-1.

Figure E-1. Phase I Example

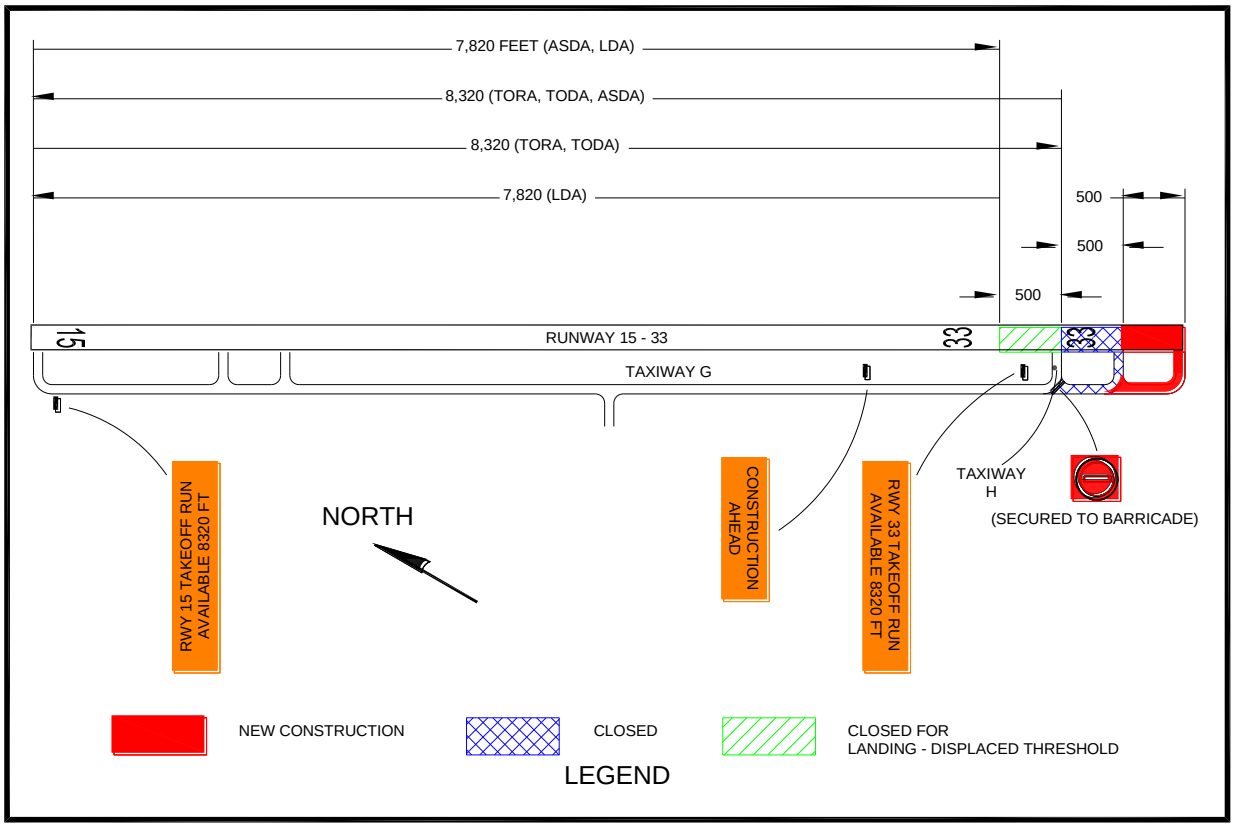


Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 33 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).

E.2 During Phase II, the runway 33 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 33 takeoff and the departure end of runway 15 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 15 will be adjusted to provide the required RSA and applicable departure surface. See Figure E-2.

Figure E-2. Phase II Example



Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 15 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).

E.3 During Phase III, the existing portion of the runway will be repaved with Hot Mix Asphalt (HMA) and the runway 33 glide slope will be relocated. Construction will be accomplished between the hours of 8:00 pm and 5:00 am, during which the runway will be closed to operations.

Figure E-3. Phase III Example

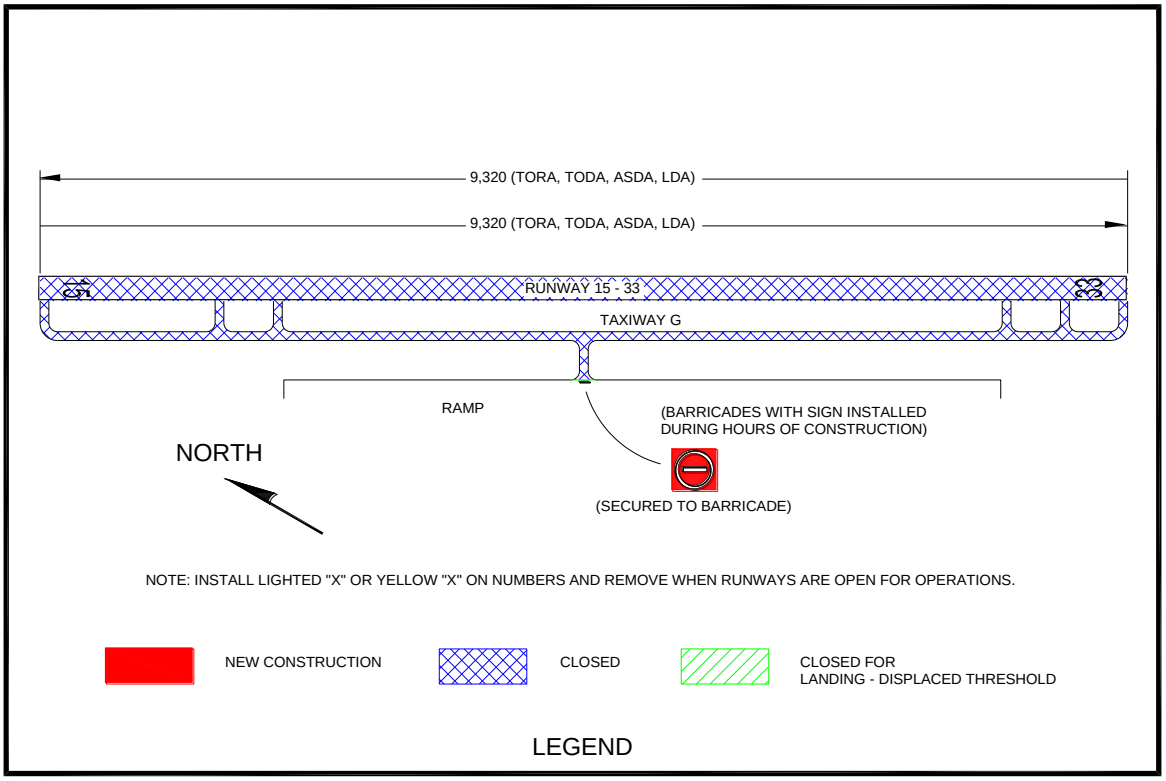


Table E-1. Operational Effects Table

Project	**Runway 15-33 Extension and Repaving**			
Phase	**Normal (Existing)**	**Phase I: Extend Runway 15 End**	**Phase II: Extend Runway 33 End**	**Phase III: Repave Runway**
Scope of Work	N/A	Extend Runway 15-33 1,000 ft on north end with Hot Mix Asphaltic Concrete (HMA).	Extend Runway 15-33 500 ft on south end with Hot Mix Asphaltic Concrete (HMA).	Repave existing runway with HMA Relocate Runway 33 Glide Slope
Effects of Construction Operations	N/A	Existing North 500 ft closed	Existing South 500 ft closed	Runway closed between 8:00 pm and 5:00 am Edge lighting out of service
Construction Phase	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
Runway 15 Average Aircraft Operations	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 40 /day GA: 26 /day Military: 0 /day	Carrier: 45 /day GA: 26 /day Military: 5 /day	Carrier: 45 / day GA: 20 / day Military: 0 /day
Runway 33 Average Aircraft Operations	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 30 /day GA: 18 /day Military: 0 /day	Carrier: 25 /day GA: 18 /day Military: 5 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
Runway 15-33 Aircraft Category	C-IV	C-IV	C-IV	C-IV
Runway 15 Approach Visibility Minimums	1 mile	1 mile	1 mile	1 mile
Runway 33 Approach Visibility Minimums	¾ mile	¾ mile	¾ mile	1 mile

Note: Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.

Project		Runway 15-33 Extension and Repaving			
Phase		Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Runway 15 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	7,820	7,320	7,820	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 33 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	8,320	6,820	8,320	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 15 Approach Procedures		LOC only	LOC only	LOC only	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 33 Approach Procedures		ILS	ILS	ILS	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 15 NAVAIDs		LOC	LOC	LOC	LOC
Runway 33 NAVAIDs		ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR
Taxiway G ADG		IV	III	IV	IV
Taxiway G TDG		4	4	4	4
ATCT (hours open)		24 hours	24 hours	24 hours	0500 - 2000
ARFF Index		D	D	D	D

Project	Runway 15-33 Extension and Repaving			
Phase	**Normal (Existing)**	**Phase I: Extend Runway 15 End**	**Phase II: Extend Runway 33 End**	**Phase III: Repave Runway**
Special Conditions	Air National Guard (ANG) military operations	All military aircraft relocated to alternate ANG Base	Some large military aircraft relocated to alternate ANG Base	All military aircraft relocated to alternate ANG Base
Information for NOTAMs		Refer above for applicable declared distances. Taxiway G limited to 118 ft wingspan	Refer above for applicable declared distances.	Refer above for applicable declared distances. Airport closed 2000 – 0500. Runway 15 glide slope OTS.

Note: This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

Table E-2. Runway and Taxiway Edge Protection

Runway/Taxiway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	Safety Area Width in Feet Divided by 2*

*See AC 150/5300-13 to complete the chart for a specific runway/taxiway.

Complete the following chart for each phase to determine the area that must be protected before the runway threshold:

Table E-3. Protection Prior to Runway Threshold

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Distance to Threshold Based on Required Approach Slope*	
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1

*See AC 150/5300-13 to complete the chart for a specific runway.

