

**BIDDING AND CONTRACT DOCUMENTS**

**FOR**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT  
DRAINAGE, & CONSTRUCT APRON E  
WARREN "BUD" WOODS  
PALMER MUNICIPAL AIRPORT**

**BID OPENING DATE & TIME: August 23, 2022 at 2:00pm**



Prepared for:

**CITY OF PALMER**  
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(907) 745-3271

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**July 2022**



# CITY OF PALMER

## CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, & CONSTRUCT APRON E

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CITY OF PALMER STANDARD SPECIFICATIONS FOR STREETS-DRAINAGE-UTILITIES-PARKS, DATED 2018, MAY BE DOWNLOADED FROM THE CITY WEBSITE AT [WWW.CITYOFPALMER.ORG](http://WWW.CITYOFPALMER.ORG).



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**I**

**INVITATION TO BID**



## **CITY OF PALMER**

### **Invitation to Bid**

#### **Construct Taxiway N, Improve Airport Drainage, & Construct Apron E**

**Description of Work:** This project includes constructing 3,400 feet of new taxiway and a 2.5-acre parking apron, including two subgrade infiltration systems, taxiway lighting, apron lighting, and other related work as more fully described in the Contract Documents. Estimated base bid cost is between \$5,000,000 and \$10,000,000.

Sealed bids, in single copy, for furnishing all labor, equipment and materials and performing all work for the above project are hereby invited. Bids will be opened publicly and read at Palmer City Hall, 231 W. Evergreen Avenue, Palmer, Alaska on **August 23, 2022 at 2:00 pm.**

A pre-bid meeting will be held at the above address on **August 11, 2022 at 10:00 am** with a site visit to follow.

This is a bonded, public works project. Contractors are required to be licensed by the City and State and shall comply with Title 36 and Davis-Bacon wage rates. A bid bond is required with each bid in the amount of 10% of the bid. Successful bidder will be required to provide a performance bond and a labor and material payment bond, each in the amount equal to 100% of the contract price. This project is subject to Buy American, DBE, and other federal requirements.

Contract Documents will be available starting **August 2, 2022** in electronic format only. Documents may be downloaded at [www.palmerak.org/bids](http://www.palmerak.org/bids). There is no fee for Contract Documents.

For additional info, contact the Palmer Public Works office at (907) 745-3400.

The City reserves the right to reject any or all bids and to waive irregularities or informalities in any of the bids when in its best interest.

John Moosey  
City Manager





**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**II**

**SPECIAL PROVISIONS**



# CITY OF PALMER

## CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, & CONSTRUCT APRON E

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# CITY OF PALMER

## CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, & CONSTRUCT APRON E

### SPECIAL PROVISIONS

#### SECTION 95.01 LOCATION AND SCOPE

All proposed Work is located within the City of Palmer corporate limits and is more particularly located on the design drawings. The Work included under this Contract consists of furnishing all labor, materials, equipment, supervision, and other facilities necessary to successfully complete the Work set forth in the Drawings and specifications. It shall be the responsibility of the bidder to prepare his/her bid so that all materials and/or fittings shall harmoniously conform to the intent of the Contract Drawings, Specifications, and Special Provisions.

Below are the schedules of Work that are presented in the Bid Proposal of this Contract:

#### SCHEDULE DESCRIPTION

- A Construct Taxiway N, Extend Taxiway J, and Remove Taxiways B and L**  
Construct approximately 3,400 linear feet of taxiway, including excavation, subbase, crushed aggregate base, hot mix asphalt, markings, edge lighting, and 72,400 cubic-foot subgrade infiltration system. Includes pavement milling, lighting control upgrades, seeding, and other related work.
- B Drainage Improvements**  
Construct 1 each 68,595 cubic-foot subgrade infiltration system. Includes excavation, foundation and embedment stone, drainage chambers, piping, and other related work.
- C Construct Apron E**  
Construct approximately 2.5-acre aircraft parking apron, including excavation, subbase, crushed aggregate base, hot mix asphalt, markings, tie-down anchors, area lighting, and other related work.
- D Additive Alternate 1 – Replace Taxiway J Pavement**  
Remove and replace hot mix asphalt paving on approximately 880 linear feet of taxiway and other related work.
- E Additive Alternate 2 – Apron E Headbolt Heater Outlets**  
Install headbolt heater outlets on Apron E.

#### SECTION 95.02 REFERENCE TO CITY OF PALMER STANDARD SPECIFICATIONS

This Contract is subject to and hereby incorporates by reference the 2018 City of Palmer Standard Specifications, hereinafter referred to as CPSS; portions of the State of Alaska Department of Transportation and Public Facilities Standard Specifications for Airport Construction Revised 01/01/20 as modified for this project (included as Exhibit C), hereinafter referred to as SSAC; the

International Building Code, latest edition adopted by City of Palmer; FAA Advisory Circular (AC) AC150/5370-10H *Standards for Specifying Construction of Airports*; and FAA AC 150/5370-2G *Operational Safety on Airports During Construction* (included as Exhibit D). When conflicts exist between CPSS, SSAC, and FAA Advisory Circulars, the requirements of CPSS as modified by these Special Provisions, then SSAC shall govern.

### **SECTION 95.03 TIME OF COMPLETION**

Work under this Contract shall be “substantially complete,” as defined by CPSS Section 10.05 Control of Work, Article 5.31 Substantial Completion, on or before **September 30, 2023**.

The Contract Completion Date is **June 30, 2024**. Final Acceptance of the Work shall be obtained by the Contract Completion Date.

Notice to Proceed is anticipated to be issued on or about **October 15, 2022**.

### **SECTION 95.04 MODIFICATIONS AND/OR ADDITIONS TO CITY OF PALMER SPECIFICATIONS**

The following listed provisions of CPSS are amended as hereinafter stated:

#### **A. DIVISION 10 STANDARD GENERAL PROVISIONS**

##### **SECTION 10.01 DEFINITIONS**

***Add the following:***

**Airport Manager** – The airport’s authorized official in accordance with FAA requirements; the City of Palmer Airport Superintendent.

***Add SSAC General Contract Provisions (GCP) Section 10 in Exhibit C.***

##### **SECTION 10.02 BIDDING REQUIREMENTS AND CONDITIONS**

**Article 2.1 Examination of Bidding Documents and Site**  
***Delete the third paragraph and substitute the following:***

Records of subsurface and hydrological investigations, including but not limited to, boring logs, test results, soil investigation reports, material reports, and other supplemental information are made available for information purposes only. These records are not part of the Contract. These records indicate subsurface conditions only at specific locations at the time sampled, and only to the depths penetrated. They do not necessarily reflect frozen state, or variations in soil, rock or hydrology that may exist between or outside such locations or at other times. Actual conditions, including ground water levels and saturation, may differ from what is shown in the records. Bidder shall assume responsibility for any conclusions Bidder may draw from such data. The Bidder shall be responsible for

obtaining and analyzing such additional data as Bidder may require and shall be responsible for conclusions drawn from that information.

***Add the following to the end of the Article:***

This project is located on or adjacent to runways, taxiways, aprons and lease lots within secured areas that require airport management approval and escorts prior to entry. Site visit(s) will be held at the date(s) and time(s) presented in the "Invitation to Bid." This site visit(s) is the only opportunity bidders will have to view the project area and to review the conditions with the Owner and Engineer. The site visit(s) will be conducted as a "tour", led by the Owner and Engineer. In order to participate, the bidders must be present at the specified time and location.

The site visit is to familiarize the Contractor with the conditions, as they exist, and to verify the quantity and nature of the Work. Any discrepancies between the conditions existing and those herein specified must be reported in writing before the bid opening in accordance with CPSS Section 10.02 Article 2.2.

***Article 2.5 Disadvantaged and Woman Owned Business Enterprises (DBE/WBE) Requirements***

***Delete the first paragraph and substitute the following:***

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 City of Palmer to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit bids/proposals. Award of this contract will be conditioned upon satisfying the requirements of this bid specification. These requirements apply to all bidder's/offeror's, including those who qualify as a DBE. The bidder/offeror shall make good faith efforts, as defined in Appendix A of 49 CFR Part 26, to meet the contract goal for DBE participation in the performance of this contract, if a contract goal is established. See Part V. DBE Requirements.

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's/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 in the kind and amount of work provided in the commitment made under (4); and (6) if the contract goal, if any, is not met, evidence of good faith efforts.

The bidder/offeror shall submit a completed interested bidder's list collection form with their bid.

**A DBE contract goal has not been established for this contract; however, all other DBE requirements of Part V. DBE Requirements apply.**

## **SECTION 10.03 AWARD AND EXECUTION OF CONTRACT**

### **Article 3.4 Action on Bids**

**Delete the last paragraph and substitute the following:**

The execution of this Contract is subject to availability of funding from City, State and/or Federal grant sources. Award of a contract is contingent upon receipt of such funds. If sufficient funds are not received, this project may be canceled at no cost to the City of Palmer.

### **Article 3.6 Execution of Contract**

**Delete the first sentence of the fourth paragraph and substitute the following:**

The Contractor will be supplied with one (1) electronic file (PDF format) of the conformed Contract Documents with half-size Drawings, exclusive of City of Palmer Standard Specifications, and one (1) set of full-size Drawings.

### **Article 3.7 Contractor's Warranty**

**Delete the entire Article and refer to SSAC GCP 90-10 in Exhibit C.**

## **SECTION 10.04 SCOPE OF WORK**

### **Article 4.8 Work Incidental to the Contract**

**Replace the first paragraph and list and substitute the following:**

Several items of Work, not covered in the Bid Proposal, will be considered incidental to the cost of the Contract. These items shall include, but are not limited to, the following:

1. Shoring power poles and utility crossings.
2. Dewatering of excavation and trenches for excavation purposes and for achieving the required compaction.
3. Sheeting, shoring and bracing and portable trench shields.
4. Resetting disturbed property corners or monuments, except monuments identified on the Drawings to be reset.
5. Providing safe hauling and Traffic Control Plan, prior to beginning construction, for hauling and site access.
6. Post-construction cleanup.
7. Attending construction progress meetings with the Owner and the Engineer.
8. Jobsite safety.
9. Pot holing to identify the location of buried utilities.
10. Furnishing and installing pipe bedding.
11. Furnishing and installing bonding and grounding conductors for electrical installations.
12. Disposal of excess or unusable excavation.



13. Maintenance and Drainage per CPSS Section 10.04 Article 4.14.
14. Final grading of all disturbed areas to smooth contours and restoration of existing drainage patterns in trench areas.
15. Saw cutting of pavement and concrete for removal.
16. Providing tack coat on vertical surfaces of pavement and concrete prior to paving.
17. Working in proximity to existing buried and aboveground utilities and protection and repair of damage caused by the Contractor.
18. Removal of miscellaneous obstructions as identified on the Drawings.
19. Providing the Contractor's onsite project office.
20. Grading of ditches to restore existing drainage pattern.
21. Water for construction and seeding including maintenance.
22. Additional temporary construction easements for Contractor material storage or staging yards.
23. All other items designated as incidental on the Drawings or specifications.

**Article 4.10      *Protection of Persons, Property and Environment***  
***Add the following after the first paragraph:***

Hazardous materials include but are not limited to petroleum products, oils, solvents, paints, lead based paints, asbestos, and chemicals that are toxic, corrosive, explosive, or flammable. Except as otherwise specified in this Contract, the Contractor shall:

1. Not excavate, nor use for fill, any material at any site suspected of or found to contain hazardous materials or petroleum fuels;
2. Not raze and remove, or dispose of structures that contain asbestos or lead-based paints;
3. Not stockpile, nor dispose of, any material at any site suspected of or found to contain hazardous materials or petroleum;
4. Report immediately to the Engineer any known or suspected hazardous material discovered, exposed, or released into the air, ground, or water during construction of the project;
5. Report any containment, cleanup, or restoration activities anticipated or performed as a result of such release or discovery;
6. Handle and dispose of hazardous material with properly trained and licensed personnel who follow an approved Hazardous Material Control Plan as per SSAC Item P-641.

**Article 4.12      *Public Convenience and Access***  
***Add the following after the third paragraph:***

The Contractor shall provide for the free and unobstructed movement of aircraft in the Air Operations Areas of the airport with respect to his own operations and the operations of all his subcontractors. To provide for the continued usage of adequate airport facilities and access within the airport, including airside access to the lease lots adjacent to Taxiway J, construction shall be scheduled and phased. The Contractor shall schedule and phase the Work to meet the air operations safety requirements for aircraft access specified in SSAC Item G-110 Airport Safety Requirements in Exhibit C.

With respect to his own operations and the operations of all his 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. All work shall conform to the Construction Safety and Phasing Plan (CSPP) and Narrative included in the project documents.

The Contractor shall make his own estimate of all labor, materials, equipment and incidentals necessary for providing safety devices and plans for aircraft and vehicular traffic as specified in this section. The cost of providing continuous, safe aircraft traffic shall be measured and paid for under SSAC Item G-110 Airport Safety Requirements in Exhibit C.

Contractor shall provide updates of planned activities weekly or more frequently as requested by the Engineer, for the purpose of updating the public through the City's web site.

**Delete the entire Article 4.13 Traffic Control Plan and substitute the following Article 4.13 Maintenance of Traffic:**

**Article 4.13 Maintenance of Traffic**

It is the explicit intention of the Contract that the safety of aircraft, the public, the airport's equipment and personnel, and the Contractor's equipment and personnel, shall be the most important consideration. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas of the airport, except as specifically provided in this Contract or in the Safety Plan Compliance Document (SPCD), with respect to its own operations and the operations of all its subcontractors. 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, whenever the airport is open to the arrival or departure of aircraft as detailed on the plans, CSPP, and SPCD.

With respect to the Contractor's own operations and the operations of all the Contractor's 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, maintenance vehicles, or support vehicles at the airport.

When the Contract requires the maintenance of vehicular traffic on an existing roadway, the Contractor shall keep such roadway open to all traffic, and shall provide such maintenance as may be required to accommodate traffic and to keep the roadway smooth and even. The Contractor shall furnish, erect, and maintain barricades, warning signs, flaggers, and other traffic control devices in reasonable conformity with the *Manual on Uniform Traffic Control Devices for Streets and Highways* (published by the United States Government Printing Office) and the

*Alaska Traffic Manual Supplement*, unless otherwise specified by the Department. 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 roadways, and as required in CPSS Section 10.04 Article 4.14.

The Contractor shall make their own estimate of all labor, materials, equipment, and incidentals necessary for providing the maintenance of aircraft and vehicular traffic as specified in this subsection.

The cost of maintaining the aircraft and vehicular traffic specified in this Article shall not be measured or paid for directly, but shall be subsidiary to the various contract items, except when pay items are included in the bid schedule that directly pay for traffic control measures. The traffic control measures included for payment will be specifically described under those items.

**Article 4.14      *Maintenance and Drainage***  
***Add the following to the end of the Article:***

**Maintenance of Airport Facilities.** The Contractor shall maintain the airport and related airport facilities located within the project area relative to his operations from the date construction begins until the Contractor receives a letter of project completion. The Contractor shall maintain these areas continually and effectively on a daily basis, with adequate resources to keep them in satisfactory condition at all times. The Contractor shall maintain those areas outside the project that are affected by the work, such as haul routes, detour routes, structures, material sites, and equipment storage sites during periods of their use.

Do not place foreign objects and debris (FOD) or any debris capable of causing damage to aircraft landing gears or propellers or of being ingested in jet engines on surfaces in active aircraft movement areas. Ensure that all loose material and debris has been removed from the sides of equipment and haul vehicles prior to travel on airport or road surfaces. Keep all active runway, taxiway, and apron areas free of materials spilled by your operations. Clean spilled materials off of closed runways, taxiways, or aprons prior to opening these areas to aircraft. If FOD is spilled on an active runway, taxiway, or apron, remove it immediately. The Engineer reserves the right to suspend all hauling operations until FOD is removed from active aircraft movement areas. Hauling time lost due to the suspended haul will not be considered reason to extend contract time or reason for a claim. The Engineer will allow hauling to continue when the spilled material is cleaned up to his satisfaction. FOD preventive measures and FOD cleanup of runways, taxiways, haul routes, and equipment is subsidiary to the contract and no additional payment will be made.

**Article 4.15      *Temporary Erosion Control and Storm Water Pollution Prevention Plans***  
***Construction***  
***Add the following to the first paragraph:***

Prior to the Preconstruction Conference, provide a Storm Water Pollution Prevention Plan, a Hazardous Material Control Plan, and a Spill Prevention Control and Countermeasure Plan, with the line of authority and designated field representatives, as required under SSAC Item P-641.

***Delete the third, fourth, fifth and sixth paragraphs and substitute the following:***

Construct Taxiway N, Improve Airport Drainage,  
& Construct Apron E

SP-7

See SSAC Item P-641 for additional erosion and pollution control requirements.

**Article 4.17 Utilities**

**Delete the entire Article and substitute the following:**

- a. **Bid Considerations.** Bidders shall include in their bid the cost of:
- (1) Providing uninterrupted operation of all visual and electronic signals, including power supplies and Lighting used in the guidance of aircraft, except as specified in the CSPP and SPCD;
  - (2) All utility work that is specified in the Contract as work to be performed by the Contractor;
  - (3) Working around or through all permanent and temporary utilities shown on the Plans, in both their present and adjusted positions;
  - (4) Accommodating the removal, adjustment, or relocation of utilities shown on the Plans by entities other than the Contractor;
  - (5) Construction and removal of temporary utilities, to provide temporary utility service during the construction or repair of a permanent utility; and
  - (6) Other utility work not specifically identified as compensable in Subparagraph d Compensation.

The Plans show the approximate locations of utilities known to be within the work zone. Bidders shall expect that the location, elevation and nature of utilities may vary from what is shown on the Plans and shall factor those contingencies into the bid price. Additional utilities may exist that are not shown on the Plans. Compensation related to utilities not shown on the plans will only be available according to Subparagraph d Compensation.

When an entity other than the Contractor is to remove, adjust, or relocate any utility, or perform other utility related work within the project boundaries, the applicable completion dates or specific calendar days to complete the removal, adjustment, relocation, or other utility related work may be stated in the Special Provisions. If no date is stated in the Special Provisions, the Contractor shall work cooperatively with the utility owner during the Project.

- b. **Cooperation with Utility Owners.** The Contractor assumes the obligation of coordinating their activities with utility owners, and shall cooperate with utility owners to facilitate removal, adjustment, or relocation operations, avoid duplication of work, and prevent unnecessary interruption of services. When a utility owner is identified in the Contract as being responsible for removing, adjusting, or relocating a utility, the Contractor shall give the utility owner 15 days advance written notice regarding the dates when the utility owner is required to begin and end operations.

The Contractor shall cooperate with utility owners to determine a utility progress schedule for all parties' utility work. The Contractor shall submit the schedule to the Engineer before beginning that portion of utility work. The Contractor shall update the utility progress schedule monthly and shall note time delays and their cause.

Utility owners are not required to work in more than one location at a time, and shall be allowed to complete a specific section of work prior to commencing another section. Utility owners will not normally perform adjustment or relocation of underground utilities when the ground is frozen. Utility owners may prohibit the Contractor, through the Engineer, from working near utilities when the ground is frozen.

If utility owners do not complete their work in a timely manner, the Engineer may direct the Contractor to temporarily relocate the utilities, to construct new utilities, or to make necessary repairs to complete the utility work.

**c. Utility Work.** The Contractor shall:

- (1) Make all necessary arrangements with utility owners to locate all utilities that may be within an area of work before excavation in that area, according to AS 42.30.400;
- (2) Provide right-of-way staking and construction staking with lines and grades before excavation in that area;
- (3) Prevent damage to utilities or utility property within or adjacent to the project;
- (4) Carefully uncover utilities where they intersect the work;
- (5) Immediately stop excavating in the vicinity of a utility and notify the Engineer and the utility owner if an underground utility is discovered that was not field marked or was inaccurately field marked;
- (6) Promptly notify the utility owner, the Engineer, and the Airport Manager in the event of accidental interruption of utility service, and cooperate with the utility owner and the Engineer until service is restored;
- (7) Take all precautions necessary to protect the safety of workers and the public when performing work involving utilities;
- (8) Follow an approved TCP;
- (9) Keep the length of open trench excavation to a minimum, backfill trenches as work is completed;
- (10) Cover open trenches with metal plates capable of bearing traffic where traffic will cross trenches;
- (11) Maintain continuous utility service and install temporary utility systems where needed;
- (12) Ensure all excavation conforms to AS 42.30.400 – 42.30.490;
- (13) Ensure all excavation and utility work conforms to excavation requirements in 29 CFR 1926, Subpart P, and confined space requirements in 29 CFR 1926.21(b)(6);
- (14) Ensure all work undertaken near energized high voltage overhead electrical lines or conductors conforms to AS 18.60.670, AS 18.60.675, AS 18.60.680 or other applicable law;

- (15) Ensure all work undertaken near energized high voltage underground electric lines or conductors conforms to all applicable laws and safety requirements of the utility owner;
- (16) When required by the utility owner, provide for a cable watch of overhead power, underground power, telephone, and gas;
- (17) Obtain plan approval from the local fire authority, and provide for the continued service of fire hydrants, before working around fire hydrants;
- (18) Do all pressure testing or camera testing required to verify utility acceptance in a timely manner; and
- (19) Coordinate the Storm Water Pollution Prevention Plan (SWPPP) (SSAC Item P-641) with their work and the utility companies' work.

**d. Compensation.**

- (1) Except as otherwise specifically provided in this Subparagraph d, no equitable adjustment will be paid by the Owner:
  - (a) Due to any variations in location, elevation, and nature of utilities shown on the Plans, or the operation of removing, adjusting, or relocating them;
  - (b) For any delays, inconvenience, or damage sustained as a result of interference from utility owners, interference from utilities, or interference from the operation of removing, adjusting, or relocating utilities; or
  - (c) For any adjustments or relocations of utilities requested for the Contractor's convenience.
- (2) Except as otherwise specifically provided in this Subparagraph d, the Engineer will issue a Change Order with equitable adjustment if:
  - (a) Utilities not shown on the Plans require removal, adjustment, or relocation;
  - (b) Conflicts occur between utilities not shown on the Plans and other necessary work; or
  - (c) Conflicts due to the required elevation of a utility occur between new and existing utilities that are both shown on the Plans.
- (3) When the Contractor damages utilities, the utility owner may choose to repair the damage or require the Contractor to repair the damage. When the Contractor damages utilities:
  - (a) No equitable adjustment will be paid by the Owner, and the Contractor shall be solely responsible for repair costs and expenses, when:
    - 1. The Contractor failed to obtain field locates before performing the work that resulted in the damage;
    - 2. The utility was field located by the utility owner or operator, and the field locate is accurate within 24 horizontal inches if the utility is buried 10 feet deep or

less, or the field locate is accurate within 30 horizontal inches if the utility is buried deeper than 10 feet;

3. The plan profile or the field locate does not indicate or inaccurately indicates the elevation of a buried utility;
4. The utility is visible in the field; or
5. The Contractor could otherwise reasonably have been aware of the utility.

(b) The Engineer will issue a Change Order with an equitable adjustment for the cost of repairing damage if:

1. The field locate by the owner or operator of a buried utility erred by more than 24 horizontal inches if the utility is buried 10 feet deep or less, or 30 horizontal inches if the utility is buried deeper than 10 feet;
2. The utility was not shown on the Plans or other Contract documents, and the Contractor could not reasonably have been expected to be aware of the utility's existence; or
3. The Contractor made a written request for a field locate according to AS 42.30.400, the utility owner did not locate the utility according to AS 42.30.410, and the Contractor could not reasonably have been expected to be aware of the utility's existence or location.

(4) If a delay is caused by a utility owner, is beyond the control of the Contractor, and is not the result of the Contractor's fault or negligence, the Engineer may issue a Change Order with an equitable adjustment to contract time, but no equitable adjustment will be made for the cost of delay, inconvenience or damage. Additional contract time may be granted if the cause of delay is because a utility owner is to perform utility work:

(a) By dates stated in the Special Provisions, and the utility work is not completed by the dates stated; or

(b) In cooperation with the Contractor and the utility owner does not complete the work in a timely manner, based on a written progress schedule agreed upon by the Contractor, the utility owner, and the Engineer.

(5) If the Engineer orders the Contractor to make necessary construction or repairs due to incomplete utility work by utility owners, the Contractor will be paid as specifically provided for in the Contract, or the Engineer will issue a Change Order with equitable adjustment.

e. **Cooperation with Airport Management and FAA.** The Contractor shall coordinate their activities and cooperate with the Airport Management and the FAA, and shall provide 45 days advance written notice to them before working on utilities in the Air Operations Area. All coordination with Airport Management and the FAA shall be through the Engineer. Refer to the CSPP for coordination requirements. The Contractor shall include and cooperate with Airport Management, the FAA, and the Engineer, in determining a utility progress schedule for work on the Airport Property.

The Contractor shall submit a written plan to repair damaged utilities to the Engineer, and shall follow the plan when repairing damaged utilities. The plan shall identify repair personnel or subcontractors. The Contractor shall not work on or adjacent to utilities unless repair personnel are available to repair damaged utilities. Personnel repairing utilities shall be licensed for the work required, and shall have the tools and material required to repair damaged utilities within the time limits required.

When damage affects, or may in the Engineer's opinion affect, the function of navigational or visual aids, the Contractor shall repair damage within two hours. When damage affects, or may in the Engineer's opinion affect, the function of utilities, the Contractor shall repair the damage within 24 hours.

**Article 4.22      *Coordination with Other Work***

***Delete the entire Article and substitute the following:***

The Owner may, at any time, contract for and perform other or additional work on or near the Project, or allow others to perform work on or near the project. The Contractor shall allow other contractors reasonable access across or through the Project.

The Contractor shall cooperate with other contractors working on or near the Project, and shall conduct work without interrupting or inhibiting the work of other contractors. All contractors working on or near the Project shall accept all liability, financial or otherwise, in connection with their Contract. No claim shall be made by the Contractor or paid by the Owner for any inconvenience, delay, damage or loss of any kind to the Contractor due to the presence or work of other contractors working on or near the Project.

The Contractor shall coordinate and sequence the work with other contractors working within the same project limits. The Contractor shall properly join the work with work performed by other contractors and shall perform the work in the proper sequence to that of the others. The Contractor shall arrange, place, and dispose of materials without interfering with the operations of other contractors on the same project. The Contractor shall defend, indemnify and save harmless the Owner from any damages or claims caused by inconvenience, delay, or loss that the Contractor causes to other contractors.

**Article 4.23      *Temporary Facilities***

***Add the following after the first paragraph:***

Areas available for Contractor's use at the Airport are identified in the Plans.

***Add the following new Article 4.24 Access Haul Routes:***

**Article 4.24      *Access Haul Routes***

The Contractor shall control the movement of all heavy construction equipment to minimize damage to existing airport improvements including roads, grassy areas and aprons. Construction equipment shall be routed as shown on the plans or as approved by the Owner. Any loss of income to the Owner due to damage to hay fields or haying equipment caused by deviation from the approved haul routes shall be assessed to the Contractor, and all damage shall be repaired at no additional cost to the Owner.

Use of taxiways or runways for haul routes will not be permitted, except as shown otherwise.



**Add the following new Article 4.25 Use of Materials Found on the Work:**

**Article 4.25 Use of Materials Found on the Work**

Before using borrow, the Contractor shall utilize Useable Excavation to construct the embankment layer on the project. Useable Excavation is material encountered within the lines and grades of the project that is determined suitable by the Engineer under SSAC Item P-152-2.3, Suitable Material. For excavating the Useable Excavation and constructing the embankment with Useable Excavation, the Contractor shall be paid only the unit bid price for excavation. Hauling, placing, compacting and other activities required to construct the embankment with Useable Excavation shall be subsidiary to excavation, and the Contractor shall not be paid additional sums for those activities. The Engineer may approve the use of borrow when Useable Excavation is not available.

The Engineer may authorize the Contractor to use the Useable Excavation for Contract items other than construction of embankment, and the Contractor shall be paid both for the excavation of the Useable Excavation and for the other Contract Item for which it is acceptably used. If this action results in a shortage of embankment material:

- a. The Contractor shall replace the Useable Excavation used for Contract items other than embankment, on a yard for yard basis with borrow acceptable to the Engineer; and
- b. This replacement shall be at the Contractor's expense and at no additional cost to the Department. The Contractor shall pay any royalties required for the borrow.

The Contractor shall not excavate or remove any material that is within the project limits but outside the lines and grades, without written authorization from the Engineer.

**SECTION 10.05 CONTROL OF WORK**

**Article 5.3 Construction Progress Schedule and Schedule of Values**  
**Delete the entire Article and refer to SSAC Item G-300 in Exhibit C.**

**Article 5.4 Non-Working Hours, Holidays, Saturdays & Sundays**  
**Delete the entire Article and substitute the following:**

The Contractor shall not be allowed to work other than the times detailed on the CSPP, without prior written approval from the Engineer. The Contractor shall coordinate with the Engineer, at least 72 hours in advance, his intention to work Sundays, nights or holidays. In no case shall the Contractor do any such Work without first obtaining approval from the Engineer to allow proper inspection. Unless of an emergency nature, compensation will not be provided for work performed in violation of this paragraph.

The Contractor shall reimburse the Owner of all costs for inspection work performed while working Sundays or holidays, or anytime outside the usual working hours.

**Article 5.7 Materials**  
**Add the following to the end of the Article:**

The Contractor shall limit his borrow and aggregate sources to existing and legally permitted sources. If additional or expanded off-airport sources are desired by the Contractor, the Owner is required by FAA to comply with National Environmental Policy Act (NEPA) for the mining, which requires an environmental review and clearance from the FAA. The Contractor shall notify the Owner and shall reimburse the Owner for all consulting costs for NEPA compliance for the proposed site or expansion. The Owner cannot guarantee NEPA compliance can be obtained within the Contractor's desired timeframe.

The Contractor shall furnish airport lighting equipment that conforms to the requirements of cited materials specifications. In addition, where an FAA specification for airport lighting equipment is cited in the Plans or Specifications, the Contractor shall furnish such equipment that is certified and listed under AC 150/5345-53, *Airport Lighting Equipment Certification Program*.

**Article 5.8            *Testing of Materials***

***Delete the last two paragraphs of the Article and substitute the following:***

The Contractor is responsible for the quality of construction and materials used in the work. Quality control is process control, and includes all activities that ensure that a product meets Contract specifications. Contractor quality control is subsidiary to the applicable items unless a contract item for Quality Control is established on the bid schedule.

The Contractor shall implement a Quality Control Program (CQCP) in conformance with SSAC GCP Section 100 Contractor Quality Control Program in Exhibit C. The Contractor shall perform sampling and testing during materials processing and placement according to its CQCP and shall obtain acceptable material samples from locations designated within the source.

**Acceptance Testing.** The Owner has the exclusive right and responsibility for determining the acceptability of the construction and incorporated materials.

The Owner will sample materials and perform acceptance tests at its expense. Copies of tests will be furnished to the Contractor upon request. The Contractor shall not rely on the Owner's acceptance testing for its quality control. The Owner's acceptance testing is not a substitute for the Contractor's quality control. The Engineer may retest materials that have failed the Owner's acceptance test, but is not required to do so. As part of acceptance testing, the Owner will sample and test materials to determine the quality of the source. The Owner will reject materials when the samples do not meet specifications.

Acceptance sampling and testing frequencies may be located in an Appendix to these Specifications, and are incorporated into the Contract.

**Article 5.9            *Contractor's Authorized Representatives and Employees***

***In the first sentence, delete "Notice to Proceed" And substitute "execution of the Contract".***

**Article 5.10            *Subcontracting***

***Delete the following:***

"2. Within ten (10) days after the effective date of the Notice-to-Proceed, and prior to commencement of the Work, the Contractor shall provide..."

***And substitute:***

“2. Within two (2) days after bid opening, and prior to commencement of the Work, the apparent low bidder shall provide...”