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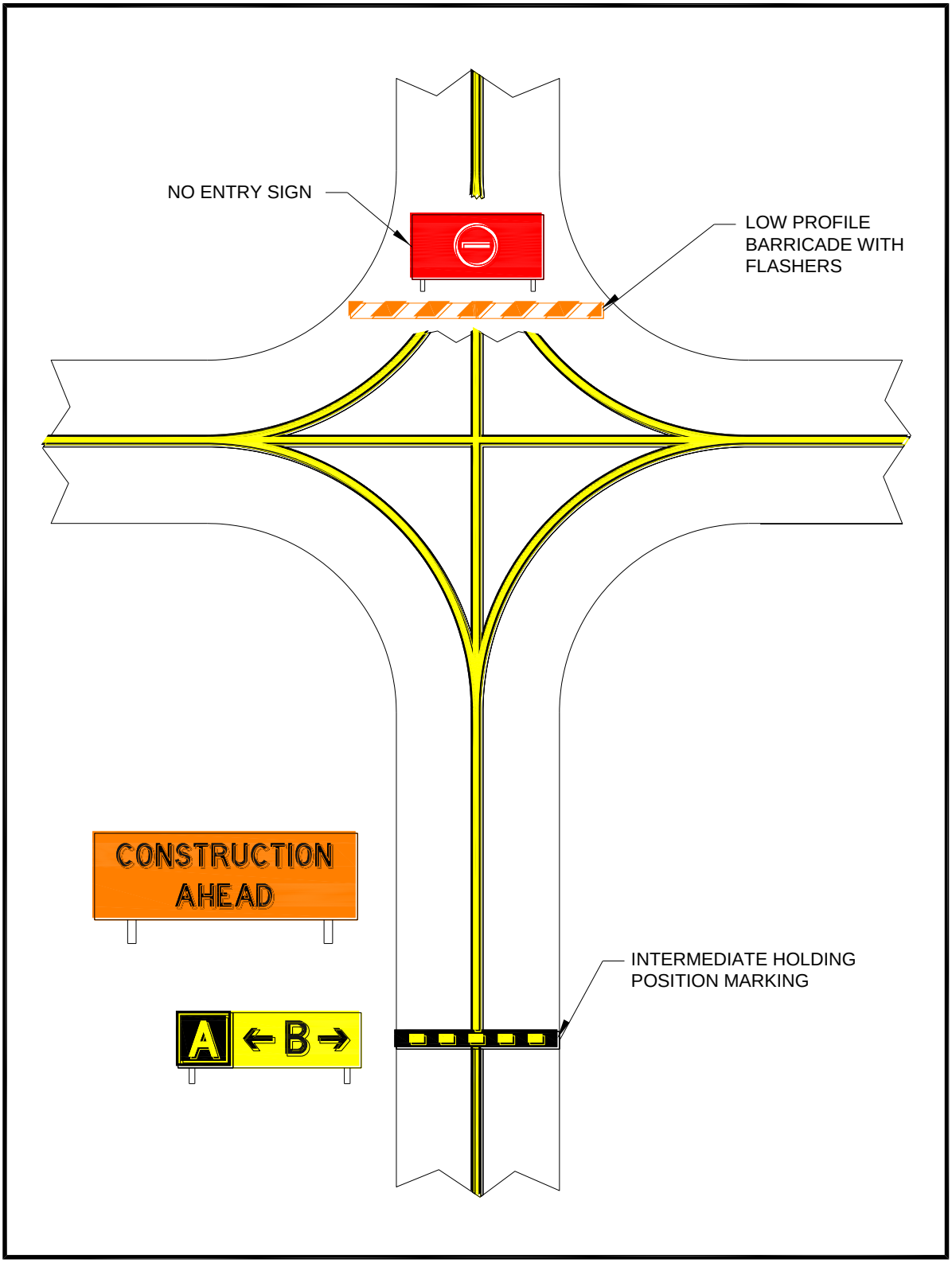
APPENDIX F. ORANGE CONSTRUCTION SIGNS

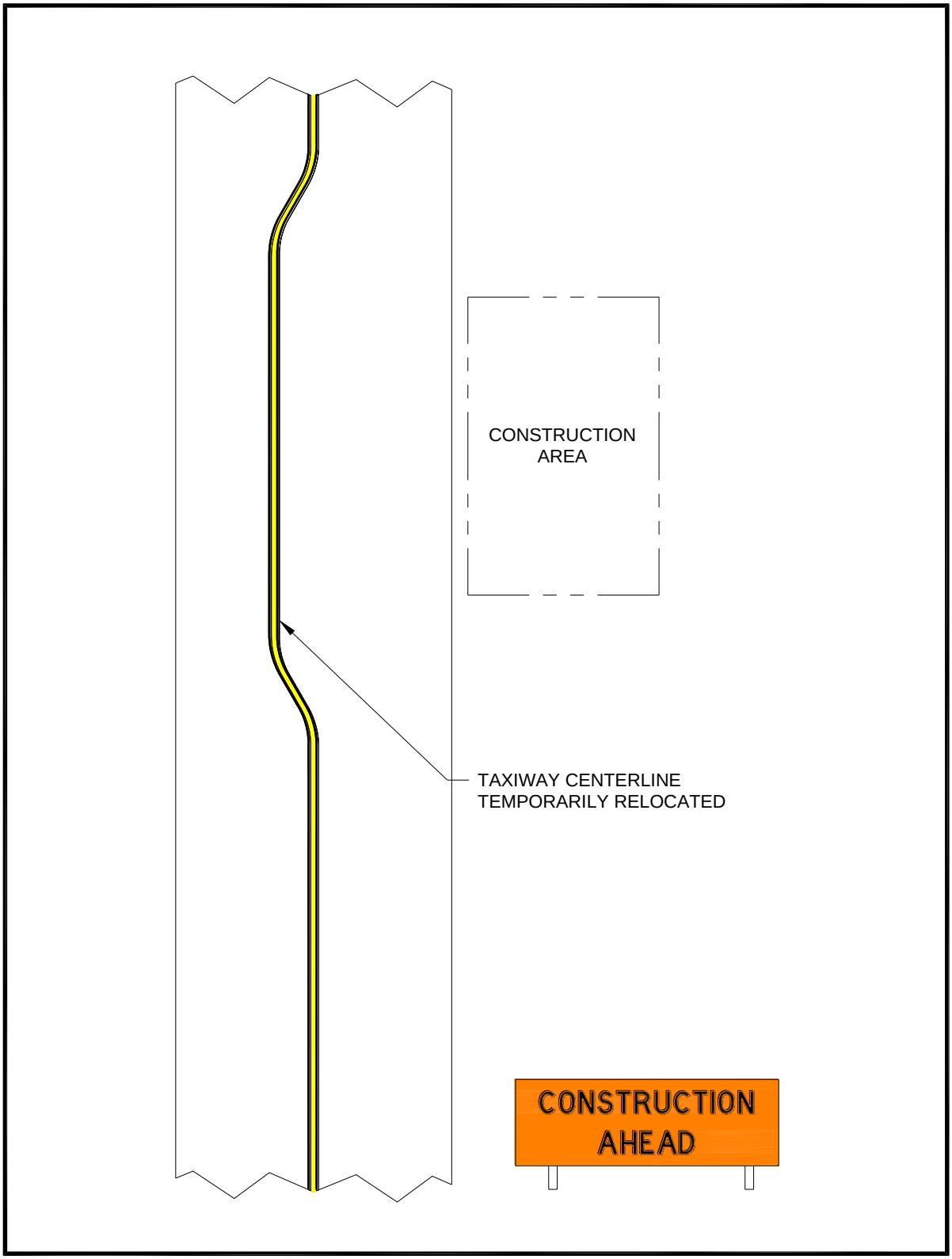
Figure F-1. Approved Sign Legends

Figure F-2. Orange Construction Sign Example 1



Note: For proper placement of signs, refer to EB 93.

Figure F-3. Orange Construction Sign Example 2



Note: For proper placement of signs, refer to EB 93.

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Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Engineering Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5370-2G Date: _____

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

_____
_____
_____

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

_____
_____
_____

☐ Other comments:

_____
_____
_____

☐ I would like to discuss the above. Please contact me at (phone number, email address).

_____

Submitted by: _____ Date: _____

U.S. Department of Transportation

Federal Aviation Administration

Advisory Circular

Subject: OFF-PEAK CONSTRUCTION OF AIRPORT PAVEMENTS USING HOT-MIX ASPHALT

Date: 9/29/2006 **AC No.:** 150/5370-13A

Initiated by: AAS-100 **Change:**

1. PURPOSE. This advisory circular (AC) provides guidance for the planning, coordination, management, design, testing, inspection, and execution of off-peak construction of airport pavements using hot-mix asphalt (HMA) paving materials. This circular focuses on HMA airfield pavement construction. The material contained herein also applies to other types of airfield improvements where off-peak construction is identified as the preferred delivery method.

2. EFFECTIVE DATE. The effective date is September 29, 2006.

3. CANCELLATION. AC 150/5370-13, *Offpeak Construction of Airport Pavements Using Hot-Mix Asphalt*, dated August 27, 1990, is canceled.

4. SELECTED READING MATERIAL. Appendix A lists publications that contain additional information on the subject matter.

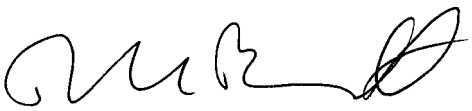
5. APPLICATION. The guidelines contained herein are recommended by the Federal Aviation Administration (FAA) for applications at airports where closure of a pavement would create significant adverse impacts.

6. METRIC UNITS. To promote an orderly transition to metric units, the text and figures include both English and metric dimensions. The metric conversions are based on operational significance and may not be exact equivalents. Until there is an official changeover to the metric system, the English dimensions should be used.

7. COMMENTS OR SUGGESTIONS for improvements to this AC should be sent to:

Manager, Airport Engineering Division
Federal Aviation Administration
ATTN: AAS-100
800 Independence Avenue, S.W.
Washington, DC 20591

8. COPIES OF THIS AC. The Office of Airport Safety and Standards is in the process of making ACs available to the public through the Internet. These ACs may be accessed through the FAA home page (www.faa.gov). A printed copy of this AC and other ACs can be ordered from the U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.



DAVID L. BENNETT
Director of Airport Safety and Standards

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Figure 8. Core Drilling Above In-pavement Light Base (NOTE: *Drilling Rig is Plumb*) 33

SECTION 1. BACKGROUND

1. JUSTIFICATION. As airport traffic increases and additional airport capacity becomes scarce, airport construction activities can cause severe disruptions to airport operations and contribute to flight delays, cancellations, and missed connections that are inconvenient to passengers, result in loss of schedule integrity, and are costly to aircraft operators. In addition to allowing aircraft operators to maintain scheduled air service to the community, paving airside pavements during off-peak periods may be an effective way to maintain airport construction schedules without loss of revenues, inconvenience to passengers or excessive air traffic system delays.