***At the end of this Article, add the following language:***

The Contractor shall ensure for each subcontract, and shall require subcontractors to ensure for each lower tier subcontract:

1. Subcontractor shall comply with the requirements of CPSS Section 10.08 Federal Requirements, including Supplemental Conditions for Federal Contracts - Required Contract Provisions for Airport Improvement Program and for Obligated Sponsors in Exhibit A,
  2. Subcontractor shall be familiar with SSAC Item G-110 Airport Safety Requirements in Exhibit E and shall conform to its requirements regarding his work,
  3. Subcontractor shall be subject to the Prime Contractors Safety Plan Compliance Document.
  4. Include prompt payment provisions of AS 36.90.210 in all subcontracts.
  5. Include a clause requiring the Contractor to pay the subcontractor for satisfactory performance according to AS 36.90.210 and within eight (8) working days after receiving payment from which the subcontractor is to be paid.
  6. Include a clause requiring the Contractor to pay the subcontractor all retainage due under the subcontract, within eight (8) working days after final payment is received from the Owner, or after the notice period under AS 36.25.020(b) expires, whichever is later.
  7. Include a clause requiring the Contractor to pay interest on retainage according to AS 36.90.250 and AS 45.45.010(a).
  8. Subcontractors pay current prevailing wages as per Division 10.06 Article 6.15 and file signed and certified payrolls with the Engineer and DOLWD for all work performed on the project.
  9. Upon receipt of a request for more information regarding subcontracts, the requested information is provided to the Engineer within 5 calendar days.
- a. The following will be considered as subcontracting, unless performed by the Contractor:
- (1) Roadside Production. Roadside production of crushed stone, gravel, and other materials with portable or semi-portable crushing, screening, or washing plants set up or reopened in the vicinity of the project to supply materials for the project, including borrow pits used exclusively or nearly exclusively for the project.
  - (2) Temporary Plants. Production of aggregate mix, concrete mix, asphalt mix, other materials, or fabricated items from temporary batching plants, temporary mixing plants, or temporary factories that are set up or reopened in the vicinity of the project to supply materials exclusively or nearly exclusively for the project.
  - (3) Hauling. Hauling from the project to roadside production, temporary plants, or commercial plants, from roadside production or temporary plants to the project, from roadside production or temporary plants to commercial plants, and all other hauling not specifically excluded in this subsection.

- (4) Other Contractors.** All other contractors working on the project site under contract with the Contractor are considered subcontractors unless specifically excluded in this subsection.
- b.** The following will not be considered as subcontracting, but the Contractor shall comply with the prompt payment provisions of AS 36.90:
- (1) Commercial Plants.** The purchase of sand, gravel, crushed stone, crushed slag, batched concrete aggregates, ready-mixed concrete, asphalt paving mix, and any other material or fabrication produced at and furnished from established and recognized commercial plants that sell to both public and private purchasers.
- (2) Hauling.** Delivery of materials from a commercial plant to a different commercial plant, and delivery from a commercial plant to the project site by vehicles owned and operated by the commercial plants or by commercial freight companies that have a contract with the commercial plant. Commercial freight companies are trucking or hauling companies that deliver multiple types of materials to multiple clients, both public and private, on an established route and on a recurrent basis.
- (3) Contractors' General Business.** Work within permanent home offices, branch plants, fabrication plants, tool yards, and other establishments that are part of a contractor's or subcontractor's general business operations.
- c.** Owner-Operators. Hauling of materials for the project by bona fide truck owner-operators who are listed as such on the signed and certified payroll of the Contractor or approved subcontractor is not considered subcontracting for purposes of AS 36.30.115.

The Contractor shall ensure that the required prompt payment provisions of AS 36.90.210 are included in contracts with owner-operators.

The Contractor shall collect and maintain at the project site current and valid copies of the following to prove that each trucker listed is a bona fide owner-operator:

- (1)** Alaska Driver's License with appropriate CDL class and endorsements;
- (2)** Business license for trucking with supporting documents that list the driver as the business owner or corporate officer;
- (3)** Documents showing the driver's ownership interest in the truck, including copies of:
- (a)** Truck registration; and
- (b)** Lease (if truck is not registered in driver's name or in the name of the driver's company).

The Contractor shall maintain legible copies of these records for a period of at least three years after final acceptance of the project.

Owner-operators must qualify as independent contractors under the current Alaska Department of Labor's criteria. Owner-operators may be required to show:

- (4)** The owner-operator's right to control the manner in which the work is to be performed;

- (5) The owner-operator's opportunity for profit or loss depending upon their managerial skill;
- (6) The owner-operator's investment in equipment or materials required for their task, or the employment of helpers;
- (7) Whether the service rendered requires a special skill;
- (8) The degree of permanence of the working relationship; and
- (9) Whether the service rendered is an integral part of the owner-operator's business.

The status of owner-operators is subject to evaluation throughout the project period. If the criteria for an independent contractor are not met, the Contractor shall submit amended payrolls listing the driver as an employee subject to all labor provisions of the Contract.

The Contractor shall issue each owner-operator a placard in a form approved by the Engineer that identifies both the truck driver and the vehicle. The placard shall be prominently displayed on the vehicle so that it is visible to scale operators and inspectors.

Notwithstanding the Owner's definitions of contracting and subcontracting, the Contractor shall be responsible for determining and complying with all federal and state laws and regulations regarding contracting, subcontracting, and payment of wages. The Contractor shall promptly pay any fines or penalties assessed for violations of those laws and regulations, and shall promptly comply with the directives of any government agency having jurisdiction over those matters.

**Article 5.12      *Safeguarding of Excavation***  
***Add the following paragraph:***

Work areas shall be barricaded and adequate signing and warning lights placed to prevent inadvertent entry by vehicular, aircraft or pedestrian traffic. All barricades, signs and warning lighting adjacent to aircraft operation areas shall not exceed 18 inches in height, shall be of low mass, and shall be resistant to propeller blasts from aircraft. All open airport surfaces shall be left in a drivable condition for aircraft and vehicle operations at the end of each day's operation. Surfaces may be closed only in accordance with the CSPP and SSAC Item G-110 Airport Safety Requirements in Appendix C.

**Article 5.24      *Suspension of Work***  
***Add the following paragraph:***

Where the Work is suspended for adverse weather conditions, safety reasons, or the need for operational control of the airport, Contractor shall not be entitled to additional compensation; however, Contractor will be granted additional Contract time commensurate with the time of suspension.

**Article 5.27      *Liquidated Damages***  
***Delete the entire first paragraph and substitute the following:***

The Owner may withhold from any progress payment the sum of \$2,500.00 per day as Liquidated Damages for each and every calendar day that Substantial Completion is delayed beyond each identified Substantial Completion Date. After Substantial

Completion of the entire project, the Owner may withhold out of any progress payment the sum of \$500.00 per day as Liquidated Damages for each and every calendar day that Final Acceptance is delayed beyond the Contract Completion Date. If no money is due to the Contractor, the Owner shall have the right to recover said sums from Contractor, the Surety, or both.

**Article 5.31 Winter Maintenance**

**Delete subparagraph C Item 4 and substitute the following:**

4. Illumination, edge lighting, signage, and navigational aids (NAVAIDS) shall be in proper working order.

**Article 5.34 Substantial Completion**

**Delete the last paragraph and substitute the following:**

For Substantial Completion, all work shall be complete such that the project can (1) be safely and effectively use by the public without further delays, disruption, or other impediments; and (2) pavement structure, shoulder, drainage, sidewalk, permanent signing and markings, guardrail and other traffic barrier, fencing, safety appurtenance, structures, utilities, lighting, bridge deck and parapet work, and guidance systems for aircraft is complete.

**SECTION 10.06 LEGAL RELATIONS AND RESPONSIBILITIES**

**Article 6.1 Laws to be Observed**

**Add the following at the end of the article:**

The Contractor has the affirmative duty to keep informed of and comply with all laws. The Contractor is not entitled to and shall not rely on any Owner employee's interpretation, whether oral or written, of any law, ordinance, regulation, order, or decree, or any permit issued by an agency other than the Owner.

**Article 6.6 Permits**

**Add the following at the end of the first paragraph:**

Contractor shall notify the Engineer promptly if any activity cannot be performed as specified in the permits, and cease conducting the activity until permit modifications or any required additional permits are obtained. Contractor shall obtain any modifications to permits acquired by Contractor.

Contractor shall provide the information necessary to comply with the Alaska Department of Environmental Conservation Alaska Pollutant Discharge Elimination System (APDES) to discharge stormwater from the construction site. Requirements of this permit are given under SSAC Item P-641 in Appendix C.

The provision of permits acquired by the Contractor, and of notices and information under this Article, does not shift or create responsibility for compliance with Federal or State law to the Owner, or otherwise impose a duty for oversight or review.

**Add the following at the end of the article:**

Contractor shall secure and pay for all permits and fees associated with this work, including but not limited to:

- Department of Labor and Workforce Development Notice of Work

In addition, before using an area on or off project site not previously permitted for use by the Contract, the Contractor shall:

- a. Contact all government agencies having possible or apparent permit authority over that area;
- b. Obtain all required permits, clearances, and licenses from those agencies;
- c. Obtain permission from any property owners or lessees with an interest in the property; and
- d. Provide all of the following to the Engineer:
  - (1) All permits or clearances necessary to use the site for its intended purpose(s);
  - (2) A written statement that all permits or clearances necessary have been obtained;
  - (3) Written evidence that the Contractor has contacted all of the relevant agencies and that no additional permits are required on the part of the Contractor, including at a minimum the name of the agency and staff person contacted, the date contacted, and result of coordination; and
  - (4) A plan that identifies how the site will be finally stabilized and protected.

The Engineer may reject a proposed site if the Contractor fails to provide any of the above information or to demonstrate that a proposed site can be finally stabilized to eliminate future adverse impacts on natural resources and the environment.

***Add the following new Article 6.19 Payments to Contractors and Subcontractors:***

***Article 6.19 Payments to Contractors and Subcontractors***

Payment to Contractors and Subcontractors shall comply with the provisions of Alaska Statute 36, Section 36.90, Article 3 entitled "Public Construction Contract Payment."

***Add the following new Article 6.20 Load Restrictions:***

***Article 6.20 Load Restrictions***

The Contractor shall comply with all vehicle legal size and weight regulations of 17 AAC 25 and the *Administrative Permit Manual*, and shall obtain permits from the DOT&PF Division of Measurement Standards & Commercial Vehicle Enforcement before moving oversized or overweight equipment on a state highway.

The Engineer may permit oversized and overweight vehicle movements within the project limits provided the Contractor submits a written request and an acceptable Traffic Control Plan. No overloads will be permitted on a pavement, base or structure that will remain in place in the completed project. The Contractor shall be responsible for all damage done by their equipment

Construct Taxiway N, Improve Airport Drainage,  
& Construct Apron E

due to overloads, and for damage done by a load placed on a material that is curing and has not reached adequate strength to support the load.”

## **SECTION 10.07 MEASUREMENT AND PAYMENT**

***Delete the entire Section and replace with SSAC GCP Section 90 in Exhibit C.***

***Add a new Section 10.08 Federal Requirements, as follows:***

## **SECTION 10.08 FEDERAL REQUIREMENTS**

### ***Article 8.1 General***

The City of Palmer anticipates a federal grant for the construction of this project and the City of Palmer, and its Contractors, subcontractors, agents, and consultants are therefore bound to comply with the federal requirements set forth in these Articles, as well as other federal requirements, which may apply. Federal contract provisions are set forth in Exhibit A of these Special Provisions and are hereby incorporated into the Contract. All bidders shall submit the required Bidder Certifications with each bid in accordance with Exhibit B of these Special Provisions.

### ***Article 8.2 FAA Specifically Excluded from Contract***

The work covered by the Contract is anticipated to be included in Airport Improvement Program Project No. **03-02-0211-030-2022** and **03-02-0211-031-2022**, which is (are) being accomplished by the City of Palmer in accordance with the terms and conditions of Grant Agreement(s) between the City of Palmer and the United States, under the Airport and Airways Improvement Act of 1982, pursuant to which the United States has agreed to pay a certain percentage of the costs. The United States is not a party to this Contract and no reference in this Contract to the FAA or any representative thereof, or to any rights granted to the FAA or any representative thereof, or to the United States, by the Contract makes the United States a party to this Contract.

### ***Article 8.3 Officials Not to Benefit***

No member of, or delegate to, Congress, or Resident Commissioner shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

### ***Article 8.4 Convict Labor***

No convict labor may be employed under this Contract.

### ***Article 8.5 Inspection and Review***

The Engineer, his representative, the Owner representative, the FAA representative, or the Department of Labor representative shall be allowed access to 100% of all parts of the project to review or inspect work or materials used in the performance of this Contract.



**Article 8.6      Prevailing Wages**

In addition to State of Alaska Title 36 minimum wage requirements, the Contractor shall comply with federal Davis-Bacon Act minimum wage requirements. Contractor shall comply with the federal wage requirements as set forth in Exhibit A - Supplemental Conditions for Federal Aid Contracts. Wage determinations can be found at the locations provided in Section VI, Minimum Rates of Pay. The Contractor shall be responsible for determining the proper employee classification and rates of pay of the most stringent wage determination and complying with all provisions, including payroll submission to the proper authority, of the wage determinations contained herein.

**B.    DIVISIONS 20 THROUGH 80**

*Delete Divisions 20 through 80 and replace with the Alaska DOT&PF Standard Specifications for Airport Construction, as modified for this project, in Exhibit C.*

**END OF SPECIAL PROVISIONS**



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**EXHIBIT A**

**SUPPLEMENTAL CONDITIONS FOR FEDERAL AID CONTRACTS**





**FAA**  
**Airports**

## **Required Contract Provisions for Airport Improvement Program and for Obligated Sponsors**

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## **A1 ACCESS TO RECORDS AND REPORTS**

### **ACCESS TO RECORDS AND REPORTS**

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

## A2 AFFIRMATIVE ACTION REQUIREMENT

### NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION to ENSURE EQUAL EMPLOYMENT OPPORTUNITY

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

#### **Timetables**

Goals for minority participation for each trade:	<b>15.1%</b>
Goals for female participation in each trade:	<b>6.9%</b>

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

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

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

4. As used in this notice and in the contract resulting from this solicitation, the "covered area" is the City of Palmer in the Matanuska-Susitna Borough in the State of Alaska.



## **A3 BREACH OF CONTRACT TERMS**

### **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 deadline indicated in the Owner's notice.

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

## **A4 BUY AMERICAN PREFERENCE**

### **A4.1.1 Buy American Preference Statement**

#### **BUY AMERICAN PREFERENCE**

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

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

## **A4.1.2 Certificate of Buy American Compliance – Manufactured Product**

### **Certificate of Buy American Compliance for Manufactured Products**

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

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101 by:
- a) Only installing steel and manufactured products produced in the United States, or;
  - b) Installing manufactured products for which the FAA has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing, or;
  - c) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

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

1. To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
2. To faithfully comply with providing US domestic product
3. To furnish US domestic product for any waiver request that the FAA rejects
4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

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

1. To submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that support the type of waiver being requested.
2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination may result in rejection of the proposal.
3. To faithfully comply with providing US domestic products at or above the approved US domestic content percentage as approved by the FAA.
4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

### **Required Documentation**

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

- a) Listing of all product components and subcomponents that are not comprised of 100% US domestic content (Excludes products listed on the FAA Nationwide Buy American

Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).

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

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

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

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

\_\_\_\_\_

Date

\_\_\_\_\_

Signature

\_\_\_\_\_

Company Name

\_\_\_\_\_

Title

## **A5 CIVIL RIGHTS - GENERAL**

### **GENERAL CIVIL RIGHTS PROVISIONS**

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

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

## **A6 CIVIL RIGHTS – TITLE VI ASSURANCE**

### **A6.1.1 Title VI Solicitation Notice**

#### **Title VI Solicitation Notice:**

The **City of Palmer**, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

### **A6.1.2 Title VI Clauses for Compliance with Nondiscrimination Requirements**

#### **Compliance with Nondiscrimination Requirements**

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

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

5. **Sanctions for Noncompliance:** In the event of a contractor’s noncompliance with the Non-discrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:
  - a. Withholding payments to the contractor under the contract until the contractor complies; and/or
  - b. Cancelling, terminating, or suspending a contract, in whole or in part.
  
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

**A6.1.3 Title VI List of Pertinent Nondiscrimination Acts and Authorities**

**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);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs

or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

- Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38;
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).



## **A7 CLEAN AIR AND WATER POLLUTION CONTROL**

### **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. § 740-7671q) 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 exceeds \$150,000.

## **A8 CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS**

### **CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS**

#### **1. Overtime Requirements.**

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

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

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

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

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

#### **4. Subcontractors.**

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

**A9 COPELAND “ANTI-KICKBACK” ACT**

**COPELAND “ANTI-KICKBACK” ACT**

Contractor must comply with the requirements of the Copeland “Anti-Kickback” Act (18 U.S.C. 874 and 40 U.S.C. 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.

## **A10 DAVIS-BACON REQUIREMENTS**

### **DAVIS-BACON REQUIREMENTS**

#### 1. Minimum Wages.

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

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

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

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

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

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

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

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

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

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

## 2. Withholding.

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

## 3. Payrolls and Basic Records.

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

(ii)(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (*e.g.* the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at [www.dol.gov/whd/forms/wh347instr.htm](http://www.dol.gov/whd/forms/wh347instr.htm) or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker and shall provide them upon request to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, Sponsor, or Owner).

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

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

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

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

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

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

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

#### 4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or

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

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

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

#### 5. Compliance with Copeland Act Requirements.

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

#### 6. Subcontracts.

The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR Part 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate



instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

7. Contract Termination: Debarment.

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

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

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

9. Disputes Concerning Labor Standards.

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

10. Certification of Eligibility.

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

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

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

## **A11 DEBARMENT AND SUSPENSION**

### **A11.1.1 Bidder or Offeror Certification**

#### **CERTIFICATION OF OFFERER/BIDDER REGARDING DEBARMENT**

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

### **A11.1.2 Lower Tier Contract Certification**

#### **CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT**

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

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

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

## **A12 DISADVANTAGED BUSINESS ENTERPRISE**

### **A12.1.1 Solicitation Language (Race/Gender Neutral Means)**

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

### **A12.1.2 A1.1.1 Prime Contracts (Projects covered by DBE Program)**

#### **DISADVANTAGED BUSINESS ENTERPRISES**

**Contract Assurance (§ 26.13)** - The contractor, sub-recipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate, which may include, but is not limited to: (1) Withholding monthly progress payments; (2) Assessing sanctions; (3) Liquidated damages; and/or (4) Disqualifying the contractor from future bidding as non-responsible.

**Prompt Payment (§26.29)** - The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than eight (8) working days from the receipt of each payment the prime contractor receives from the City of Palmer for the subcontractor's work. Additionally, if retainage is withheld from any subcontractor payments, the Contractor shall return the retainage within eight (8) working after payment is received for the subcontractor's work that is satisfactorily completed. Failure of the Contractor to make payments within the timeframe specified above may cause the City of Palmer to withhold the amount due from the contractor's future progress payments, future requests for payment by the Contractor may be required to be accompanied by signed statements from all subcontractors stating they have been paid for satisfactory work previously performed, and the contractor may be deemed non-responsible. Any delay or postponement of payment from the above referenced timeframe may occur only for good cause following written approval of the City of Palmer. This applies to both DBE and non-DBE subcontractors.

## **A13 DISTRACTED DRIVING**

### **TEXTING WHEN DRIVING**

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

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding \$3,500 and involve driving a motor vehicle in performance of work activities associated with the project.

## **A14 ENERGY CONSERVATION REQUIREMENTS**

### **ENERGY CONSERVATION REQUIREMENTS**

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

## **A15 EQUAL EMPLOYMENT OPPORTUNITY (E.E.O.)**

### **A15.1.1 E.E.O. Contract Clause**

#### **EQUAL OPPORTUNITY CLAUSE**

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

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

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

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

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

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

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

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the

administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however*, That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

### **A15.1.2 EEO Specification**

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

1. As used in these specifications:

- a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
- b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;
- c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
- d. "Minority" includes:
  - (1) Black (all) persons having origins in any of the Black African racial groups not of Hispanic origin);
  - (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);
  - (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
  - (4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

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

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

**A16 FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)**

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

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

## **A17 LOBBYING AND INFLUENCING FEDERAL EMPLOYEES**

### **CERTIFICATION REGARDING LOBBYING**

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

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

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

## **A18 PROHIBITION of SEGREGATED FACILITIES**

### **PROHIBITION of SEGREGATED FACILITIES**

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

(b) “Segregated facilities,” as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

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

## **A19 OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970**

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. Contractor must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The Contractor retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR Part 1910). Contractor must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

## **A20 PROCUREMENT OF RECOVERED MATERIALS**

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

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

The list of EPA-designated items is available at [www.epa.gov/epawaste/consERVE/tools/cpg/products/](http://www.epa.gov/epawaste/consERVE/tools/cpg/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.



## **A21 TAX DELINQUENCY AND FELONY CONVICTIONS**

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

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

#### **Certifications**

- a) The applicant represents that it is ( ) is not ( ) a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
- b) The applicant represents that it is ( ) is not ( ) is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

## **A22 TERMINATION OF CONTRACT**

### **A22.1.1 Termination for Convenience**

#### **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:

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

### **A22.1.2 Termination for Default**

#### **Termination for Default (Construction)**

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

## **A23 TRADE RESTRICTION CERTIFICATION**

### **TRADE RESTRICTION CERTIFICATION**

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

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

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

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 U.S.T.R. or
- (2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such U.S.T.R. list or
- (3) who incorporates in the public works project any product of a foreign country on such U.S.T.R. 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 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 U.S.T.R, 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 may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

## **A24 VETERAN'S PREFERENCE**

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



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**EXHIBIT B**

**BIDDER CERTIFICATIONS**





**EXHIBIT B1**  
**DEBARMENT AND SUSPENSION CERTIFICATION**

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

The Bidder further agrees that:

Each lower tier subcontract that exceeds \$25,000 as a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project.

Where the Bidder or any lower tier participant is unable to certify to this statement, they shall attach an explanation to this form which shall be submitted with the bid proposal.

\_\_\_\_\_

Date

\_\_\_\_\_

Authorized Signature

\_\_\_\_\_

Bidder / Offeror Name

\_\_\_\_\_

Title

**EXHIBIT B2**  
**PROHIBITION OF SEGREGATED FACILITIES CERTIFICATION**

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

“Segregated facilities,” as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

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

\_\_\_\_\_  
Date

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Bidder / Offeror Name

\_\_\_\_\_  
Title

**EXHIBIT B3**  
**TRADE RESTRICTION CERTIFICATION**

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

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

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

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 U.S.T.R. or
- (2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such U.S.T.R. list or
- (3) who incorporates in the public works project any product of a foreign country on such U.S.T.R. 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 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 U.S.T.R, 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 may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA

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Date

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Authorized Signature

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Bidder / Offeror Name

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Title

**EXHIBIT B4**  
**BUY AMERICAN CERTIFICATION**

**Certificate of Buy American Compliance for Manufactured Products**

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

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101 by:
- a) Only installing steel and manufactured products produced in the United States, or;
  - b) Installing manufactured products for which the FAA has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing, or;
  - c) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

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

- 1. To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
  - 2. To faithfully comply with providing US domestic product
  - 3. To furnish US domestic product for any waiver request that the FAA rejects
  - 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- The bidder or offeror hereby certifies it cannot comply with the 100% Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
- 1. To the submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that support the type of waiver being requested.
  - 2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination may result in rejection of the proposal.
  - 3. To faithfully comply with providing US domestic products at or above the approved US domestic content percentage as approved by the FAA.

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

**Required Documentation**

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

- a) Listing of all product components and subcomponents that are not comprised of 100% US domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- c) Percentage of non-domestic component and subcomponent cost as compared to total "item" component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

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

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

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

\_\_\_\_\_ Date

\_\_\_\_\_ Authorized Signature

\_\_\_\_\_ Bidder / Offeror Name

\_\_\_\_\_ Title

**EXHIBIT B5**  
**TAX DELINQUENCY AND FELONY CONVICTION**

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

**Certifications**

- a) The applicant represents that it is (  ) is not (  ) a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
  
- b) The applicant represents that it is (  ) is not (  ) is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

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Date

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Authorized Signature

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Bidder / Offeror Name

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Title





**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**EXHIBIT C**

**DOT&PF STANDARD SPECIFICATIONS FOR AIRPORT CONSTRUCTION**



**STATE OF ALASKA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES**



**STANDARD SPECIFICATIONS  
FOR  
AIRPORT CONSTRUCTION**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**AIP NO. 03-02-0211-030-2022 & 03-02-0211-031-2022**

**(Advisory Circular 150/5370-10H, Standard Specification for Construction of Airports,  
as modified, and approved by the Federal Aviation Administration  
for Airport Improvement Program contracts in Alaska)**

**Revised 01/01/20**

**US Customary**

**NOTE:** Special Provisions for each project are marked as changes to the text of the Standard Specifications. Deleted text is identified by strikethrough. Additions are underlined.



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## **PART I**

# **GENERAL CONTRACT PROVISIONS**





## SECTION 10 DEFINITION OF TERMS

**10-01 GENERAL.** The following terms and definitions apply in these Specifications. If a term is not defined, the ordinary, technical, or trade meanings for that term shall apply, within the context in which it is used.

Titles and headings of sections, subsections, and subparts are intended for convenience of reference and will not govern their interpretation. Working titles which have a masculine gender, such as “workman” and “flagman” and the pronouns and adjectives “he”, “his” and “him” are utilized in the contract documents for the sake of brevity, and are intended to refer to persons of either sex. 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.

Cited publications refer to the most recent issue, including interim publications, in effect on the date of the Invitation To Bid, unless specified by year or date.

These Specifications are written to the Bidder or Contractor. Unless otherwise noted, all actions required by the specifications are to be performed by the Bidder, the Contractor, or the Contractor's agent.

Some portions of these Specifications are written using imperative mood, abbreviated format, incomplete sentences and/or active voice to communicate the Contractor's responsibilities in a direct and concise manner. Omission of words or phrases such as “a,” “an,” “the,” “the Contractor shall,” “unless otherwise specified,” or “unless otherwise directed” is intentional. Interpret the Contract as if they were included.

For all Specification language except the General Contract Provisions, whenever anything is, or is to be, done, if, as, or, when, or where “acceptable, accepted, approval, approved, authorized, determined, designated, directed, disapproved, ordered, permitted, rejected, required, satisfactory, specified, submit, sufficient, suitable, suspended, unacceptable, unsatisfactory, or unsuitable,” the expression is to be interpreted as if it were followed by the words “by the Engineer” or “to the Engineer.”

**10-02 ACRONYMS.** Wherever the following abbreviations are used in these Specifications or on the Plans, they are to be construed the same as the respective expression represented. :

AAC	<i>Alaska Administrative Code</i>
AASHTO	American Association of State Highway and Transportation Officials
AC	<i>FAA Advisory Circular</i>
ACI	American Concrete Institute
AIA	American Institute of Architects
AIP	Airport Improvement Program
AKOSH	Alaska Occupational Safety and Health
ANSI	American National Standards Institute
AOA	Air Operations Area
AS	<i>Alaska Statute</i>
ASDS	<i>Alaska Sign Design Specifications</i>
ASTM	American Society for Testing & Materials
ATM	Alaska Test Method
ATMM	<i>Alaska Test Methods Manual</i>
CFR	<i>Code of Federal Regulations</i>
CSPP	Construction Safety and Phasing Plan
CTAF	Common Traffic Advisory Frequency
DOLWD	Alaska Department of Labor and Workforce Development
DOT&PF	Alaska Department of Transportation and Public Facilities
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FM	Factory Mutual

FOP	Field Operating Procedure (See <i>Alaska Test Methods Manual</i> )
FSS	Flight Service Station
ICEA	Insulated Cable Engineers Association (formerly IPCEA)
<del>MCL</del>	<del>Materials Certification List</del>
MRP	Mining and Reclamation Plan
NEC	<i>National Electrical Code</i>
NEMA	National Electrical Manufacturers Association
NOTAMs	<i>Notices to Airmen</i>
RASSO	Regional Airport Safety and Security Officer
SPCC	<i>Spill Prevention, Control, and Countermeasure (Plan)</i>
SPCD	Safety Plan Compliance Document
SSAC	<i>DOT&amp;PF Standard Specifications for Airport Construction</i>
SSPC	Society for Protective Coatings
SWPPP	<i>Storm Water Pollution Prevention Plan</i>
TCP	<i>Traffic Control Plan</i>
UL	Underwriters Laboratory
WAQTC	Western Alliance for Quality in Transportation Construction (See <i>Alaska Test Methods Manual</i> )

### 10-03 DEFINITIONS.

**ACCEPTANCE SAMPLING AND TESTING.** Sampling and testing performed by the ~~State of Alaska~~ Department, or its designated agent, to evaluate acceptability of the final product.

**ACCESS ROAD.** The right-of-way, the roadway, and all improvements constructed thereon connecting the airport to another public thoroughfare.

**ADDENDA.** Clarifications, corrections, or changes to the Plans, Specifications, or other Contract documents issued graphically or in writing by the Department after the advertisement but prior to bid opening.

**ADVERTISEMENT.** The public announcement, as required by law, inviting bids for specified work or materials.

**ADVISORY CIRCULAR (AC).** FAA standards and guidance for their Airport Improvement Program.

**AGREED PRICE.** An amount negotiated between the Department and the Contractor after Contract award for additional work performed or additional materials supplied under the Contract.

**AIR OPERATIONS AREA (AOA).** Any area of the airport used or intended to be used for the landing, takeoff, surface maneuvering, or parking 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.

**AIRPORT.** An area of land or water that is used or intended for use for the landing and takeoff of aircraft, and any appurtenant areas that are used or intended for use for airport buildings or other airport facilities or right of way, together with airport buildings and facilities.

**AIRPORT IMPROVEMENT PROGRAM (AIP).** A grant-in-aid program, administered by the FAA.

**ALASKA STANDARD PLAN.** Detail drawing adopted by the Department for repetitive use, showing details to be used where appropriate. Alaska Standard Plans are adopted as Alaska's accepted standards, in accordance with AS 19.10.160(a), and for use in conformity with 12 AAC 36.185(a)(2).

**ALASKA TEST METHODS MANUAL (ATMM).** The materials testing manual used by the Department. It contains Alaska Test Methods, WAQTC Test Methods, WAQTC FOPs for AASHTO Test Methods, and Alaska Standard Practices for evaluating test results and calibrating testing equipment.

**ALASKA TRAFFIC MANUAL.** The standard for traffic control devices on Alaska roads, per AS 28.01.010(d). The Alaska Traffic Manual is comprised of the Manual on Uniform Traffic Control Devices (MUTCD) published

by the Federal Highway Administration as modified by the Alaska Traffic Manual Supplement, and any adopted revisions or interim addenda issued subsequently and corrections to known errors in either document.

**AVIATION MATERIALS CERTIFICATION LIST.** See Materials Certification List.

~~**AWARD.** Acceptance of the successful bid by the Department. The award is effective upon execution of the Contract by the Contracting Officer.~~

**BASE COURSE.** One or more layers of specified material placed on a subbase or subgrade to support a surface course.

~~**BID (OR PROPOSAL).** The bidder's offer, on the prescribed forms, to perform the specified work at the prices quoted.~~

~~**BID BOND.** A type of bid guaranty.~~

~~**BIDDER.** An individual, firm, corporation, joint venture, or any acceptable combination of individuals and entities submitting a bid for the advertised work.~~

~~**BID FORMS.** Department-furnished forms that a bidder must complete and submit when making a bid in response to an advertised project. Bid forms may include a bid schedule, certification forms, acknowledgment forms, and other documents.~~

~~**BID GUARANTY.** The security furnished with a bid to guarantee that the bidder will enter into a contract if the Department accepts the bid.~~

**CALENDAR DAY.** Every day shown on the calendar, beginning and ending at midnight.

~~**CHANGE ORDER.** A written order by the Department to the Contractor making changes to the Contract, within its general scope, and establishing the basis of payment and time adjustment, if any, for the work affected.~~

**COMMON TRAFFIC ADVISORY FREQUENCY (CTAF).** A designated frequency for the purpose of carrying out airport advisory practices while operating to or from an airport that does not have a control tower or an airport where the control tower is not operational. CTAF is identified in appropriate aeronautical publications such as the current *Alaska Flight Information Supplement*, a civil/military flight information publication issued by FAA every 56 days.

**COMPLETION DATE.** The date on which all Contract work is specified to be completed.

**CONSTRUCTION.** Physical activity by the Contractor or any Subcontractor using labor, materials or equipment within the Project, or within material sources planned for use on the Project.

**CONSTRUCTION SAFETY AND PHASING PLAN (CSPP).** The overall plan for safety and phasing of a construction project developed by the Department and approved by the FAA. It is included in the invitation for bids and becomes part of the project specifications.