2. PURPOSE. Techniques for paving during off-peak periods have been applied successfully at airports throughout the United States for many years. This advisory circular describes the techniques that are available and the procedures that should be followed in the execution of off-peak construction projects in order to ensure safety, provide quality construction, and avoid excessive air traffic delays. Section 7, Operational Safety Procedures, provides further emphasis on the importance of safety during off-peak construction.

3. OFF-PEAK TIMES. In most cases, off-peak refers to the nighttime hours between 9:00 p.m. and 7:00 a.m. when scheduled passenger flight air service is at the lowest. Off-peak may also include particular days of low activity or periods of low usage through a continuous weekend period; for example, from 10:00 pm Friday until 2:00 p.m. Sunday. At some airports, such as those serving resort areas, off-peak may refer to particular seasons of the year; for example, Spring or Fall. Scheduling work periods of at least 8½ hours is recommended; however, shorter work periods may be acceptable at locations where 8½ or more hours is difficult to attain.

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SECTION 2. PROJECT PLANNING

4. POTENTIAL. The potential for off-peak paving should be identified early in the project planning stage and discussed in the predesign conference (see AC 150/5300-9, *Predesign, Prebid and Preconstruction Conferences for Airport Grant Projects*). After the need for a particular airport improvement has been identified, it should be determined if that project will necessitate the closing of any airside pavements. Pavements should be identified which, if closed, may cause disruption to the flow of air traffic at the facility. Pavements closed to accommodate construction activities should be fully addressed in the phasing plans of the project documents. Construction phasing plans should specifically identify alternate taxi routes for aircraft as well as service and construction vehicle routes. Alternate routes should be fully coordinated with airport operations, air traffic control, aircraft operators, and fixed base operators.

5. FEASIBILITY. If the project will involve the closing of critical airside pavements, it should be determined if it is advisable to construct the project during off-peak periods. The first step should be to identify the off-peak hours associated with the facility in question. For example, the off-peak period for a primary runway may be during the nighttime hours between 10:00 p.m. and 7:00 a.m. However, the off-peak period associated with a taxiway leading to an air cargo ramp may be during the daytime or normal airport operating hours.

6. STAGING. It is often possible to stage the project so that some elements may be accomplished during normal working hours, while other elements may be completed during off-peak periods. For example, a taxiway that crosses an active runway may be resurfaced during normal working hours if alternative taxi routes are available. However, the portions of the taxiway which abut or intersect the runway and would involve closing the runway to aircraft operations may be good candidates for completion during off-peak hours. In addition, work can be accomplished when wind or other weather conditions prevent aeronautical use of sections of airside pavements.

7. CONSIDERATIONS. The major factors that influence the decision to perform construction during off-peak hours should be identified and, if possible, quantified. These factors should include those listed below:

a. Cost of Off-peak Construction. In most cases the standard unit price items, e.g., cost/ton of hot-mix asphalt etc., will increase for off-peak construction to account for nighttime and weekend work periods outside the normal working hours. As described in paragraphs 18a and 20a, additional inspectors and standby equipment may be required, thus increasing the project cost. Nighttime construction requires portable lighting units, supplemental equipment lighting and night shift pay differentials for construction personnel which will also increase the project cost. In addition, the availability of a nighttime testing laboratory facility and personnel may increase costs.

b. Cost of Aircraft Delays. The cost of delayed or canceled flights can be very expensive and, therefore, may be the most important factor in determining whether to accomplish the construction during off-peak periods. This is particularly true of paving projects requiring the

closure of a runway, taxiway, or aircraft parking area. In such instances, the use of off-peak construction should be considered. Delayed flights, particularly arrivals, incur additional costs for operating the aircraft for the period of the delay. Extended periods of reduced flight schedules and canceled flights by aircraft operators as well as the reduction in passenger volume all account for lost revenues to the airport. When considering off-peak construction periods, the impact to the airport, aircraft operators, aircraft support services, and passenger support services should all be evaluated. Such impacts should be quantified and presented to all parties prior to commencement of construction to determine whether off-peak is feasible.

c. Quality of Construction. No additional material acceptance testing is required for off-peak construction projects. The laboratory acceptance testing should be performed at the specified intervals during each work period and field samples obtained from the work area prior to reopening for operations, when practical. The results of all available testing should be reviewed before the next work period begins. This condensed work schedule may require additional personnel to ensure that the tests are performed correctly and on time and to ensure that the construction is of acceptable quality. More detailed construction monitoring is recommended, particularly for construction performed during the hours of darkness. More detailed field monitoring, rapid acceptance testing, and the need to reopen the pavement for traffic at early ages will likely require an accelerated testing delivery schedule. Field sampling for acceptance testing may require previously constructed work areas to be closed during the next work period while obtaining samples.

d. Disruption to Specialized Operators. Construction during off-peak hours can be accomplished with minimal disruption to normal airport operations with few exceptions. Some specialized carriers operate primarily outside the normal operating hours for the airport. For example, air cargo aircraft usually operate at night or during the early morning when other airport operations are typically at a very low level. While an air cargo carrier's operation may be a very small portion of the airport's total operation, that airport could be a major revenue-generating point for that particular carrier. The nature and extent of these operations will vary from airport to airport, as will the procedures to accomplish the construction without negatively impacting the services of a specialized operator. In these cases, it is particularly important to discuss the proposed construction with the aircraft operators well in advance in order to minimize potential impacts and to develop mutually agreeable strategies, procedures, schedules, and financial arrangements.

8. COORDINATION. A coordination framework for the project should be prepared by the airport operator which includes planning, design, and construction phases. This framework should specify the individual organizations having interests in the project, which factors or events will be important to each group, and the time frame for involvement. Specific coordination procedures and organizations to be included are detailed in paragraph 10.

9. COST ESTIMATES. Cost estimates must be developed in sufficient detail to give an accurate indication of the finances necessary to accomplish the project. Estimates should specify all special pay items in order to maintain flexibility in project scheduling and to avoid unnecessarily inflated prices.

SECTION 3. COORDINATION

10. BACKGROUND. Off-peak construction projects involving hot-mix asphalt (HMA) pavements within aircraft operational areas are highly visible and have the potential to cause aircraft delays. Therefore, close coordination with all elements of the airport is essential throughout the planning, design, and construction phases. Figure 1 shows the organizations that should participate in the coordination of off-peak construction projects. As soon as an airfield paving project has been identified by the airport operator, the operator should meet with airport users and the FAA to discuss the manner in which the project will be implemented. Personnel representing the groups and organizations identified in Figure 1 should attend all planning and coordination meetings. Special coordination consideration must be given to those airports that do not have an Air Traffic Control Tower (ATCT) or that have limited ATCT hours.

a. Airport Operator. The airport operator should be represented by the operator's project manager as well as in-house representatives of the planning, engineering, operations, security, and maintenance sections. If the airport operator has retained the services of outside design consultants and construction management firms to oversee the project, the respective managers and field personnel should also attend all meetings related to the project.

b. Airport Users. Airport users that operate in the areas affected by the project, either regularly or on an occasional basis, should actively participate in the project coordination process. Airlines should be represented by the airport technical committee, the Air Transport Association Regional Office, and the station managers. Air cargo facilities managers, fixed-base operators (FBOs) and other users of airside facilities such as fuel suppliers, flight catering services, and pilot organizations should also be represented.

c. FAA. The FAA should be involved in the coordination process through representatives of the local ATCT, National Airspace System Implementation Program Office (ANI), the airports district office, the flight standards district office, and the airway facilities division. The airport operator should also maintain close coordination with the FAA regional airport certification inspector through the airport's district office.

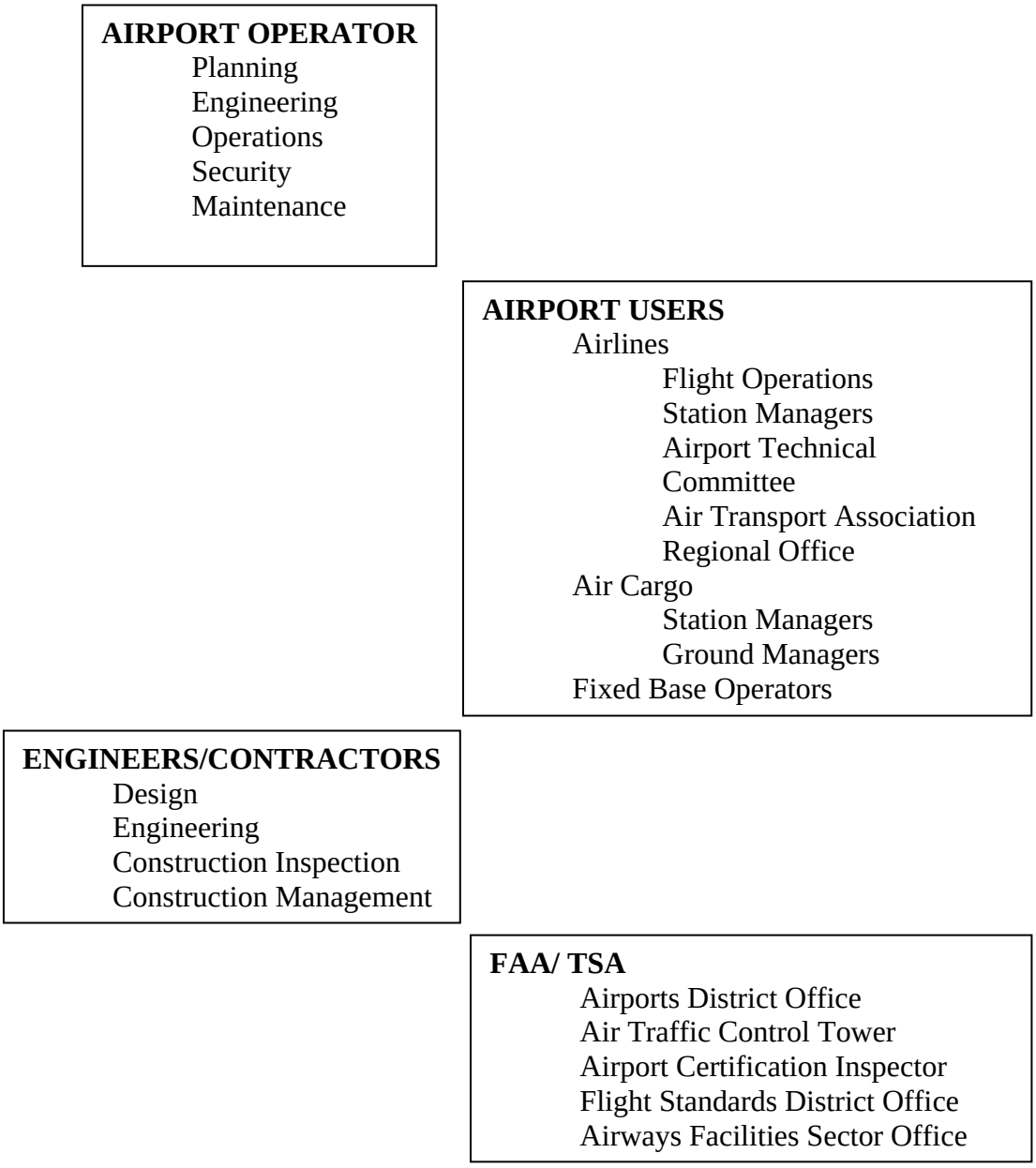

Figure 1. Coordination - Participating Organizations

11. INITIAL COORDINATION. The initial coordination meeting in the project planning phase should identify the coordination framework and process for the entire project and set forth the ground rules under which the project will be accomplished. The meeting agenda should include the following items:

a. Construction Work Periods. Off-peak working hours and extended daily or weekly work periods should be identified as soon as possible in the planning process. Since time is a critical factor in off-peak construction, the contractor should be given as much time as possible for HMA paving operations during each work period. A minimum of 8½ hours is recommended for efficiency during construction. The work should be scheduled during a time period that will

displace the least number of scheduled flights. A specific work period timeframe and extended length work period timeframes should be identified, based on input from all participating organizations, as soon as possible in the planning phase. Work periods should be selected and agreed upon early enough to allow airlines to adjust their flight schedules as required for the project's scheduled construction period. Runways and other airside pavements crucial to maintaining aircraft operations should be opened and closed at the agreed upon times without exception. Airline flight schedules and the contractor's work schedules are predicated upon the availability of the affected airport pavements at the designated times.

b. Operational Criteria. Mutually agreeable operational criteria for each critical phase or sub-phase should be developed for those factors and procedures that will be in use during the construction process. These items include, but are not necessarily limited to, those listed below:

(1) Issuance of Notices to Airmen (NOTAMs) and advisories.

(2) Aircraft operations, performance, and taxi routes.

(3) Navigation aids and visual landing aids.

(4) Truck haul routes and airfield access security requirements.

(5) Testing, inspection, access, protocol, and procedures.

(6) Requirements and safety inspections for reopening areas for operational use.

(7) Designation of equipment staging area(s).

(8) Placement and removal of construction safety barricades and runway closure markers.

(9) Designation of secure storage site for construction materials.

(10) Temporary airfield pavement marking, signing, and lighting.

(11) Days of the week and detailed scheduled timeframe upon which construction will take place.

(12) Proper vehicle identification, security clearances, and airfield maneuvering (e.g. lights, flags, when radio equipped escorts are needed, etc.).

(13) Contingency plans for construction interruptions due to equipment breakdowns or weather events. Large operations may require standby paving equipment for key areas like intersections.

(14) Emergency pavement reopening plan.

(15) Temporary parking and service plan for aircraft during scheduled pavement closures.

(16) Detailed contractor safety plan.

c. Communication. Lines of communication (see checklists below) should be established by the airport operator to maintain coordination and control of pavement closures and reopenings through all phases of the project. Proper communication procedures will ensure that the necessary organizations and individuals will be kept informed of the project schedule and will provide necessary input at critical points throughout the project. It is particularly important to establish methods and lines of communication for determining if the project work area is available to start work at the beginning of each work period and if the work area is in acceptable condition prior to its reopening for aircraft operations.

Pavement Closure Communication Checklist:

Contractor Superintendent	**Resident Engineer**	**Airport Operator Project/Operations Manager**
Request Pavement	Confirm Contractor's work time, area, & safety measures	Notify ATCT
Closure time & work annex to Resident Engineer	Request Pavement closure from Project/Operations Manager	Issue NOTAMs
		Confirm closure with ATCT
		Notify Resident Engineer & Contractor to proceed with closure

Pavement Reopening Communication Checklist:

Contractor Superintendent	**Resident Engineer**	**Project/Operations Manager**
Request Reopening	Inspect work area	Inspect work area
	Request reopening to Project/Operations Manager	Notify ATCT, Resident Engineer, & Contractor
		Reopen pavement

d. Special Considerations. Particular aspects of construction that will require special coordination or communication procedures should be identified. These items are discussed in sections 5 and 7 and include pavement transitions and runway closings.

SECTION 4. PROJECT MANAGEMENT

12. PROJECT MANAGER. The airport operator must select a qualified project manager(s) to oversee all phases of the project, from planning through final inspection of the completed work. The individual(s) selected should be experienced in the design and management of airfield pavement construction projects as well as HMA placement during off-peak hours. The individual should also be familiar with the airport operations, airport security requirements, aircraft operator schedules, and overall airport layout. The project manager should be the final authority on all technical aspects of the project and must be responsible for coordination with airport operations. All contact with the airport operator, the weather service, or the FAA should be made through the project manager or designated representative (i.e., resident engineer) to ensure continuity and proper coordination with all elements of the operation of the airport. Any changes resulting from discussions with the airport operator, airport security, the weather service, or the FAA should be processed through the project manager to maintain continuity and coordination. All such communications should be documented in writing by the project manager. The project manager's specific responsibilities are detailed below:

a. Planning and Design.

(1) Establish clear and concise lines of communication.

(2) Participate as a member of the selection team for the design engineer, if allowed by local policy.

(3) Monitor and review the project design to ensure that it meets budget constraints.

(4) Coordinate the design review with other elements of the airport operator, the airlines, the Air Transport Association Regional Office, Transportation Security Administration (TSA), and the FAA, including designated working hours, aircraft and operational requirements, technical reviews, and establishment of coordination procedures.

(5) Chair all meetings pertaining to the project.

b. Construction.

(1) Have the ATCT manager brief construction personnel on basic ATCT procedures for the facility, proper communications with ATCT, hazards of jet blast, familiarization with the airport layout, and avoidance of runway incursions.

(2) Manage the overall construction effort with an adequate number of qualified resident engineers and inspectors to observe and document the work done by the contractor.

(3) Contact the weather service, airport operations, the air traffic control tower, local Airway Facilities sector office, airport operators, and field maintenance personnel prior to starting the next off-peak construction work shift, and confer with the contractor's project superintendent to verify that weather and air traffic conditions will allow work to proceed as scheduled.

(4) Confer with the contractor's project superintendent daily and agree on the limits of construction scheduled for the next work period to ensure that the selected work areas will be reopened to aircraft operations at the specified time for pavement reopening. This is especially important in situations where pavement repair and replacement are to take place.

(5) Participate in post-construction inspections of the work areas prior to reopening for aircraft operations. Figure 2 shows a sample checklist to aid the project manager in participating in the inspection.

13. CONSTRUCTION MANAGER. Some airport operators may choose to retain the services of a construction management firm to oversee the accomplishment of the construction project. If the construction management firm is to assume the full responsibility for the management of the project, the firm's project manager should be responsible for those items detailed in paragraphs 12a and 12b and be familiar with the operating procedures of the airport. A division of responsibilities between the project managers for the construction management firm and the airport operator should be clear-cut and understood by all parties throughout all phases of the project. A division of responsibility between project managers is not recommended in the construction phase. In any case, the construction manager should be involved in the project as soon as possible before the construction phase begins.

14. RESIDENT ENGINEER. A resident engineer, preferably a civil engineer or senior construction inspection professional, with experience working within an airport environment, should be designated to assist the project manager during the construction phases of the project. The resident engineer may be a member of the airport operator, the design engineering firm, or the construction management firm, but in any case should report directly to the project manager. In order to be of maximum benefit to the project, the resident engineer should be responsible for the items listed below:

a. Prepare documentation for all quantities constructed during each work period.

b. Ensure that all tests are performed and results obtained from each work period.

c. Schedule the inspections and surveys that must be performed during each work period.

d. Observe compliance with contract specifications and report any discrepancies to the project manager and the contractor.

e. Maintain a construction diary and prepare daily inspection reports.

f. Facilitate communication between the contractor, airport operations, affected airlines or FBOs, control tower, quality assurance testing personnel, and the project manager.

ITEM	COMPLETED	REMARKS
1. Have all paving and rolling operations planned for the work period been completed?		
2. Are all transition ramps properly constructed and safe for aircraft operations?		
3. Have all field quality assurance tests been conducted for the work period?		
4. Have all temporary markings been applied to all appropriate newly paved surfaces?		
5. Have all lighting units, construction equipment, and safety devices been removed to a remote storage location?		
6. Have all construction materials that are to remain on site been properly secured from dislodgement by wind or jet blast?		
7. Have all excavations been properly backfilled, plated, or appropriately marked for safe aircraft operations?		
8. Has all construction debris been cleaned up and removed from the airport's construction site, access pavements, and haul routes? Has any necessary pavement sweeping been completed?		
9. Have all obstruction lights and barricades been removed from areas that are to be opened to aircraft operations?		
10. Has all lighting and/or temporary lighting been returned to service and tested?		
11. Have all visual aids been returned to service and tested?		
12. Have proper NOTAMs been issued for the runway/taxiway/apron operating conditions?		
13. Have all pavement "lips" greater than 3 inches (75mm) in height been removed?		
14. Has the hot-mix asphalt cooled enough to be opened to aircraft operations?		

Figure 2. Inspection Checklist

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SECTION 5. DESIGN CONSIDERATIONS

15. PLANS AND SPECIFICATIONS. Plans and specifications for pavement repair and overlay during off-peak periods should be presented in sufficient detail to allow ready and accurate determination of the limits of pavement repair, finish grades (in accordance with standards in AC 150/5300-13, *Airport Design*) and depths of overlay. They should be used by the contractor and the inspectors for each work period and should, therefore, be clear and precise in every detail.