**CONTINGENT SUM.** A method for paying for a Contract bid item reserved by the Department for specified contingencies. The Contractor shall perform Contingent Sum work only upon the Directive of the Engineer. The basis of payment for Contingent Sum work shall be specified in the Contract or the Directive.

~~**CONTRACT.** The written agreement between the Department and the Contractor setting forth the obligations of the parties for the performance and completion of the work.~~

The Contract includes the Invitation To Bid, Bid Form, Standard Specifications, Special Provisions, Plans, Bid Schedule, Contract Forms, Contract Bonds, Addenda, and any Change Orders, Interim Work Authorizations, Directives, or Supplemental Agreements that are required to complete the work in an acceptable manner, all of which constitute one instrument.

~~**CONTRACTING OFFICER (PROCUREMENT OFFICER).** The person authorized by the Commissioner of the Department to enter into and administer the Contract on behalf of the Department. The Contracting Officer has authority to make findings, determinations, and decisions with respect to the Contract and, when necessary, to modify or terminate the Contract. The Contracting Officer is identified on the Invitation To Bid.~~

~~**CONTRACT ITEM (PAY ITEM).** A specifically described item of Contract work listed on the Bid Schedule or in a Change Order.~~

**CONTRACTOR.** The individual, firm, corporation, joint venture, or any acceptable combination of individuals and entities contracting with the Department for performance of the Contract.

**CONTRACT TIME.** The time allowed under the Contract, including authorized time extensions, for the completion of all work by the Contractor.

**CONTROLLING ITEM.** Any feature of the work considered at the time by the Engineer: (1) essential to the orderly completion of the work and (2) a feature which, if delayed, will delay the time of completion of the Contract (such as an item of work on the critical path of a network schedule).

**COST.** Amounts actually incurred by the Contractor in the performance of the Contract that are (a) actually reflected in contemporaneously maintained accounting or other financial records and (b) supported by original source documentation. Costs are to be stated in U.S. dollars.

**CULVERT.** A pipe or arch half pipe, that provides an opening under the embankment.

~~**DAY.** Calendar day unless preceded by the word "working".~~

**DEPARTMENT.** The City of Palmer, except when used in reference to standard forms, then the State of Alaska Department of Transportation and Public Facilities.

**DIGITAL SIGNATURE.** An electronic signature that conforms to the Uniform Electronic Transactions Act, AS 09.80.010 et seq.

**DIRECTIVE.** A written communication to the Contractor from the Engineer enforcing or interpreting a Contract requirement or ordering commencement or suspension of an item of work already established in the Contract.

**DRAINAGE SYSTEM.** The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

~~**ELECTRONIC BID.** A bid that a bidder (i) prepares on the Department's bid forms accessed through the Department's approved online bidding service and (ii) submits to the Department through use of that bidding service's online submittal process.~~

**ELECTRONIC MAIL (EMAIL).** A system for sending messages from one person to another via telecommunications links between computers or terminals using dedicated software.

~~**ENGINEER.** The authorized representative of the Department's Contracting Officer. The Engineer is responsible for administration of the Contract.~~

**EQUIPMENT.** All machinery, tools, apparatus, and supplies necessary to preserve, maintain, construct, and complete the work.

**EQUITABLE ADJUSTMENT.** An increase or decrease in Contract price or time calculated according to the terms of this Contract.

~~**EXTRA WORK.** An item of work not provided for in the Contract as awarded but found essential by the Engineer for the satisfactory completion of the Contract within its intended scope.~~

**FEDERAL AVIATION ADMINISTRATION (FAA).** Branch of the U.S. Department of Transportation. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.

**FEDERAL SPECIFICATIONS.** The most current version of the Federal Specifications and Standards, Commercial Item Descriptions, and supplements, amendments, and indices thereto which are prepared and issued by the General Services Administration (GSA) of the Federal Government in effect on the date bids are opened.

**FOREIGN OBJECT DEBRIS (FOD).** Any object, live or not, located in an inappropriate location in the airport environment that has the capacity to injure airport or air carrier personnel and damage aircraft.

**HIGHWAY, STREET, OR ROAD.** A general term denoting a public way used by vehicles and pedestrians, including the entire area within the right-of-way.

**HIGHWAY TRAFFIC CONTROL PLAN.** See traffic control plan.

**HOLIDAYS.** State of Alaska legal holidays are:

- a. New Year's Day - January 1
- b. Martin Luther King, Jr. Day - Third Monday in January
- c. Presidents' Day - Third Monday in February
- d. ~~Seward's Day - Last Monday in March~~
- e. Memorial Day - Last Monday in May
- f. Independence Day - July 4
- g. Labor Day - First Monday in September
- h. Alaska Day - October 18
- i. Veteran's Day - November 11
- j. Thanksgiving Day - Fourth Thursday in November
- k. Christmas Day - December 25
- l. ~~Every Sunday~~
- m. Every day designated by public proclamation by the President of the United States or the governor as a legal holiday.

If a holiday listed above falls on a Saturday then that Saturday and the preceding Friday are both legal holidays ~~for officers and employees of the state~~. If the holiday falls on a Sunday, ~~except (12) above~~, then that Sunday and the following Monday are both legal holidays.

**INSPECTOR.** An authorized representative of the Engineer assigned to make all necessary inspections, observations, and/or tests, observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.

**INTERIM WORK AUTHORIZATION.** A written order by the Engineer initiating changes to the Contract, within its general scope, until a subsequent Change Order is executed.

**INVITATION TO BID.** The advertisement for bids for all work or materials on which bids are required.

**LABORATORY.** The official testing laboratories of the Department or such other laboratories as may be designated by the Engineer.

**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.

**MAJOR CONTRACT ITEM.** A Contract item for which the Contractor's Bid Amount is 5 percent or more of the total Contract award amount. Determination of a Major Contract Item is made at the time of Award.

~~**MANUAL BID.** A bid that a bidder (i) prepares on the Department's bid forms accessed either through the Department's approved online bidding service or obtained from the Department's Regional Contracts Office and (ii) submits to the Department in physical paper form by hand delivery, U.S. Mail, or courier service.~~

~~**MATERIALLY UNBALANCED BID.** A mathematically unbalanced bid that either (a) gives rise to a reasonable doubt that it will ultimately result in the lowest overall cost to the Department, even though it may be the lowest bid or (b) is so unbalanced as to be tantamount to allowing a significant advance payment.~~

**MATERIALS.** Substances specified for use in the construction of the project.

~~**MATERIALS CERTIFICATION LIST (MCL).** Also referred to as "Aviation Materials Certification List". A list of materials for which the Contractor shall submit certifications to the Engineer. The MCL will also designate electrical products requiring listing by an approved independent electrical testing laboratory. The MCL is included in the Contract documents as an appendix.~~

~~**MATHEMATICALLY UNBALANCED BID.** A bid (a) where each pay item fails to carry its share of the cost of the work plus the bidder's overhead and profit, or (b) based on nominal prices for some pay items and enhanced prices for other pay items.~~

~~**MINOR CONTRACT ITEM.** A Contract item with a total value of less than 5 percent of the Contract award amount.~~

**NON-FROST SUSCEPTIBLE.** Stone, gravel or sand, that contains 6 percent or less material passing the No. 200 screen as determined by sieve analysis performed with ATM 304 on the minus 3-inch material, and has a plastic index of 6 or less as determined by ATM 205.

~~**NOTICE OF INTENT TO AWARD.** The written notice by the Department announcing the apparent successful bidder and establishing the Department's intent to award the Contract when all required conditions are met.~~

~~**NOTICE TO PROCEED.** Written notice to the Contractor to begin the Contract work.~~

**ORIGINAL GROUND (OG).** The ground surface prior to the start of work.

**PAVEMENT STRUCTURE.** The combination of subbase, base course, and surface course placed on a subgrade to support and distribute the traffic load. Some layers may not be present, see Plans.

~~**PAYMENT BOND.** The security furnished by the Contractor and the Contractor's Surety to guarantee payment of all persons who supply labor and material in prosecution of the work provided for in the contract.~~

~~**PERFORMANCE BOND.** The security furnished by the Contractor and the Contractor's Surety to guarantee performance and completion of the work provided for in the contract.~~

**PLANS.** The Department's contract drawings, profiles, typical cross sections, and supplemental drawings or reproductions showing the location, character, dimensions, and details of the work.

**PRECONSTRUCTION CONFERENCE.** A meeting between the Contractor and the Engineer to discuss the project before the Contractor begins the work.

**PROCESS CONTROL.** See quality control.

~~**PROCUREMENT OFFICER.** See contracting officer.~~

**PROFILE.** The vertical elevation of the surface of the layer at the location indicated. It is typically indicated at the longitudinal centerline of the top layer of pavement on the runway, taxiway, apron, or roadway. On a material or fabrication it may be used to indicate a shape, or a thickness of material or thickness of a coating.

**PROJECT.** (a) The specific section of the airport or other property and related facilities on which construction is to be performed, or (b) the work that is to be performed under the Contract whether completed or partially completed.

~~**QUALIFIED PRODUCTS LIST.** A list of products that the Department has found conforms to the SSAC, except for Buy American and Alaska Agricultural/Wood Products. The Department makes no guarantee that any product on the Qualified Products List meets the requirements of Subsection 60-09 Buy American Steel and Manufactured Products, or Alaska Agricultural/Wood Products.~~

**QUALITY CONTROL (QC)** also called **PROCESS CONTROL.** The system used by a contractor to monitor, assess and adjust their production or placement processes to ensure that the final product will meet the specified level of quality. Quality control includes sampling, testing, inspection and corrective action (where required) to maintain continuous control of a production or placement process.

**RESOURCES.** Labor, equipment, materials, supplies, tools, transportation, and supervision necessary to perform the work.

~~**RESPONSIBLE BIDDER.** A bidder that the Department determines has the skill, ability, financial resources, legal capacity to contract, equipment, required licenses, integrity, satisfactory record of performance and that is otherwise fully capable of performing the Contract.~~

~~**RESPONSIVE BID.** A bid that the Department determines conforms in all material respects with the solicitation for bids.~~

**RETAINAGE.** A percentage of a payment established in advance under a contract or subcontract to be withheld from a progress payment due on the contract or subcontract. Payment or a percentage of payment withheld for unsatisfactory performance is not retainage.

**RIGHT-OF-WAY.** Land or property or an interest in property available for a project. The uses allowed in portions of right-of-way may be restricted.

**RUNWAY.** The area of the airport prepared for the landing and takeoff of aircraft.

**RUNWAY SAFETY AREA (RSA).** A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event an aircraft undershoots, overshoots, or departs from the runway.

**SAFETY PLAN COMPLIANCE DOCUMENT (SPCD).** A document prepared by the Contractor that details how the Contractor will comply with the CSPP, and approved by the Department.

**SECURITY PLAN.** A Contract document that specifies methods of controlling the operations of the Contractor, subcontractors, and suppliers so as to provide for (1) security of workers, equipment, and public, (2) security of aircraft in the Air Operations Areas of the airport, and (3) security of the Airport property.

**SPECIAL PROVISION.** Addition or revision that amends or supersedes the Standard Specifications and is applicable to an individual project.

**SPECIALTY ITEM.** A Contract item identified in the Contract that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract.

**SPECIFICATIONS.** General term applied to all Contract terms, conditions, directions, provisions, and requirements.

**STANDARD SPECIFICATIONS.** A book or electronic file of specifications approved by the Department for general application and repetitive use.

**STATE.** The State of Alaska, acting through its authorized representative.

**STRUCTURE.** Bridge, building, catch basin or inlet, cribbing, culvert, electrical duct, flexible and rigid pavements, handholes, junction boxes, lighting fixture and base, manhole, navigational aid, retaining wall, storm and sanitary sewer lines, transformer, underdrain, vault, visual aid, water line, and other manmade features of the airport that may be encountered in the work and not otherwise classified herein.

**SUBBASE.** Layer of specified material between the subgrade and base course.

~~**SUBCONTRACTOR.** Individual or legal entity to whom or to which the Contractor sublets part of the Contract.~~

**SUBGRADE.** The soil or embankment upon which the pavement structure is constructed.

**SUBSIDIARY.** Work or material not measured or paid for directly. Compensation for such work is included in the payment for other items of work.

~~**SUBSTANTIAL COMPLETION.** The point at which the project (1) can be safely and effectively used by the public without further delays, disruption, or other impediments; and (2) pavement structure, shoulder, drainage, sidewalk, permanent signing and markings, guardrail and other traffic barrier, fencing, safety appurtenance, structures, utilities, lighting, bridge deck and parapet work, and guidance systems for aircraft is complete.~~

~~For projects built in phases the work is substantially complete when it is ready for the subsequent project.~~

**SUPERINTENDENT.** The Contractor's authorized representative in responsible charge of the work.

**SUPPLEMENTAL AGREEMENT.** Negotiated written agreement between the Department and the Contractor authorizing performance of work beyond the general scope of, but in conjunction with, the original Contract. Supplemental agreements are new procurements under the State Procurement Code, AS 36.30.

~~**SURETY.** Corporation, partnership, or individual, other than the Contractor, executing a bond furnished by the Contractor.~~

**SURFACE COURSE.** Top homogenous layer of the pavement structure. It is designed to withstand the wear of traffic and the disintegrating effects of climate. Sometimes called the wearing course.

**TAXIWAY.** The portion of the air operations area of an airport that has been designated for movement of aircraft to and from runways or aircraft parking areas.

**TAXIWAY SAFETY AREA (TSA).** A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

**TRAFFIC CONTROL PLAN (TCP).** Also referred to as "Highway Traffic Control Plan". A drawing or drawings indicating the method for safely guiding and protecting motorists, pedestrians, bicyclists, and workers in a highway traffic control zone. The TCP depicts the highway traffic control devices and their placement and times of use.

**UTILITY.** Line, facility, or system for producing, transmitting, or distributing communications, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, storm water not connected with highway drainage, or other similar commodity, including a publicly owned fire or police signal system, street lighting system, or railroad which directly or indirectly serves the public. Also means lighting as defined in this subsection. Also means a utility company, inclusive of any subsidiary.



**VERIFICATION SAMPLING AND TESTING.** See ACCEPTANCE SAMPLING AND TESTING.

**WORK.** Depending on the context, (a) The act of furnishing all resources for the project and performing all duties and obligations required by the Contract or (b) the physical construction, facility or end product that is contemplated under the Contract, whether completed or partially completed.

**WORKING DAYS.** Calendar days, except Saturdays and state holidays.

**WORKING DRAWINGS.** Stress sheets, shop drawings, erection plans, falsework plans, framework plans, cofferdam plans, bending diagrams for reinforcing steel, wiring diagrams and schematics, traffic control plans, or any other supplementary plans or similar data which the Contractor is required to submit to the Engineer for approval.



## SECTION 90 MEASUREMENT AND PAYMENT

**90-01 GENERAL.** Wherever the Contract provides that certain work is subsidiary or it is without extra compensation, the payment for that work is included in the payment for other items of work, and no further or additional payment shall be made for that work.

When more than one type of material or work is specified for a pay item, the pay item and the proposal line number are used to differentiate the material or work.

Lump sum items will not be measured for payment. The Contractor shall accept the bid amount for a lump sum item as complete payment for all work necessary to complete that item. Quantities shown for lump sum items are approximate. No adjustment in the lump sum price will be made if the quantity furnished is more or less than the estimated quantity unless the Contract specifically states otherwise.