16. PAVEMENT SURVEY. Accurate surveys and proper grade control are critical to the successful accomplishment of a quality off-peak paving job, particularly if the paving is done during the hours of darkness. Survey control should be established and maintained in areas that are accessible and that will not be disturbed during construction activities. The following factors should be used as a guide to surveying for off-peak paving projects:

a. Cross-sectioning. A complete system of benchmarks should be set on the side of the runway, taxiway, or apron area to permit a ready reference during cross-sectioning operations. The benchmarks should be set at approximately 400-foot (120M) intervals. Pavement cross-sectioning should be performed, at a minimum, on a 25 feet (7.5M) grid system both longitudinally and transversely. All breakpoints (high, low, and crown) should be added to the grid system to supplement the survey. Where paving lane widths are less than 25 feet (7.5M), the transverse grid component layout should be adjusted relative to the width of the proposed paving lane.

b. Elevations. Extreme care should be exercised in level operations because the elevations will be used in determining the depth of the HMA pavement for meeting design grades. The design engineer should not use grade information from previous as-built drawings or surveys that were performed during potential frost conditions because these elevations will vary seasonally. This is particularly critical for single-lift HMA overlays where pavement depths are varied by design.

c. Grades. After the design finish grades, transverse slopes and break points of the pavement are determined, a tabulation of grades and a finish grade grid should be included in the plans the contractors use in preparing bids for the project. The finish grade grid system will be used for the establishment of the erected stringline during the paving operations. The tabulation of grades should include the existing pavement elevations, design finish grades, depth of pavement millings (if required) and depth of overlay. Grades should be shown longitudinally every 25 feet (7.5M) and transversely every 12.5 feet (3.75M) on a grid system with all break points included. This level of topographic survey information is considered essential in the preparation of plans which are sufficiently accurate for contracting for off-peak construction services.

17. SPECIAL DETAILS. Details pertaining to the following items should be included in the plans for the project.

a. Transition Ramps. At the end of each work period, it will be necessary to provide a transition ramp from the completed course of an HMA overlay to the existing pavement. The construction of this ramp is one of the most important tasks in each work period. Details on transition ramp construction techniques are presented in paragraph 36.

b. In-Pavement Lighting. If the paving project involves in-pavement lighting fixtures, the plans should depict the removal and reinstallation of the fixtures in detail. Construction techniques for in-pavement lighting are discussed in paragraph 37.

c. Temporary Pavement Markings. During the course of off-peak construction projects, temporary pavement markings are often required to allow for aircraft operations between work periods. During the design phase of the project, the designer should coordinate with the project manager, airport operations, airport users and the FAA Airports project manager to determine minimum temporary markings. The FAA Airports project manager should, in turn, coordinate with the appropriate FAA Flight Standards Office and disseminate his findings to all parties. Where possible, the temporary markings on finish grade pavements should be placed to mirror the dimensions of the final markings. Further details on temporary markings are presented in paragraph 38.

d. Skid Resistance. If a special skid resistant surface or grooving is required, the guidance published in AC 150/5320-12, *Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces*, should be used to ensure adequate aircraft braking action. Grooving should not be used until the pavement has cured for 30 days, per the guidance provided in AC 150/5320-12.

18. SPECIFICATIONS. In addition to the typical specifications required for any pavement project, the following items should be included in the specifications for off-peak paving projects:

a. Standby Equipment.

(1) Construction Equipment. When operationally critical pavements are involved, the contract should require the contractor to maintain standby equipment at the construction site for all construction work performed during off-peak periods. The specific type and amount of equipment should be that which is necessary to complete the work planned for that work period should any piece of equipment break down. This includes equipment such as paving machines, milling machines, rollers, trenching machines, core drills, backhoes, graders, tack trucks, and any equipment necessary to remove disabled equipment. In addition, standby cleanup equipment such as sweepers, brooms, etc., should be available to ensure timely reopening of the pavement at the end of the work period. Standby equipment may be used for construction to improve productivity, but the contractor should be required to properly repair or replace any broken equipment before being allowed to proceed with the next work period. Standby equipment should be listed on the daily equipment log which is usually required by the contract's specifications. To minimize the chances of equipment failure, the contractor should be required to furnish proof that the equipment has been well maintained and is in good working condition. In addition, if at all possible, the

contractor should be required to prearrange for alternate equivalent equipment to permit completion of the project in a timely fashion in the event of a major breakdown.

(2) Asphalt Plant. Provision should also be made for a standby asphalt production plant or for sufficient hot storage bins to provide enough material to reopen the construction work area to aircraft operations should the primary plant break down. While it is preferred that the standby plant be capable of producing HMA that meets the project specifications for FAA asphalt mix (P-401), it is often impractical and cost prohibitive to do so on short notice when the pavement must be reopened for use. In these instances the emergency use of HMA meeting state requirements is acceptable for use in the event of a primary plant breakdown and to allow the affected work area to be reopened. Once the primary plant problem is resolved, the state HMA must be removed and the area repaved with material as specified in the contract documents. The project manager and the contractor must agree prior to construction commencement on the exact HMA state mix that will be allowed in the case of an emergency.

b. Obstruction Lighting and Barricades. Drawings and specifications applicable to the work should show the details of the construction-related obstruction lighting and safety barricades to be used. The types of construction lights and barricades to be used and the procedures for marking construction areas should be consistent with AC 150/5370-2, *Operational Safety on Airports During Construction*. Some airports have used portable self-contained elevated tower-style lighted X's to indicate closure of runways at night, and during reduced visibility conditions for daytime off-peak construction.

c. Construction Lighting.

(1) Construction Area. Lighting equipment must be sufficient to adequately illuminate the work area in order to ensure a quality HMA overlay if the construction is to be performed during nighttime hours. Additionally, it is recommended that all paving machines, rollers, milling machines, distributor trucks, and other support equipment, except haul trucks, be equipped with artificial illumination to safely illuminate the area immediately surrounding their work areas. The lights should be positioned to provide the most natural color illumination and contrast with a minimum of shadows. The spacing for each individual project will have to be determined by trial. Light towers should be positioned and adjusted to aim away from ATCT cabs and active runways to prevent blinding effects. Lighting the pavement from both sides is considered preferable as lighting from only one side can result in objectionable shadows. Light towers should be removed from the construction site when the pavement is reopened to aircraft operations. Construction lighting units should be identified and generally located on the construction phasing plans in relationship to the ATCT and active runways and taxiways. A separate bid item for the number of portable light plants per day should be included in the bid schedule.

The project manager should strictly enforce lighting requirements because sufficient light is necessary to properly observe the placement and compaction of material, and thus ensure the satisfactory construction of overlays. Pay items should be established in the contract to ensure that the contractor is willing and able to provide adequate temporary construction lighting on a per-unit basis.

(2) Vehicular Lighting. All construction vehicles and equipment should be properly marked with flashing amber lights in accordance with AC 150/5370-2, *Operational Safety on Airports During Construction*. Flags may be used to supplement vehicle markings also in accordance with the circular. Additionally, all paving machines, rollers, milling machines distributor trucks, and other support equipment, except haul trucks, should be equipped with artificial illumination to safely illuminate the area immediately surrounding their work areas. Refer to Figure 3.

Figure 3. Pavement Spreader in Nighttime Construction

d. Special Pay Items. Special pay items or allowances pertaining to lost time experienced by the contractor due to wind/weather conditions, airline schedule requirements and other airport operational requirements or needs beyond the contractor's control should be established in the contract specifications. This will maintain maximum flexibility in the scheduling of work and will avoid unnecessarily inflated prices. By having these times defined as pay items, the

contractor will not have to anticipate in his bid, the full risk of such lost time by increasing other bid items to cover these delay-associated costs. One typical method for addressing these special pay items is to provide for owner-estimated dollar amount allowances in the bid schedule that all contractors will carry in their bids. The actual costs of lost time events would then be calculated on a time and materials basis as specified and paid out of the allowance amounts. These lost time pay items should include suspension time, standby time and down time, as described below:

(1) **Suspension Time.** The suspension of the entire work period, with advance notice of at least two hours prior to the scheduled start time.

(2) **Standby Time.** The time when a contractor's forces are mobilized for work and waiting to start. This condition may last for a maximum of two hours after the scheduled start time.

(3) **Down Time.** The period between the end of the standby time and normal quitting time.

e. Liquidated Damages. It is imperative that the runway, taxiway, and other airside pavements crucial to maintaining aircraft operations and schedule integrity be opened on time following the completion of each work period. Scheduled airlines and the air traffic control system usually have aircraft en route to coincide with the opening. If the opening is delayed, diversions and cancellations costing thousands of dollars may be incurred. One way of calling the contractor's attention to the importance of opening on time is to include a liquidated damage clause in the contract. The liquidated damage assessed should reflect the revenue lost and additional expenses incurred by the airport sponsor and aircraft operators when the pavement is not usable. Liquidated damages for hourly, daily, and total project completion are often used. The method used to calculate the amount of liquidated damages should be shown in the design report or other appropriate documents. At very busy airports, liquidated damages have been assessed in time increments as short as 15 minutes. It is important to keep in mind that the liquidated damages established for a project must be based on reasonable and realistic estimates of the costs incurred to the owner and the airport users as a result of contractor's failure to complete on time. In order to be fully enforceable, liquidated damages cannot be established in an arbitrary and capricious manner. The assessed liquidated damages should reflect and not exceed the lost revenue and additional expenses incurred due to unusable pavement. Limits to liquidated damage clauses may vary by political jurisdiction, but some sort of motivating pressure should be put on the contractor to open on time. Liquidated damages should be identified by the airport operator's construction representative project manager, construction manager, and resident engineer, and tracked accordingly whether hourly, daily, or total contract time. The airport's representative should notify the contractor's superintendent as soon as the scheduled opening time has not been met and that liquidated damages for delays to airport operations are in effect. The assessment of liquidated damages should be held for possible review until the project is complete.

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SECTION 6. TESTING AND INSPECTION

19. TESTING. Off-peak construction does not require any additional types of material testing other than that required under standard construction procedures and specifications. The major difference between off-peak construction and standard construction is that, usually, not all acceptance testing can be performed prior to reopening the area to aircraft operations. For example, cores for the determination of hot-mix asphalt density should not be taken until the pavement has cooled to ambient temperature. The field core samples required for density testing for a given work period may have to be taken during the following work period. Laboratory testing of HMA material may require additional personnel to perform the required number of tests during a reduced work period. Nuclear density tests, while not allowed as acceptance tests for FAA funded projects, can be valuable as immediate on-site density indicators to control and monitor rolling patterns and to help ensure that the specified density for acceptance testing is being achieved. These procedures may require additional personnel to ensure that the tests are performed correctly and on time.

20. INSPECTION. High quality inspection performed in a timely manner contributes significantly to the success of any paving project. The number of inspectors required for any given paving project will depend on a number of factors (project size, complexity, production rates, etc.). The resident engineer should be responsible for overall inspection and reporting. Adequate inspection can be achieved with (in addition to the project manager and the resident engineer) an asphalt plant inspector, with one or two helpers, for each plant, and one paving inspector, with an adequate number of helpers, at the paving site. The number of helpers required depends on several factors such as, number of paving machines, production rates, complexity of the project, etc. Areas requiring particular attention typically include: pavement milling; pavement repair inspection; HMA plant production and field laydown; electrical inspection; and surveying.

a. Asphalt Plant Inspector(s). The asphalt plant inspector(s) should be primarily responsible for sampling and testing of the HMA, as produced, to assure the product is within specifications. The asphalt plant inspector(s) must maintain records and prepare reports as required by the specifications. The inspector(s) should maintain open communications with the contractor's testing personnel as well as the resident engineer for any potential HMA or plant problems during the work period.

b. Paving Inspector(s). The paving inspector(s) should be primarily responsible for proper laydown of the HMA, as placed, to assure conformance with the specifications. The paving inspector(s) must maintain records and prepare reports as required by the specifications. The paving inspector should also calculate the random sampling locations for layout of core samples.

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SECTION 7. OPERATIONAL SAFETY PROCEDURES

21. GENERAL. Off-peak construction, or any construction, should never derogate the level of safety or security of aircraft operations or construction operations. In order to provide for safety and security during off-peak construction, the topics in this section are emphasized. Nighttime construction on a closed pavement system, when other areas of the airport are open, is inherently more dangerous than nighttime work.

22. SAFETY PLAN. A construction safety/phasing plan that addresses work area security, access, lighting, and barricades, and emergency contacts should be prepared to guide activities in the construction phase. Refer to paragraph 11b for additional requirements to cover in the safety plan. Once the safety plan is developed for construction, coordinate with the FAA's Airport District Office. A contingency plan should be prepared to address cases of abnormal failures or unexpected disasters. These plans should be updated weekly as the project schedule progresses. Refer to AC 150/5370-2, *Operational Safety on Airports During Construction*, for further guidance on safety related issues. Safety plans need to be adjusted as the project progresses. Weekly construction meetings need to be held to discuss how effective the plan is and what adjustments are needed to keep it realistic.

23. CONSTRUCTION ACTIVITIES.

a. NOTAMs. NOTAMs should be issued as early as possible advising users of any construction activity which will require the shutdown of airside pavements and/or navigational aids for more than 24 hours or in excess of 4 hours daily on consecutive days. NOTAMs should be prepared daily by the airport operator and issued by the airport operator to reflect current construction activities.

b. Safety Meetings. Regularly scheduled safety meetings should be held to discuss safety issues. Personnel should be reminded that nighttime and off-peak construction offers some unique safety concerns such as the need to lock out electrical switches to prevent accidentally or prematurely energizing electrical systems, the need to wear reflective vests and hats to increase visibility, etc. Safety meetings should address airfield environment awareness and stress the serious consequences of runway/taxiway incursions. Keeping contractor and subcontractor personnel up to date on the changing work areas and changing active airfield areas is critical.

c. Truck Haul Routes. Truck haul routes should be located to avoid the use of airside airport pavements (unless there is no cost-effective alternative), minimize hauling operations within aircraft operating areas, and to avoid truck traffic in close proximity to navigational aids. Truck haul routes should be clearly marked. The use of radio equipped escort vehicles to guide truck traffic to and from the work area is highly recommended.

d. Construction Lighting and Barricades. The contractor should be required to have sufficient construction lighting and barricades (as indicated in the construction safety/phasing plans and specifications) to block off any intersecting runways and taxiways and to delineate haul routes to the work site.

e. Staging Areas. To facilitate construction equipment, staging area(s) should be as close to the work site as possible in a location that will not interfere with aircraft operations or navigational aids. The staging area(s) should be fenced and secured where practicable.

f. Storage of Construction Materials. Storage of construction materials should be located within or near the equipment staging area(s), if practical. However, if this is not practical, stored material should be covered and located to preclude wind, jet blast, prop wash and/or rain from blowing or washing materials into aircraft operating areas. Stored materials should not encroach on aircraft operating areas or otherwise violate criteria in Title 14 Code of Federal Regulation (CFR) Part 77 *Objects Affecting Navigable Airspace,* or the airport hazard criteria contained in AC 150/5300-13, *Airport Design*, unless the location and heights of the stored material have been approved by an FAA airspace study.

24. POST-CONSTRUCTION INSPECTION. Prior to reopening pavements to aircraft operations, an inspection of the work area must be performed by the project manager. The project manager (or project manager's designated representative) should conduct an inspection of the work area with airport operations personnel and the project superintendent. The project manager should ensure that all construction materials have been secured, all pavement surfaces have been swept clean, all transition ramps have been properly constructed, and that surfaces have been appropriately marked for aircraft to operate safely [see paragraph 12b(5) and Figure 2]. Only if all items on the list meet with the airport operator and project manager's (or project manager's designated representative) approval should the air traffic control tower be notified to open the area to aircraft operations. The contractor's superintendent should be required to retain a suitable workforce and the necessary equipment at the work area for any last minute cleanup which may be requested by the airport's project manager prior to opening the pavement.

SECTION 8. CONSTRUCTION PRACTICES

25. PRECONSTRUCTION CONFERENCE. The requirements and procedures to be followed during the off-peak construction process should be set forth in detail and discussed with all parties involved in or affected by the construction at a preconstruction conference. The format, agenda and timing of preconstruction conferences are described in AC 150/5300-9, *Predesign, Prebid, and Preconstruction Conferences for Airport Grant Projects*. The overall purpose of these conferences is to ensure that all parties understand the construction procedures, as well as potential problems and possible solutions. The conference should be convened and conducted by the project manager as soon as practicable after the construction contract has been awarded and before the notice to proceed has been issued. The agenda should include items such as operational safety, testing, quality control, security, labor requirements and environmental factors. The items discussed below are particularly important and should be emphasized at preconstruction conferences for off-peak paving projects.

26. PROJECT SUBMITTALS. Prior to beginning work on the project, the contractor must be required to file the following items with the project manager for approval:

a. Progress Schedule. A detailed progress schedule showing the proposed schedule of work in the areas to be constructed each period.

b. Equipment and Personnel. A complete list of contractors, equipment, and personnel to be used, including standby equipment, as required by the specifications.

c. Asphalt Plant. Evidence that the hot-mix asphalt plant or plants meet the requirements of the specifications.

d. Quantity. Evidence that the amount of hot-mix asphalt that the contractor proposes to place each work period can be supplied to the construction site in the time required.

e. Project Superintendent. The experience record of the project superintendent that the contractor proposes to place in charge of the project. The experience record should list the superintendent's experience on hot-mix asphalt overlays, including nighttime or off-peak construction.

f. Safety/Phasing Plan. A detailed safety plan that addresses airfield security requirements, construction safety barricade locations, haul routes, etc. All safety plans must be coordinated with the FAA's Airports District Office and updated weekly as required in section 7, paragraph 22.

g. Other Requirements. Other requirements identified in the contract documents.

27. TESTING AND INSPECTION. It should be emphasized to the contractor that acceptance testing will take place each work period, and work will not be allowed to proceed in the next work period unless all tests have been reviewed, recorded, and approved. The daily inspection

reports should be made by the inspection team and testing laboratory. These reports should include the location and description of the work performed, the results of the inspections, and any comments on the specifications. Items considered to be critical are Marshall test results, in-place density results, pavement smoothness, and finished grade elevations.

a. Reporting Test Results. All laboratory test results, with the exception of field core densities, should be forwarded to the project manager as soon as practical during the work period. Open lines of communication from the laboratory to the field and back will allow for minor changes to be made at the plant to the HMA (if required) during production. These potential changes will promote a better quality product.

b. Reporting Field Cored Densities. The field cores for in-place density acceptance testing may have to be obtained during the following work period due to pavement temperatures or reopening times. The results of these tests may not be known over 24 hours.

28. CONSTRUCTION PROGRESS MEETINGS.

a. Daily. A daily progress meeting should be held between the project manager and the contractor's superintendent to discuss the work requirements for the next work period and to review the test results from the previous work period.

b. Weekly. A weekly progress meeting should be held with representatives of all elements of the airport and the airport user community. The agenda for this meeting should include the work schedule for the coming week, any operational problems that have been encountered or may be expected, and any other operational aspects of the project as necessary. The progress meeting should also address the updated safety/phasing plan with the associated changes for the following week.

29. WEATHER.

a. Permissible Weather Conditions. The project manager, the contractor, the local airway facilities sector office and field maintenance personnel, airport operations, and the air traffic control tower should establish procedures for determining the weather conditions under which work will not begin as scheduled or when work should be suspended due to inclement weather. It is particularly important to establish an adequate lead time for notifying the contractor if work is to be suspended for the period due to inclement weather.

b. Wind Conditions. Weather conditions that may affect construction include wind conditions, as well as precipitation and temperature. For example, a forecast of winds from a particular direction may preclude the use of a crosswind runway or other alternative. Off-peak construction during Instrument Flight Rule (IFR) conditions is not recommended because construction vehicles and markings may be difficult to see from the control tower as well as from an aircraft cockpit.

30. COMMUNICATION. It should be emphasized to the contractor that all communication with the air traffic control tower or any other element of the airport should be made through the project manager (or project manager's designated representative) or as agreed upon between the ATCT and the airport. This is important because the number of people having contact with the

various elements of the airport should be limited in order to prevent possible misunderstandings or conflicting information. The only exception should be radio-equipped escort vehicles controlling construction traffic through active airfield pavements or zones. The project manager should have direct contact with airport operations at all times. All requests for closing and/or opening the construction area to aircraft operations should be made only by the project manager (or the project manager's designated representative).

a. Radio Frequencies. On large paving projects, project managers, contractors, airport management, and security personnel must coordinate to ensure that the radio frequencies used for contact and control of day-to-day construction operations by radio do not conflict with existing frequencies used for air traffic, security, and emergency purposes. Airport communication requirements should be included in the contract documents and followed in their entirety over the life of the project.

31. SECURITY DURING CONSTRUCTION. In addition to the normal security requirements and operational procedures of the airport, all personnel and suppliers should be given a drawing showing haul routes, restricted areas, and any other details pertinent to the construction operation. The drawing should contain a notice that states that any unauthorized construction personnel found in restricted areas of the airport are subject to arrest for a punishable Federal offense and will be promptly and permanently removed from the job. At some airports, all vehicles are escorted to and from airside locations for safety and security reasons. Security requirements vary at individual airports and these requirements should be detailed in the project specifications.