**90-02 MEASUREMENT OF QUANTITIES.** All work completed under the Contract will be measured using the U.S. Customary system of measure. The Engineer may agree for purposes of making progress payments to use a method of measurement other than the methods described below. However, all final payments for quantities will be calculated using one or more of the methods of measurement described below and in the applicable pay item section. Unless otherwise specified, work will be measured as follows:

- a. **Acre (43,560 ft<sup>2</sup>).** Horizontally, unless specified on the ground surface. No deductions will be made for individual fixtures with an area of 500 ft<sup>2</sup> or less.
- b. **Contingent Sum.** Measured as specified in the Contract or Directive authorizing the work. The method of payment may include: (1) a lump sum basis, (2) a price multiplied by the units of work performed, (3) a pay adjustment based on the quality of work, or (4) a deduction from the contract amount.
- c. **Cubic Yard (yd<sup>3</sup>).** At the location specified using method (1), below. Methods (2) through (5) may be used with written approval of the Engineer.
  - (1) **Average End Area.** End area is the calculated area between original ground cross section and either the design cross section or at the Engineer's discretion the final cross section. Volume of material is calculated using the average of end areas multiplied by the distance along centerline between end areas. In extreme cases where most of the earthwork lies along a single horizontal curve the Engineer may compute volume using the average of end areas multiplied by the distance along centroid of cross section between end areas.
  - (2) **Three-Dimensional.** Where it is impractical to measure material by cross sectioning due to erratic location of isolated deposits, acceptable methods involving three-dimensional measurements may be used.
  - (3) **Neat Line.** Structures will be measured according to neat lines shown on the Plans or as altered to fit field conditions.
  - (4) **Nominal.** Volume calculated as nominal width times nominal thickness times the average length of each piece.
  - (5) **Weight.** With the Engineer's written approval, material that is specified to be measured by volume may be weighed and converted to volume for payment purposes. The Engineer will determine the appropriate conversion factors. When liquid asphalt is a pay item, ASTM D4311 will be used to convert from weight to volume at 60 °F.
- d. **Cubic Yard Vehicle Measure (CYVM).** Material measured by volume in the hauling vehicle will be measured at the point of delivery. Vehicles may be of any acceptable size or type provided that the volume of the actual contents may be readily and accurately determined. Vehicles shall be loaded

to the measured vehicle volume. If vehicles are not loaded to the measured vehicle volume, the Engineer at their discretion, may apply a percentage of full factor to the measured volume. Loads shall be leveled when directed. No payment will be made for loads that exceed the legal capacity of the vehicle.

- e. **Linear Foot (LF).** From end to end, in place, parallel to the centerline of the item or ground surface on which the items are placed.
- f. **Thousand Feet Board Measure (MBM).** Nominal volume based on nominal widths and thickness times actual extreme length of each piece. One thousand feet board measure = 1,000 ft<sup>2</sup> X 1 inch thick.
- g. **Thousand Gallon (MGal).** By using method (1), below. Methods (2) or (3) may be used with written approval of the Engineer:
  - (1) Measured or calibrated volume tank;
  - (2) Metered volume, using a certified calibrated meter; or
  - (3) Weighed under this subsection and converted to volume, using a specified or approved conversion factor.
- h. **Mile.** From end to end, measured horizontally along centerline.
- i. **Pound.** Using a certified scale or the net weight of packaged material as labeled by the manufacturer. The Engineer will accept nominal weights for standard manufactured items, unless otherwise specified. The Engineer will accept industry-established manufacturing tolerances, unless otherwise specified.
- j. **Square Foot (ft<sup>2</sup>).** Parallel to the surface being measured. No deductions will be made for individual fixtures with an area of 1 ft<sup>2</sup> or less. Transverse measurement for area computations will be the neat dimensions shown on the Plans or as directed by the Engineer.
- k. **Square Yard (yd<sup>2</sup>).** Parallel to the surface being measured. No deductions will be made for individual fixtures with an area of 1 yd<sup>2</sup> or less. Transverse measurement for area computations will be the neat dimensions shown on the Plans or as directed by the Engineer.
- l. **Station (100 feet).** Horizontally, parallel to centerline.
- m. **Ton (2,000 pounds).** By using method (1) or (2), below. Method (3) may be used with written approval of the Engineer:
  - (1) **Commercial Weighing System.** Permanently installed and certified commercial scale that meets the requirements for the project weighing system.
  - (2) **Project Weighing System.** Approved automatic digital scale and scale house. All scales are subject to approval according to the Weights and Measures Act, AS 45.75.

Spring balances and belt conveyor scales shall not be used to determine pay weight.

The Contractor may use proportioning (batch) scales for weighing material for payment when the batching equipment includes an approved and certified automatic weighing, cycling, and monitoring system.

Weigh scales used with a storage silo may be used to weigh the final product for payment, provided the scales are approved and certified.

Vehicle scales shall be maintained with the platform level and rigid bulkheads at each end. The platform must be long enough to permit simultaneous weighing of the hauling vehicle including coupled vehicles, in a single draft. Double draft weighing is not allowed.

**(a) Scale Requirements.** The Contractor shall:

1. Ensure that vehicle scale(s) are installed and maintained to the standards listed in the National Institute of Standards and Technology (NIST), Handbook 44, Specifications, Tolerances and other Technical Requirements for Commercial Weighing and Measuring Devices, as adopted by AS 45.75.050(d);
2. Contact the Division of Measurement Standards/Commercial Vehicle Enforcement (MSCVE) to coordinate scale inspections before use, at required intervals or as directed by the Engineer and for clarification or possible exceptions to this section;
3. Ensure that a weatherproof housing is provided to protect the scale indicating/recording equipment and allows the scale operator convenient access to the weigh indicator, scale computer, ticket printer, and sequential printer;
4. Use competent personnel to operate the scale system;
5. Furnish and maintain on-site, NIST Class-F cast iron test weights in denominations of 500-lb and/or 1,000-lb. The required minimum for vehicle scales is 4,000-lb; the required minimum for hopper scales is 2,000-lb. Test weights shall have a recognized calibration certificate on file which is dated no more than two years from date of Notice to Proceed. Test weights will be used as directed by the Engineer or MSCVE for initial accuracy calibration testing and may be used for subsequent scale testing or inspection. Projects accessible by direct road access from the communities identified on the [dot.alaska.gov/mscve](http://dot.alaska.gov/mscve) website, 5 days before bid opening, are exempt from the requirement to furnish and maintain on-site test weights;
6. Provide the following information on any scale used to weigh materials for payment:
  - i. Owner of the scales and scale locations;
  - ii. Manufacturer's name, model serial number, maximum capacity, and type of scales (single beam, double beam, self-reading, etc.)
  - iii. Date(s) the scales were installed and/or adjusted;
  - iv. Scale service company inspections and accuracy checks (attach copy);
  - v. Division of Measurement Standards inspections and accuracy checks (attach copy); and
  - vi. Time and dates of notification of any malfunctions.

**(b) Electronic Computerized Weighing System.** The Contractor shall use an electronic computerized weighing system (ECWS) with the following minimum capabilities:

1. **Computer.** A computer with a self-reading scale system that includes the scale load cell, a sealed direct reading weight indicator, scale computer, ticket printer, and sequential printer, and that can record a complete shift's transaction in an electronic format approved by the Engineer.

The computer must store project numbers, all pay item descriptions for multiple projects and products that are weighed, and the following information for each hauling vehicle used on the project:

- i. Vehicle identification number marked on the vehicle;
- ii. Tare weight; and
- iii. Maximum allowable gross vehicle weight (MAVW).

During weighing operations, the ECWS must compare each vehicle's gross weight to its MAVW. If the vehicle exceeds its MAVW, the system must alert the scale operator that an "overload" exists. The system must not issue a ticket for an overload.

The computer must have a battery backup and protection for power surges or brown outs. The computer system must retain all stored data during a power outage and must operate during a power outage to allow the scale operator to shut down the hard drive without losing information.

2. **Tickets.** The ECWS must have a ticket printer that prints a legible, serially numbered weigh ticket for the Engineer with the following information on each ticket in the order listed:

- i. Project number;
- ii. Item number and description;
- iii. Date weighed;
- iv. Time weighed;
- v. Ticket number;
- vi. Vehicle Identification Number;
- vii. Maximum allowable gross vehicle weight;
- viii. Gross weight;
- ix. Tare weight;
- x. Net weight;
- xi. Subtotal item net weight for each haul unit since start of shift; and
- xii. Accumulated item net weight for all haul units since start of shift.

Tickets must show all weights in pounds in accordance to NIST Handbook 44, and in tons reported to two decimal places.

After printing, the weigh ticket must automatically advance to a perforation so it can be torn off and handed to the driver. Each ticket shall be initialed by the scale operator before handoff to the driver.

3. **Sequential Printer.** A sequential printer that prints out all transactions (keystrokes) made by the computer concurrently with the ticket printer. For permanent commercial scales, the printer may print at the end of the company's daily shift with the Engineer's

approval. The printer must print all scales transactions including tares, voided tickets, and data changes made by the scale operator. The printer must allow for advancing the paper manually so that the scale operator can write notes on the paper when special situations occur, such as voided tickets, incorrect vehicle identification number used, etc. The scale operator shall also note these special situations in the Scales Diary.

The sequential printout shall be submitted to the Engineer at the end of each shift.

4. **Data Files.** Submit electronic data files to the Engineer at the end of each shift, with all ticket information produced during the shift recorded. These Data files must be complete and correct without conversion or manipulation.
5. **Scale Diary.** The scale operator shall keep a Scale Diary in an electronic format acceptable to the Engineer. The scale operator shall complete the Scale Diary with the following information: dates of action, type of material, source, time the scale opened and time the scale closed, times of scale balance, ticket sequence, time the haul for each material started and stopped, voided ticket numbers, vehicle identification numbers, times of tare and tare weights, and the scale operator's signature. The Scale Diary shall include the following information on any scale used to weigh materials for payment:
  - i. Owner of the scales and scale locations;
  - ii. Manufacturer's name, model serial number, maximum capacity, and type of scales (single beam, double beam, self-reading, etc.);
  - iii. Date(s) the scales were installed and/or adjusted;
  - iv. Scale service company inspections and accuracy checks (attach copy);
  - v. Division of Measurement Standards inspections and accuracy checks (attach copy); and
  - vi. Time and dates of notification of any malfunctions.

The Scale Diary shall be given to the Engineer at the end of each shift. The Scale Diary is the property of the Department.

- (c) **Weighing Procedures.** The scale operator shall tare hauling vehicles and record tare weights at least once daily; perform additional tares and record additional tare weights as directed by the Engineer; perform tares in the presence of the Engineer when requested; and ensure that each hauling truck displays a unique, legible identification mark.

The ~~Engineer-Contractor~~ will calculate the MAVW for each vehicle and list all vehicles and their MAVW(s) in the scale house. The MAVW is either the maximum allowable legal weight determined by the ~~Engineer-Contractor~~ when the Contractor cannot haul overloads, or the manufacturer's recommended maximum allowable gross vehicle weight as certified by the Contractor when vehicles are allowed to haul overloads. Only MAVWs that the ~~Engineer-Contractor~~ has provided to the Engineer in writing shall be used. Tickets may not be issued to a vehicle until the ~~Engineer-Contractor~~ provides the MAVW. All vehicles and MAVWs are subject to random verification by Engineer.

No payment will be made for any material weighed without using the ECWS, unless the Contractor obtains the Engineer's prior written authorization. If the ECWS malfunctions or breaks down, weights shall be manually weighed and recorded for up to 48 hours as

directed by the Engineer. The manual weighing operation shall meet all other Contract requirements.

The system must generate a report either during or at the end of the day or shift that summarizes the number of loads and total net weight for each date, project, and product. The scale operator shall submit the original report to the Engineer at the end of each shift.

No payment for any hauled material on a given date will be made until the following are delivered to the Engineer:

1. Sequential printout;
2. Daily data; and
3. Scale Diary.

The Contractor will not receive payment for any material hauled in a vehicle that does not conform to the requirements of ~~Subsection 50-12~~ CPSS Section 10.06 Article 6.20, Load Restrictions, and this Subsection. The Contractor shall dump material from non-conforming vehicles until they conform, then reweigh the vehicles.

When a weighing device indicates less than true weight, the Contractor will not receive additional payment for material previously weighed and recorded. When a weighing device indicates more than true weight, all material received after the last previously correct weighing accuracy test will be reduced by the percentage of error that exceeds 0.5 percent.

If the Engineer incurs extra construction engineering expenses from checking non-machine data entries or other data irregularities, the total value of those expenses will be deducted from the value of the Contract item before payment.

The Contractor shall accept natural variations in the specific gravity of aggregates, without adjustment in Contract unit price.

- (3) Invoices.** Supplier's invoice with net weight or volume converted to weight for bulk material that is shipped by truck or rail and is not passed through a mixing plant. Periodic check weighing may be required. Net certified weights or volumes of asphalt materials are subject to correction for temperature and foaming. All materials are subject to correction for material that is lost, wasted, or otherwise not incorporated into the work, for computing quantities.

All aggregate paid by weight shall be less than 2% over optimum moisture, or as approved by the Engineer.

**90-03 SCOPE OF PAYMENT.** The method of measurement will be a combination of lump sum and unit price items, as shown on the bid schedules. The Department will make payment at the Contract price or prices for each item shown on the bid schedule or as modified by change order with specified price adjustments. The Contractor shall accept the Contract prices as full and complete payment for (a) furnishing all equipment, materials, tools, ~~supplies, water, heat, utilities, transportation, permits,~~ and labor necessary to complete the work in a complete and acceptable manner, and for (b) all of the Contractor's risk, loss, damage, or expense of whatever character arising from or relating to the work and performance of the work, ~~including unforeseen difficulties that may be encountered.~~ All incidental costs to construct the project shall be proportionately included in each bid item.

**90-04 COMPENSATION FOR ALTERED QUANTITIES.** See CPSS Section 10.4 Articles 4.4-4.6. ~~Payment to the Contractor for unit price items shall be made only for the actual quantities of work performed and accepted or materials furnished, in conformance with the Contract. When the accepted quantities of work or materials vary from the quantities stated in the bid schedule, the Contractor shall accept payment at the original Contract unit prices for the quantities of work and materials furnished, completed and accepted as~~



payment in full. Payment at the Contract unit price shall compensate the Contractor for all costs, expenses, and profit that the Contractor is entitled to receive for the altered quantities, except as provided below:

- a. ~~When the final quantity of a Major Contract Item varies more than 25 percent above or below the bid quantity, either party to the Contract may receive an equitable adjustment, excluding anticipated profits, in the Contract unit price of that item. If the final quantity of work is:~~
  - ~~(1) Greater than 125 percent of the bid quantity, the equitable adjustment will be made only for those units that are in excess of 125 percent of the bid quantity.~~
  - ~~(2) Less than 75 percent of the bid quantity, the equitable adjustment will be made for those units of work done and accepted, except that the total payment for the item shall not exceed 75 percent of the total amount bid for the item.~~

~~Except as provided above and in Subsection 40-02, no allowance shall be made for any increased expenses, expected reimbursement, or anticipated profits suffered or claimed, either directly from alterations in quantities or indirectly from unbalanced allocations among the contract items on the part of the bidder and subsequent loss of expected reimbursements, or any other causes.~~

**90-05 COMPENSATION FOR EXTRA WORK ON TIME AND MATERIALS BASIS.** When the Engineer orders extra work to be performed on a time and materials basis, compensation will be computed as follows:

- a. **Labor.** Based on the sum of (1) through (6):
  - (1) **Total hours worked times the straight time rate of pay.** The rates of pay are those indicated on the certified payroll for all labor and foremen in direct charge of the specific operations. Rates shall not exceed those for comparable labor currently employed on the project, and shall not include general superintendence. Supervision above the level of working foreman, such as general foremen, superintendents, and project managers, etc. shall not be included in labor costs and shall be considered to be included in the overhead and profit markup.
  - (2) **Overtime hours worked times the difference between the overtime rate and the straight time rate.** No markup is allowed.
  - (3) **Fringe benefit rate times the total hours worked.** Fringe benefits include Health and Welfare, Pension Fund, etc., when such amounts are required by collective bargaining agreement or other employment contracts generally applicable to the classes of labor employed on the project.
  - (4) **Workers' Compensation Insurance at 8 percent of (1).** The actual net rate may be used if it exceeds 10 percent and if proof of rates is furnished within 30 days of the completion of the extra work.
  - (5) **Either subsistence and travel allowances or prorated camp costs.** If an employee is due and receives subsistence or camp privileges on their days off, divide that cost by the number of days worked that week and add to their daily subsistence entitlement. If the employee did not work an entire day on time and materials work, prorate the entitlement for the hours worked on time and materials.
  - (6) **Markup at 35 percent of the sum of (1), (3), (4), and (5).** This includes and shall fully compensate the Contractor for all overhead and profit, including general superintendence, additional bond, property damage liability insurance, unemployment insurance contributions, social security and other taxes, administrative overhead costs, and profit.
- b. **Materials.** Actual invoiced material and delivery costs plus 15 percent markup. The material must be approved and incorporated into the work. The Contractor shall furnish to the Engineer proof of payment for materials used in the work plus applicable transportation charges. For Contractor-

produced materials, certify in writing the Contractor's actual direct costs, the quantities used, and attach cost spreadsheets and production documentation to verify the costs.

- c. **Equipment.** Includes machinery and special equipment (other than small tools) necessary for the work and authorized by the Engineer. No additional compensation will be made for overhead, profit, maintenance, service, repairs, fuels, lubricants, or replacement parts.

- (1) **Hourly Rental Rate.** Based on rental rates in the current edition and appropriate volume of the *Rental Rate Blue Book*, by EquipmentWatch, Penton Media, Inc.

The regular hourly rental rate is equal to the equipment rate plus the estimated hourly operating cost. These rates apply for equipment used during the Contractor's regular shift of 10 hours per day. No markup is allowed.

The equipment rate is equal to the age adjusted monthly rate for the basic equipment plus the age adjusted monthly rate for applicable attachments, both divided by 176, and multiplied by the regional adjustment factor. The equipment rate is per hour.

The age adjusted monthly rate is that resulting from application of the age adjustment formula, to eliminate replacement cost allowances in machine depreciation and contingency cost allowances.

Only the attachments required for the time and materials work will be included.

- (2) **Hourly Overtime Rate.** Half of the equipment rate plus the full estimated hourly operating cost. The overtime rate will apply to hours the equipment is used in excess of 10 hours per day, either on the Contractor's normal work or on time and materials, and either on single or multiple shifts. No markup is allowed.

- (3) **Hourly Stand-by Rate.** Half of the equipment rate, for equipment ordered on stand-by during the Contractor's normal work shift, not to exceed eight hours per day. No operating costs or markup is allowed.

- (4) **Unlisted Equipment.** For equipment not listed in The Blue Book, the Contractor and the Engineer may agree to a rate before extra work is begun. If agreement is not reached, the Engineer has authority to establish a rate based on similar equipment in the Rental Rate Blue Book or prevailing commercial rates. No markup is allowed.

- (5) **Leased or Rented Equipment.** Equipment that must be rented or leased specifically for work required under this section and authorized in writing by the Engineer shall be paid at invoice price plus 15 percent markup.

Equipment rented or leased for other work under the Contract and used for work under this section shall be paid based on c.(1), (2), and (3). (above) with no markup, except that the adjusted monthly rate is the monthly rate determined directly from the submitted rental or lease agreement.

- (6) **Transportation of Equipment.** The actual cost of moving equipment to and from the work site. To receive reimbursement for transportation of equipment, the Contractor shall obtain the equipment from the nearest approved source and use the equipment exclusively for time and materials work. Payment for move-out will not exceed the amount of the move-in. No markup is allowed, except on operator's wages.

Basis of payment:

- (a) If by common carrier: paid freight bill or invoice.

- (b) If hauled with the Contractor's own resources: hourly rental rate for hauling unit plus operator wages.
- (c) If equipment must be moved under its own power: half of the normal hourly rental rate plus operator's wages.
- d. **Work by a Subcontractor or Owner-Operator.** For time and materials work performed by an approved subcontractor or owner-operator under items a. through c. above, the Contractor will receive a 5 percent markup for administrative costs. No percentage will be paid on work covered under bid items in the original Contract. No percentage over the amount covered above will be paid for work done by a lower tier subcontractor.
- e. **Work by a Specialty Subcontractor.** The Contractor shall obtain the Engineer's advance agreement that the specialty item needed is beyond the Contractor's ability or expertise or that of the Contractor's other subcontractors. For work on a specialty item performed by an approved specialty subcontractor, the Contractor will receive the approved invoice cost of work or service plus a 15 percent markup for administrative costs.
- f. **Records.** The Contractor and Engineer will each maintain a daily record of labor, equipment and materials utilized in the extra work. The Engineer and Contractor will together review their records ~~will present this record to the Contractor at the end of each day's work for verification agreement~~ and signature.
- g. **Compensation.** Payment for time and materials work will be made in the progress estimate following receipt of the verified daily records and all required supporting information from the Contractor. If, at any time, a unit price or lump sum basis of compensation is agreed to for work being performed under this subsection, that compensation will be set forth in writing as a Change Order.

**90-06 PROGRESS PAYMENTS.** The Department will make monthly progress payments to the Contractor based on estimates of the value of work performed and materials on hand under Subsection 90-07. At the Departments discretion, a progress payment may be made twice monthly if the value of the estimate exceeds \$10,000. The Contractor shall prepare and submit to the Engineer an Application for Payment, on the forms furnished, supported by such data as the Engineer may require to substantiate the Contractor's right to payment for work done during the previous period. The Engineer will review the Application for Payment and, within eight (8) days after receipt, either recommend approval and present it to the Owner, return it to the Contractor for revision along with written comments, or notify the Contractor in writing the reasons why part or all of the payment is being withheld and what actions may be taken by the Contractor to receive full payment. The Engineer may require a Schedule of Values or cost breakdown for any lump sum payment item.

Contractor's failure to pay subcontractors, or subcontractor's failure to pay lower tier subcontractors, according to prompt payment provisions required under ~~Subsection 80-04~~CSPP Section 10.05 Article 5.10 is considered unsatisfactory performance.

The Department will not withhold payment as retainage but may withhold payment for unsatisfactory performance or contract noncompliance. If satisfactory progress is being made and subcontractors are paid according to ~~Subsection 80-04~~CPSS Section 10.05 Article 5.10 and AS 36.90.210, the Engineer will authorize 100 percent payment for the estimated value of work accomplished, less any authorized deductions.

If the Engineer finds that satisfactory progress is not being made or payment for satisfactory work by a subcontractor or lower tier subcontractor is not paid according to ~~Subsection 80-04~~CPSS Section 10.05 Article 5.10, the Engineer may withhold up to 100 percent of the total amount earned from subsequent progress payments. The Engineer may withhold up to 200 percent of the estimated cost to complete final punch list items for unsatisfactory performance until those items are complete. The Engineer will notify the Contractor in writing within eight (8) working days of a request for a progress payment of the reasons why

part or all of the payment is being withheld for unsatisfactory performance and what actions may be taken by the Contractor to receive full payment.

Additional reasons for withholding include:

- a. Defective work;
- b. Claims made directly against Owner alleging an act or omission on the part of the Contractor, his employees, his agents, or subcontractors in connection with the Work;
- c. Damage to the Owner;
- d. Reimbursements for Work done by the Owner due to any failure of the Contractor or Subcontractor to carry out the Work;
- e. Reimbursements for Work done by the Owner at the request of the Contractor;
- f. Uncompleted incidental work, including but not limited to testing, cleanup, updating progress schedules, preparation of Record Documents and Operations and Maintenance Manuals;
- g. Liquidated Damages;
- h. Claims by Subcontractors, suppliers, laborers, or the Alaska Department of Labor;
- i. Failure to keep record drawings current or submit completed record drawings;
- a.j. Failure to comply with DBE/WBE reporting requirements.

Payments of withheld amounts will be made in accordance with AS 36.90.200. No interest will be paid to the Contractor for amounts withheld ~~for unsatisfactory performance~~ except if the Department fails to pay the amount withheld within twenty one (21) calendar days after the Contractor satisfactorily completes the remedial actions identified by the Engineer, as provided in AS 36.90.200(e).

The Contractor shall pay interest on retainage withheld from subcontractors, and at an interest rate according to AS 36.90.250 and AS 45.45.010(a).

#### **90-07 PAYMENT FOR MATERIAL ON HAND.**

- a. Partial Payment.** The Engineer will make partial payment for materials designated for incorporation into the work. The material shall:
  - (1) Meet Contract requirements;
  - (2) Be delivered and stockpiled at the project or other approved location;
  - (3) Be supported by invoices, freight bills, and other required information; and
  - (4) Not be living or perishable.
  - (4)(5) Be valued at greater than \$5,000 for any single class of material
- b. Payment Requests.** The Contractor shall make each payment request in writing and:
  - (1) List stockpiled items, quantities of each, and stockpile location(s);
  - (2) Certify that materials meet the applicable Contract specifications;
  - (3) For purchased materials, attach copies of invoices, freight bills, and manufacturer's published storage recommendations;

(4) For Contractor-produced materials, attach production statements showing quantities and dates produced and copies of process quality control test results; and

(5) Include other information requested by the Engineer.

c. **Storage Conditions.** The Contractor shall protect material from damage or loss while in storage. The Contractor shall:

(1) Physically separate stockpiled materials from other materials at the storage location;

(2) Clearly label materials with the project name and number; and

(3) Store materials per the manufacturer's recommendations.

If storage conditions become unsatisfactory, liens are filed on any materials, or the storage location is changed without approval, the Engineer will deduct any previous payments made for such materials.

d. **Method of Payment.** The Engineer will include payments for acceptably stockpiled materials in the progress estimate following receipt of the Contractor's written request and all required documentation. The Engineer will:

(1) Pay for materials purchased by the Contractor at the delivered cost but not to exceed 85% of the Contract amount for those items.

(2) Pay for materials produced by the Contractor at up to 50% of the Contract amount for those items.

(3) Deduct the Department's cost to inspect materials stored off the limits of the project.

(4) Deduct partial payment quantities as they are incorporated into the project.

The Contractor shall release and discharge the Department from any liability for damages or delays related to the storage or transport of, and to the payment for, material on hand.

The Department's payment for material on hand will not constitute final acceptance by the Department.

**90-08 FINAL PAYMENT.** When the project has been completed as provided in ~~Subsection 50-15CPSS~~ Section 10.5 Article 5.26, the ~~Engineer-Contractor~~ will prepare and submit to the Engineer the final estimate of the quantities of the various classes of work performed. All prior progress estimates and payments shall be subject to correction in the final estimate and payment. The final estimate will not be processed until the Alaska Department of Labor and Workforce Development has verified that final payment can be released. The Department will not process the final estimate until the Contractor ~~completes items a through d in the first paragraph of Subsection 50-16.~~

a. Obtains final completion;

b. Submits a DOLWD-approved Notice of Completion;

c. Submits Final DBE Utilization Report;

d. Submits all certificates, record drawings, warranties, and other required documents;

e. Submits Final Completion and Acceptance Certificate;

f. Submits Contractor's Statement Concerning Claims;

g. Submits Consent of Surety Company to Final Payment;

h. Submits a notarized Certificate of Compliance in the form substantially as follows:

I (we) hereby certify that all Work has been performed and materials supplied in accordance with the Contract Documents for the above Work, that not less than the prevailing rates of wages as required by the State Statute have been paid to laborers, workmen, and mechanics, that all payroll taxes have been paid, and that all claims for material and labor and other services performed in connection with these Contract Documents have been satisfied.

~~If the Contractor certifies the final estimate, or does not file a claim within 90 days of receiving the final estimate, the estimate shall be processed for final payment. Final payment shall consist of the entire sum found to be due after deducting all previous payments and all amounts to be retained or deducted under the provisions of the Contract. Failure to file a claim within 90 days of receiving the final estimate is a waiver of any and all claims relating to or arising from the final estimate.~~

~~When the Contractor executes the Certification of Final Estimate (Form 25D-116) and the Contractor's Release (Form 25D-117), final payment will be processed.~~

The Contractor may reserve any unresolved claims that were timely filed according to ~~Subsection 50-17CPSS Section 10.05 Article 5.21~~ by listing those claims as exceptions on the ~~Contractor's Release~~Contractor's Statement Concerning Claims. Any claims listed as exceptions that were not filed before the Contractor executes the final estimate will be considered null and void. Any claims filed in a timely manner but not listed on the Contractor's Release are waived and deemed released.

~~If the Contractor fails or declines to approve the final estimate within 90 days but does not file any claims, the Department will consider the estimate approved and process the estimate for final payment. Any subsequently raised claims will be considered null and void.~~

**90-09 ELIMINATED ITEMS.** When the Contractor is notified of the elimination of a minor Contract item, the Contractor will be reimbursed for actual work performed and all direct costs incurred before notification. In no case will any payment be made for anticipated profits or overhead.

Should it become necessary to eliminate a major Contract item, an equitable adjustment will be made and the Contract modified in writing accordingly.

#### **90-10 CONSTRUCTION WARRANTY.**

- a. In addition to all other warranties or remedies, express or implied, available to the Department under 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. Placement of the project on warranty shall not relieve the Contractor of the responsibility to pay for all costs resulting from defects in materials or workmanship supplied under the terms of the Contract, and for correction of those defects. This warranty shall continue for a period of ~~one year~~two years from the date of final acceptance of the work. If the Department takes possession of any part of the work before final acceptance, this warranty shall continue for a period of ~~one year~~two years from the date the Department takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work.
- 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 Department real or personal property, when that damage is the result of:

(1) The Contractor's failure to conform to contract requirements; or

(2) 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 ~~Engineer~~ Department will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage. If the defect, in the opinion of the Department, is of such nature as to demand immediate repair, the Department shall have the right to take corrective action and the cost thereof shall be borne by the Contractor.
- f. If the Contractor fails to initiate corrective action to remedy any failure, defect, or damage within 44 five (5) days after receipt of notice, or longer timeframe approved by the Engineer, the Department 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 Department, as directed by the Engineer, and (3) Enforce all warranties for the benefit of the Department.
- h. The provisions of this section shall not limit the Department's rights with respect to latent defects, gross mistakes, or fraud.

**90-11 PROJECT CLOSEOUT.** Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the Engineer approves the Contractor's final submittal. The Contractor shall:

- a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations;
- b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors;
- c. Complete final cleanup in accordance with Subsection 40-07, Cleanup;
- d. Complete all punch list items identified during the Final Inspection;
- e. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the DBE subcontractors and/or suppliers associated with the project;
- f. When applicable per state requirements, return copies of sales tax completion forms;
- g. Manufacturer's certifications for all items ~~listed in the MCL~~ as identified in the specification sections;
- h. All required record drawings, as-built drawings or as-constructed drawings;
- i. Project Operation and Maintenance (O&M) Manual;
- j. Security for Construction Warranty, when required;
- k. Equipment commissioning documentation submitted, if required.

**90-12 PARTIAL ACCEPTANCE.** If at any time during the prosecution of the project, the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Department, the Department may request the Engineer to make final inspection of that unit. If the Engineer finds, upon inspection, that the unit has been satisfactorily completed in compliance with the Contract, he may accept it as being completed, and the Contractor may be relieved of further responsibility for that unit.

Such partial acceptance and beneficial occupancy by the Department shall not void or alter any provisions of the Contract, including the beginning date of the warranty period.



## **SECTION 100 CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)**

**100-01 GENERAL.** The Contractor shall assure that all materials and completed construction conform to contract Plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be used. Although guidelines are established and certain minimum requirements are specified herein 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. Adequately 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 be prepared to discuss and present, at the preconstruction conference, their understanding of the quality control requirements. 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 accepted by the Engineer. No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and accepted.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer.

A Quality Control (QC)/Acceptance Testing workshop with the Engineer, Contractor, subcontractors, and testing laboratories shall be held prior to start of construction. The workshop shall address QC and acceptance testing requirements of the project specifications. The Contractor shall coordinate with the Engineer on time and location of the QC/Acceptance Testing workshop.

### **100-02 DESCRIPTION OF PROGRAM.**

- a. **General Description.** The Contractor shall establish a CQCP to perform inspection and testing of each item of work for which it is required by the technical specifications, including those performed by subcontractors. This CQCP shall ensure conformance to applicable specifications and Plans with respect to materials, 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. The written CQCP and plan for QC testing laboratory shall be submitted to the Engineer for review at least 5 calendar days before the preconstruction conference. The Contractor's CQCP and QC testing laboratory must be accepted by the Engineer prior to the start of any production, construction, or off-site fabrication.

The CQCP shall be organized to address, as a minimum, the following items:

- a. QC organization;

- b. Project progress schedule;
- c. Submittals schedule;
- d. Inspection requirements;
- e. QC testing plan;
- f. Documentation of QC activities and distribution of QC reports;
- g. Requirements for corrective action when QC and/or acceptance criteria are not met; and
- h. 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 shall add any additional elements to the CQCP that are necessary to adequately control all production and/or construction processes required by this contract.