32. ASSEMBLY OF EQUIPMENT. Prior to beginning work, the contractor should make certain that all equipment, including standby equipment, is in good operating condition and ready to begin work. After the project manager has checked with the weather service and airport operations, conferred with the contractor's superintendent, and agreed that work may proceed as scheduled, the contractor should assemble all personnel and equipment in the designated equipment staging area(s). All equipment must be fully operational and tested prior to mobilizing from the designated equipment staging area to the work site. Equipment and personnel should be organized so that they can proceed to the work area as soon as authorization is given. Also, all hot-mix plants should be operating and ready to produce the paving material when notified.

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SECTION 9. CONSTRUCTION TECHNIQUES

33. TEST SECTIONS. Prior to beginning full production of any pavement work on the project, a test strip should be placed, following the provisions of the P-401 specifications, to provide a trial run for all aspects of the paving operation as well as communications and acceptance testing. The test strip should be at least 150 feet (45M) long with a nominal thickness of two inches (50mm) and should include transition ramps, as detailed on the plans. The test strip should include pavement milling (to grade) if the project has profile milling and transverse passes for transitional ramps. The test strip paving operation should be set up to run on a reference line/laser for vertical control, and a reference line/laser and/or averaging device (ski) with design grades set.

NOTE: *Test strips for off-peak construction should be performed on "closed" pavement areas similar to existing construction conditions at the project work area, where it is not practical to close the actual work area for this limited amount of work.*

34. LIMITS OF OVERLAY OPERATIONS. When placing overlay pavement during off-peak periods, it is essential that the full width of the overlay be placed during each work period. Each work period should be as long as possible in order to limit the number of transverse joints for the entire project. When overlaying runways, the overlay operation should begin at one end of the runway and proceed in the primary direction of aircraft operations. The limits of HMA overlay may increase for each work shift once the project manager becomes comfortable with the capabilities of construction personnel and production rates.

35. PLACEMENT OF HOT-MIX ASPHALT.

a. Spreaders. The preferred method of placing hot-mix asphalt is to use 25-foot (7.5M) spreaders working in echelon. Paving spreaders of lesser widths may be used; however, wider spreaders will maximize the use of available time for paving and minimize paving joints. Spreaders working in echelon help to maintain a hot joint between adjacent paving lanes. The spreaders should start on the centerline and work their way outward in the sequence shown in Figure 4. It is important to overlay as much of the center portion of the runway as possible in the event that equipment failure or weather problems force the suspension of work. During the paving operation, the contractor should hold raking to a minimum and should be prohibited from casting raked material on the mat.

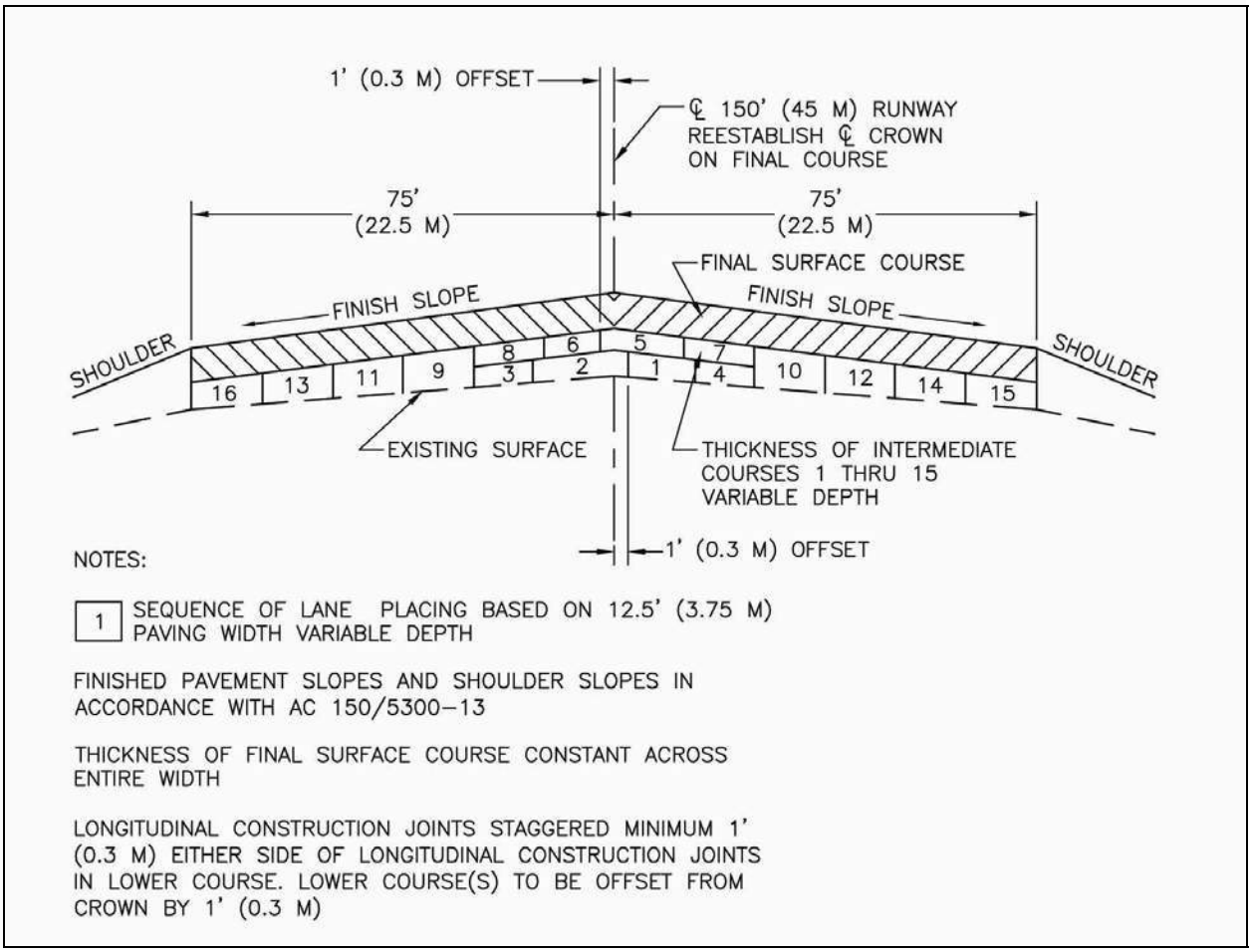

Figure 4. Typical Overlay Section – 150-foot (45M) Runway

b. Grade Control. If the runway is considered sufficiently smooth, the contractor may be permitted to place hot-mix asphalt using a traveling stringline. A slope control device should not be used under any circumstances because the cumulative error in multiple-lane paving may violate the grade control criteria. If the runway is not considered sufficiently smooth for the use of a traveling stringline, an erected stringline (Figure 5), digital control, Global Positioning System (GPS), or laser control should be required. In this case erected stringlines or laser controls should be used on both sides of the paver for the initial centerline pass. Subsequent passes may be controlled by a joint matcher on the newly overlaid side of the paver and laser control on the opposite side or a 30-foot (9M) averaging ski.

Figure 5. Setting an Erected Stringline

c. Opening to Traffic. The time required between the end of hot-mix asphalt placing and opening the pavement to aircraft traffic will vary depending on several factors. Asphalt placing can continue up to the time that will allow the newly placed surface to cool sufficiently to avoid rutting and the construction team, inspectors, and survey crew can complete their assigned tasks. These tasks include acceptance testing, pavement striping, cleaning up the construction area, and securing all materials which are to be left on the construction site. The potential for aircraft traffic to cause rutting of the newly placed mat is a function of the stability of the mix, which varies with temperature and asphalt content. As a general rule, aircraft traffic should not be allowed on the newly placed mat until it cools to 150°F (65.5°C) or lower. When it can be demonstrated that a specific HMA pavement material has shown that traffic will not adversely affect the pavement at higher temperatures, then higher pavement opening temperatures would be acceptable.

36. TRANSITION RAMPS.

a. Transverse Ramps. At the end of each work period a ramp should be constructed to provide a transition from the completed course of the overlay to the existing pavement. The construction of this transitional area is one of the most important tasks in the work period because a ramp that is too steep could cause structural damage to an operating aircraft or a malfunction of the aircraft's instruments. A ramp that is too long may result in raveling of the pavement and damage to aircraft engines if any of the loosened material is ingested. When practicable, it is recommended that the overlay proceed in the predominant direction of aircraft resulting in "down" transition ramps. This will further minimize the potential for damage to aircraft landing gear.

b. Multiple-lift Overlays. In multiple-lift overlays the transition ramps should not be constructed any closer than 500 feet (150M) to one another. The length of all longitudinal ramp slopes should be 15 feet (4.5M) for each inch (25mm) of depth of compacted overlay. Every effort should be made to pave the full width of the runway or taxiway during each work period. However, in cases where it is necessary to construct a transverse transition ramp, the ramp slope should be 5 feet (1.5M) in the transverse direction for each inch (25mm) of compacted overlay. Aircraft operations are sometimes allowed on very thin partial width overlays, such as porous friction course surfaces without transverse ramps. Abrupt drops of over 1 inch (25mm) should not be allowed on any airfield pavement where aircraft ground speeds may exceed 35 knots.

c. Construction Methods. Transition ramps are to be made with cold-planing equipment of suitable size for the work required.

d. Cold-planing Equipment. The most effective method of ramp construction is to use a cold-planing machine (Figure 6) to heel cut the pavement at the beginning and at the end of each work-period overlay. This method is shown in Figure 7. Millings and debris from cold-planing must be removed in their entirety before the application of tack coat or the placement of HMA pavements. When placing the final surface course of an overlay, the heel cut at the start of the second overlay period should be equal to the thickness of the overlay to ensure a smooth joint.

e. Other Requirements. Other requirements identified in the contract documents.

Figure 6. A Cold-Planer for Use in Removing Transition Ramp

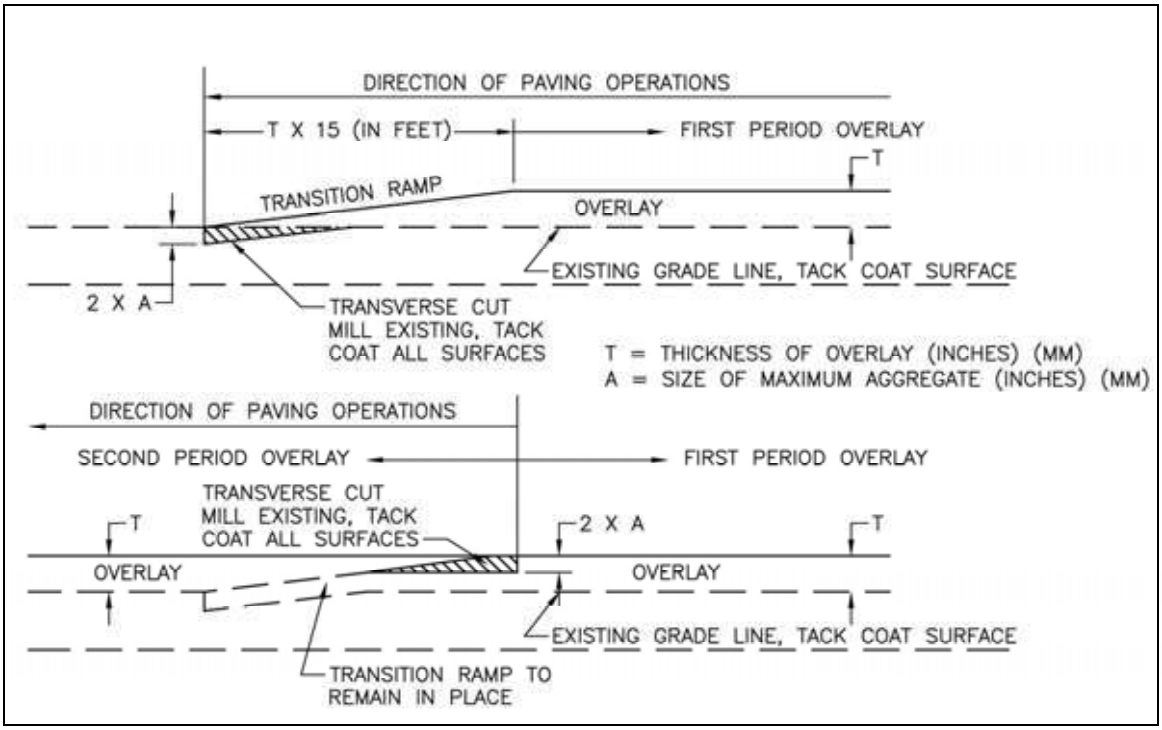

Figure 7. Transition Ramp Construction with Cold-Planing Equipment

37. IN-PAVEMENT LIGHTING. Details depicting the removal and reinstallation of in-pavement lighting should be included on the plans where applicable. The details should depict: removal of the light fixture and extension ring, placement of a target plate over the light base, filling the hole with hot-mix asphalt until overlay operations are complete, accurate survey location information, core drilling with a small (3-4 inch [75-100mm]) core to locate the center of the target plate, and final coring with an appropriate sized core machine (Figure 8). The light and new extension ring can then be installed to the proper elevation. When measuring and installing new extension rings after the overlay is in place, care should be taken to match each extension ring with the specific light fixture for which it was measured. Also, the compound used to seal around the light bases and to fill slots for conduits should be a type manufactured for that particular purpose and should be compatible with the hot-mix asphalt. For thin overlays, extension rings are sometimes added before overlaying. The removal and reinstallation process may require that certain lights be out of service for a period of time. The reinstallation process on overlays greater than 2 inches (50mm) requires lights to be cored to receive the extensions(s) and fixtures. Pavement overlay temperatures must be such that core holes do not distort. In-pavement lights should be installed in conformance with the manufacturers' written instructions and in conjunction with the contract documents. Details of in-pavement lighting installation should be specifically detailed and noted in the contract drawings and specifications.

38. PAVEMENT MARKING. Several different types of paint have been successfully used for temporary markings. However, water emulsion-based paint (Federal Specification TT-P-1952) is generally preferred over solvent-based paint (Federal Specification A-A-2886) due to the lower cost of the paint and lower effort and maintenance cost associated with cleanup. When applying temporary markings at night, it is recommended that the fast drying, Type II paint be used to help offset the higher humidity and cooler temperatures often experienced at night. Temporary markings are generally applied at 50% of the application rate recommended for permanent markings. Diluting the paint is not recommended. Dry time will be increased substantially if paint is diluted. Drop-on glass beads are not required for temporary markings. The decreased paint thickness of temporary markings results in proper embedment of only a portion of drop-on glass beads. If a marginal increase in conspicuity is necessary, the smallest gradation for glass bead conforming to Federal Specification TT-B-1325, Type I, is recommended. Loose beads on the pavement are considered construction debris and must be removed. Striated markings may also be used for certain temporary markings. AC 150/5340-1, *Standards for Airport Markings*, has additional guidance on temporary markings.

a. Pavement Curing. If possible, it is recommended that temporary markings on the final surface be left in place until final curing of the surface is achieved (usually 30 days). Allowing the final surface to cure will usually result in better appearance and adherence of the permanent markings.

b. Marking Tape. Pavement marking tape is not recommended for the temporary marking of paved surfaces. If the temperature of the mat is too high when the tape is put down, the tape may melt into the pavement and will be very difficult and time-consuming to remove prior to the application of the next course of the overlay. Also, if the tape does not adhere properly, it can be blown loose by jet blast and possibly be ingested by an aircraft engine.

Figure 8. Core Drilling Above In-pavement Light Base (NOTE: *Drilling Rig is Plumb*)

39. WORK AREA CLEANUP. Sufficient time should be provided at the end of each work period to allow for cleanup and inspection of the work area before it is opened to aircraft operations. All construction debris should be totally removed from the work area. Suction/brush type sweepers should be in operation during most of the work period to minimize final work area cleanup time. Rotary broom and blower type sweepers have been found effective in cleaning milled pavement surfaces. Where additional courses of pavement raise the surface of the pavement to the point where the runway shoulders deviate from the standards set forth in 14 CFR Part 139, and AC 150/5300-13, *Airport Design*, the contractor should restore the shoulders to the proper grade before the pavement is reopened to air traffic. All construction materials that must be temporarily left onsite should be transported to a designated materials staging area. All such materials must be secured so that they cannot be dislodged by wind or jet blast. The contractor's superintendent should accompany the project manager, resident engineer, and a representative from airport operations on an inspection of the work area before it is opened to traffic. The contractor should have the necessary manpower and equipment standing by to perform any additional cleanup that may be identified during this inspection. Active work areas should be periodically monitored by airport operations personnel to ensure the area remains free of all debris. It is not recommended that airport owners assist in the cleanup of construction materials and debris as a joint effort with the contractor. A clear delineation of roles and responsibilities during construction projects is in the best interest of all parties.

40. MILLED SURFACES. The construction process can be made more efficient by milling off a greater area of the pavement surface than will be overlaid during the work period. On occasion, aircraft operators and the airport owner (airport operations officer) may agree to permit operations on runways which have partially milled surfaces. Operations on partially milled surfaces are generally allowed when milling requirements have not been extensive. On certificated airports, the partially milled surface must not violate any of the pavement requirements set forth in 14 CFR Part 139. Generally, a maximum length of 700 feet (215M) of milled surface is acceptable. In addition, the milled surface must not be so deep or of such a geometry as to impair directional control of the aircraft. Transition joints must also be adjusted to meet the specific needs of the airport. Milled surfaces must be thoroughly cleaned of all dust and loose particles prior to opening for aircraft traffic.

SECTION 10. SUMMARY

41. GENERAL. Off-peak construction can be an effective way to maintain and improve airports while avoiding excessive aircraft delays. However, as described in the preceding paragraphs, certain factors must be considered and procedures followed to ensure quality construction while maintaining a safe operating environment. The airport sponsor should conduct a cost-benefit analysis to determine the applicability of off-peak construction to any particular project. In summary, adequate lead times should be given for airport users to adjust their schedules and operating procedures where feasible and possible. Coordination should be maintained with all affected parties through all phases of the project. Construction plans and specifications should be detailed to show the unique aspects and construction phasing requirements of the project. Finally, specific construction practices and techniques should be followed to ensure that the construction is of acceptable quality, particularly if the work is to be done at night.

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APPENDIX A. RELATED READING MATERIAL

1. ADVISORY CIRCULARS. The latest issuance of the following advisory circulars may be obtained by downloading them from the FAA's website at www.faa.gov.

a. AC 00.2, *Advisory Circular Checklist and Status of Other FAA Publications*. Contains a listing of all current advisory circulars.

b. AC 150/5300-9, *Predesign, Prebid and Preconstruction Conferences for Airport Grant Projects*. Provides guidance for conducting predesign, prebid and preconstruction conferences for projects funded under the Federal Aviation Administration's airport grant program.

c. AC 150/5320-6, *Airport Pavement Design and Evaluation*. Provides guidance to the public for design and evaluation of pavements at civil airports.

d. AC 150/5320-12, *Measurement, Construction and Maintenance of Skid Resistant Airport Pavement Surfaces*. Contains guidance on determining runway surface friction characteristics, specifications for friction measuring equipment, and procedures for the construction and maintenance of skid resistant airport pavement surfaces.

e. AC 150/5340-1, *Standards for Airport Markings*. Describes the standards for marking paved runways, taxiways, and closed or hazardous areas on airports.

f. AC 150/5370-2, *Operational Safety on Airports During Construction*. Sets forth guidelines concerning the operational safety on airports during construction, to assist airport operators in complying with Part 139, *Certification and Operation: Land Airports Serving Certain Air Carriers*, of the Code of Federal Regulations, and with the requirements of federally funded construction projects.

g. AC 150/5300-13, *Airport Design*. Presents Federal aviation design standards for airports.

h. AC 150/5370-10, *Standards for Specifying Construction of Airports*. Provides construction standards and guide specifications to be used in specifying grading, drainage, paving, lighting, fencing, turfing, and other construction activities at civil airports

2. GOVERNMENT REPORTS. The following Government reports may be purchased from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161 or from www.ntis.gov.

a. DOT/FAA/RD-80/121, *Current Practices on Nighttime Pavement Construction-Asphaltic Concrete*, July, 1982.

b. FAA/RD-76/221, *Study of Nighttime Pavement Construction Practices-Asphaltic Concrete*, December, 1987.

3. OTHER REPORTS. The following report may be obtained from Mr. Richard P. Raymond, T.Y. Lin International/HJ Ross, 201 Alhambra Circle, Suite 900, Miami, FL 33134.

a. Off-Peak Construction Practices for Airfield Pavements Utilizing Asphaltic Concrete, Richard P. Raymond, International Industry Working Group, April, 1988.