**100-03 QUALITY CONTROL ORGANIZATION.** The Contractor's CQCP shall be implemented by the establishment of a separate QC organization. An organizational chart shall be developed to show all QC personnel 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 utilized 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 Subsections 100-03.a. and 100-03.b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall consist of the following minimum personnel:

- a. **Program Administrator.** The Contractor Quality Control Program Administrator (CQCPA) shall be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA shall have a minimum of 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 5 years of paving/QC experience, the CQCPA shall meet at least one of the following requirements:

- (1) Professional engineer with 1 year of airport paving experience acceptable to the Engineer.
- (2) Engineer-in-training with 2 years of airport paving experience acceptable to the Engineer.
- (3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with 3 years of airport paving experience.
- (4) An individual with 4 years of airport paving experience acceptable to the Engineer, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The CQCPA shall 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 shall include the ability to immediately stop production until

materials and/or processes are in compliance with contract specifications. The CQCPA shall report directly to a responsible officer of the construction firm. The CQCPA may supervise the CQCP on more than one project provided that person can be at the job site within 2 hours after being notified of a problem.

- b. QC Technicians.** A sufficient number of QC technicians necessary to adequately implement the CQCP shall be provided. These personnel shall 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 2 years of experience in their area of expertise.

The QC technicians shall 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 100-06, and.
- (2)** Performance of all QC tests as required by the technical specifications and Subsection 100-07.

Certification at an equivalent level of qualification and experience, by a state or nationally recognized organization will be acceptable in lieu of NICET certification, including WAQTC qualification in any modules for which testing will be performed.

- 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.

**100-04 PROJECT PROGRESS SCHEDULE.** Critical QC activities shall be shown on the project schedule as required by ~~Section 80, paragraph 80-03, Prosecution and Progress~~ Item G-300.

**100-05 SUBMITTALS SCHEDULE.** The Contractor shall submit a detailed listing of all submittals (e.g., 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. Pay item number;
- b. Item description;
- c. Description of submittal;
- d. Specification Subsection requiring submittal; and
- e. Scheduled date of submittal.

**100-06 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 100-09.

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 utilized 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 utilized 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 utilized.

- b. During field operations, QC test results and periodic inspections shall be utilized to ensure the quality of all materials and workmanship. All equipment utilized 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 utilized.

**100-07 CONTRACTOR QC TESTING FACILITY.**

- a. For projects that include Item P-401, meet paragraph 401-3.4 Testing Laboratory.
- b. For projects that include Item P-501, meet paragraph 501-3.5 Concrete Mix Design Laboratory.

**100-08 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 the technical specification for the Pay Item, as well as any additional QC tests that the Contractor deems necessary to adequately control production and/or construction processes. Minimum testing requirements are listed in Appendix B. The Engineer may require additional testing as necessary.

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

- a. Pay item number (e.g., P401.010.0010);
- b. Item description (e.g., Hot Mix Asphalt, Type I, Class A);
- c. Test type (e.g., gradation, grade, asphalt content);
- d. Test standard (e.g., ASTM or AASHTO test number, as applicable);
- e. Test frequency (e.g., as required by technical specifications or Material Sampling and Testing Frequency table when requirements are not stated);
- f. Responsibility (e.g., plant technician); and
- 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 according to ASTM D3665. The Engineer shall be provided the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by paragraph 100-09.

**100-09 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 Engineer 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 on a form acceptable to the Engineer. 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) Pay 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; and
- (7) Safety inspection.

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

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

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

- (1) Pay 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; and
- (9) Retests.

Test results from each day's work period shall be submitted to the Engineer prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically the results shall 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 utilize statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

**100-11 INSPECTION BY THE ENGINEER.** All items of material and equipment shall be subject to inspection by the Engineer at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate QC system in conformance with the requirements detailed herein and the applicable technical specifications and Plans. In addition, all items of materials, equipment and work in place shall be subject to inspection by the Engineer at the site for the same purpose.

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

**100-12 NONCOMPLIANCE.**

- a. The Engineer will notify the Contractor in writing of any noncompliance with the CQCP. The Contractor shall, after receipt of such notice, take corrective action.
- b. When QC activities do not comply with either the CQCP or the contract provisions, or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of non-compliance, the Engineer may:
  - (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 action is taken.

**SECTION 110  
METHOD OF ESTIMATING  
PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)**

**110-01 GENERAL.** All statistical Quality Level Analysis (QLA) is computed using the Engineer's Price Adjustment program. The program calculates all intermediate values to 16 decimal places. Pay factors are rounded to the nearest 0.001. The basis of payment for production lots of selected pay items is adjusted using statistical analysis of acceptance test results.

Analysis is based on an Acceptable Quality Level (AQL) of 90 percent. The AQL is the minimum Percent Within Limits (PWL) at which the material is considered fully acceptable and receives a 1.000 pay factor.

As an incentive to produce quality material, a pay factor greater than 1.000 is possible. The maximum pay factor obtainable is 1.050.

**110-02 METHOD FOR COMPUTING PWL.** The computational sequence for computing PWL is as follows:

The procedure for estimating the PWL uses the number ( $n$ ), the arithmetic mean ( $\bar{X}$ ) and the sample standard deviation ( $s$ ), of acceptance test results as shown below. If the sample standard deviation is less than 0.001, then it is set at 0.001.

- a. The arithmetic mean is computed:

$$\bar{X} = \frac{\sum_{i=1}^n X_i}{n}$$

Where:  $X_i$  = test result for subplot  $i$ .

$\sum_{i=1}^n$  = sum of values from subplot 1 to  $n$ .

- b. The sample standard deviation is computed:

$$s = \sqrt{\frac{\sum_{i=1}^n (X_i - \bar{X})^2}{(n-1)}}$$

The upper specification limit (USL) and lower specification limit (LSL) are equal to the Target Value (TV) plus and minus the allowable tolerances as defined in the pay item specification.

Quality Indexes are computed as shown below. The maximum Quality Index obtainable is 10.000.

- c. The Upper Quality Index ( $Q_U$ ) is computed:

$$Q_U = \frac{USL - \bar{X}}{s}$$

- d. The Lower Quality Index ( $Q_L$ ) is computed:

$$Q_L = \frac{\bar{X} - LSL}{s}$$

The computed  $Q_U$  and  $Q_L$  are used with AASHTO R 9 to determine the Percent Within Upper Limits (PWL<sub>U</sub>) and Percent Within Lower Limits (PWL<sub>L</sub>).

- e. The PWL used in pay factor determination is:

$$PWL = (PWL_U + PWL_L) - 100$$

When material requirements are one-sided, with only an upper or lower limit, then the PWL is equal to the percent within the side that has a limit. For example, if a material only has an upper specification (maximum) limit, then  $PWL = PWL_U$ . Also, two-sided specification limits with one side that cannot be exceeded (like 100% passing) will be analyzed as if they are one-sided.

- f. The pay factor (PF) is:

$$PF = 0.55 + \frac{PWL_o}{200}$$

Where: PWL varies from 50.000 to 100.000.

When PWL is less than 50.000, pay factor (PF) = zero.



## **PART II**

# **TECHNICAL SPECIFICATIONS**



## ITEM D-701 PIPE FOR STORM DRAINS AND CULVERTS

### DESCRIPTION

**701-1.1** This item shall consist of the construction of pipe culverts and storm drains according to these Specifications and in reasonably close conformity with the lines and grades shown on the Plans.

### MATERIALS

**701-2.1** Materials shall meet the requirements shown on the Plans and specified below.

**701-2.2 PIPE.** The pipe shall be of the type called for on the Plans and shall be according to the following appropriate requirements.

Metallic Coated Corrugated Steel Pipe (Type I, IR or II)	AASHTO M 36
Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains	ASTM A760
Galvanized Steel Corrugated Structural Plates and Fasteners for Pipe, Pipe-Arches, and Arches	ASTM A761
Polymer Precoated Corrugated Steel Pipe for Sewers and Drains	ASTM A762
Post-Coated and Lined (Bituminous or Concrete)	
Corrugated Steel Sewer and Drainage Pipe	ASTM A849
Corrugated Aluminum Alloy Culvert Pipe	ASTM B745
Non-Reinforced Concrete Pipe	ASTM C14
Reinforced Concrete Pipe	ASTM C76
Reinforced Concrete D-Load Pipe	ASTM C655
Reinforced Concrete Arch Pipe	ASTM C506
Reinforced Concrete Elliptical Pipe	ASTM C507
Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers	ASTM C1433
Corrugated Polyethylene (PE) Pipe and Fittings	ASTM F667
Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter	ASTM F714
Poly (Vinyl Chloride) Ribbed Drain Pipe & Fittings Based on Controlled Inside Diameter	ASTM F794
Polyethylene (PE) Large Diameter profile Wall Sewer and Drain Pipe	ASTM F894
Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings	ASTM F949
Steel Reinforced Polyethylene (PE) Corrugated Pipe	ASTM F2435
Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage	ASTM F2562
Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe	ASTM F2736
Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications	ASTM F2764
Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications.	ASTM F2881
Bituminous-Coated Corrugated Metal Pipe and Pipe Arches	AASHTO M 190
Bituminous-Coated Corrugated Aluminum Alloy Culvert Pipe	AASHTO M 190 and M 196
Bituminous-Coated Structural Plate Pipe, Pipe Arch, and Arches	AASHTO M 167 and M 243
Aluminum Alloy Structural Plate for Pipe, Pipe Arch, and Arches	AASHTO M 219
Polyvinyl Chloride (PVC) Pipe	ASTM D3034
Corrugated Polyethylene Drainage Tubing	AASHTO M 252

Corrugated Polyethylene Pipe, 300 mm to 1500 mm (12- to 60-in)  
Diameter AASHTO M 294

Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings  
Based on Controlled Inside Diameter AASHTO M 304

**701-2.3 CONCRETE.** Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

**701-2.4 RUBBER GASKETS.** Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe and polyethylene pipe shall conform to the requirements of ASTM F477. Rubber gaskets for zinc-coated steel pipe and pre-coated galvanized pipe shall conform to the requirements of ASTM D1056, for the "RE" closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477.

**701-2.5 JOINT MORTAR.** Pipe joint mortar shall consist of one part by volume of Portland cement and two parts sand. The Portland cement shall conform to the requirements of AASHTO M 85, Type I. The sand shall conform to the requirements of AASHTO M 45.

**701-2.6 JOINT FILLERS.** Poured filler for joints shall conform to the requirements of AASHTO M 324.

**701-2.7 PLASTIC GASKETS.** Plastic gaskets shall conform to the requirements of AASHTO M 198 (Type B).

**701-2.8. CONTROLLED LOW-STRENGTH MATERIAL (CLSM).** Controlled low-strength material shall conform to the requirements of Item P-153. When CLSM is used all joints shall have gaskets.

**701-2.9 CULVERT MARKER POSTS.** Provide posts made of durable glass fiber and resin reinforced material flexible to -40°F, resistant to impact and ultraviolet light. "T" in cross section, 3.75-inch wide by 72 inches long, and color blue. Provide Carsonite CUM-375 utility marker or approved equal.

**701-2.10 CLASS B BEDDING.** Use one of the following materials:

- a. Suitable material as defined in specification subsection P-152-2.3, except that 100% of the material will pass a 1-inch sieve.
- b. P-299 Aggregate Surface Course (when included in this contract).
- c. P-209 Crushed Aggregate Base Course (when included in this contract).

**701-2.11 END SECTIONS.** End sections for metal pipe must be of the same material as the pipe.

## CONSTRUCTION METHODS

**701-3.1 EXCAVATION.** The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 18 inches on each side. The trench walls shall be approximately vertical.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inches or 1/2-inch for each foot of fill over the top of the pipe (whichever is greater) but for no more than 75% of the nominal diameter of the pipe. The width of the excavation shall be at least 1 foot greater than the horizontal outside diameter of the pipe. The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 inches in uncompacted depth to form a uniform but yielding foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved Class B bedding material for the full trench width. The Engineer shall determine the depth of removal necessary. The Class B bedding material shall be compacted to provide adequate support for the pipe.

The excavation for pipes that are placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the Plans.

**701-3.2 BEDDING.** The pipe bedding shall conform to the class specified on the Plans. When no bedding class is specified or detailed on the Plans, the requirements for Class B bedding shall apply. Compact all bedding to 95% of the maximum density determined by ATM 207 or ATM 212.

- a. **Rigid Pipe.** Class A bedding shall consist of a continuous concrete cradle conforming to the plan details.

Class B bedding shall consist of a bed of granular material having a thickness of at least 6 inches below the bottom of the pipe and extending up around the pipe for a depth of not less than 30% of the pipe's vertical outside diameter. The layer of bedding material shall be shaped to fit the pipe for at least 10% of the pipe's vertical diameter and shall have recesses shaped to receive the bell of bell and spigot pipe.

Class C bedding shall consist of bedding the pipe in its natural foundation material to a depth of not less than 10% of the pipe's vertical diameter. The bed shall be shaped to fit the pipe and shall have recesses shaped to receive the bell of bell and spigot pipe.

- b. **Flexible Pipe.** For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows in Table 701-1. Minimum Bedding Depth per Pipe Corrugation Depth.

**TABLE 701-1. MINIMUM BEDDING DEPTH PER PIPE CORRUGATION DEPTH**

Pipe Corrugation Depth, in.	Minimum Bedding Depth, in.
1/2	1
1	2
2	3
2-1/2	3-1/2

- c. **PVC and Polyethylene Pipe.** For PVC and polyethylene pipe, the bedding material shall consist of Class B bedding. The bedding shall have a thickness of at least 6 inches below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

**701-3.3 LAYING PIPE.** The pipe laying shall begin at the lowest point of the trench and proceed up grade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing up grade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

**701-3.4 JOINING PIPE.** Joints shall be made with (1) Portland cement mortar, (2) Portland cement grout, (3) rubber gaskets, (4) plastic gaskets, or (5) coupling bands.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints in order to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

- a. **Concrete Pipe.** Concrete pipe may be either bell and spigot or tongue and groove. The method of joining pipe sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even. Joints shall be thoroughly wetted before mortar or grout is applied.
- b. **Metal Pipe.** Metal pipe shall be firmly joined by form fitting bands conforming to the requirements of ASTM A760 for steel pipe and AASHTO M 36 for aluminum pipe.
- c. **PVC, Polypropylene, and Polyethylene Pipe.** Joints for PVC, polypropylene, and polyethylene pipe shall conform to the requirements of ASTM D3212 when water tight joints are required. Joints for PVC and polyethylene pipe shall conform to the requirements of AASHTO M 304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO M 252 or M 294. Fittings for polypropylene pipe shall conform to the requirements of ASTM F2881, ASTM F2736, or ASTM F2764.

**701-3.5 BACKFILLING.** Pipes shall be inspected before any backfill is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense.

Use backfill that is suitable material as defined in subsection P-152-2.3 except that:

- a. 100% of the material placed within 1 foot of the pipe will pass a 3-inch sieve.
- b. If the pipe is placed in or under the structural section, construct the backfill according to the material and construction requirements of the specifications for the applicable lift of material (P-154, P-299, P-209).

When the top of the pipe is even with or below the top of the trench, the backfill shall be compacted in layers not exceeding 6 inches on both sides of the pipe and shall be brought up 1 foot above the top of the pipe or to natural ground level, whichever is greater. Care shall be exercised to thoroughly compact the backfill material under the haunches of the pipe without displacing the pipe. Material shall be brought up evenly on both sides of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the backfill shall be compacted in layers not exceeding 6 inches and shall be brought up evenly on both sides of the pipe to 1 foot above the top of the pipe. The width of backfill on each side of the pipe for the portion above the top of the trench shall be equal to twice the pipe's diameter or 12 feet, whichever is less.

For PVC, polypropylene, and polyethylene pipe, the backfill shall be placed in two stages; first to the top of the pipe and then at least 12 inches over the top of the pipe. The backfill material shall meet the requirements of subsection 701-3.2c.

All backfill shall be compacted to the density required under Item P-152.

It shall be the Contractor's responsibility to protect installed pipes and culverts from damage due to construction equipment operations. The Contractor shall be responsible for installation of any extra strutting or backfill required to protect pipes from the construction equipment.

**701-3.6 CULVERT MARKER POSTS.** Install culvert marker posts at each culvert inlet and outlet. Drive posts to 18 inches minimum embedment.

## METHOD OF MEASUREMENT

**701-4.1 PIPE.** The length of pipe will be measured according to GCP Section 90, and by the linear feet of pipe in place, completed, and approved. It will be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The several classes, types and size will be measured separately. All fittings ~~and end sections~~ will be included in the length of the pipe being measured; end sections are subsidiary, will not be included in the pipe length, and will not be measured separately. All trench excavation and backfill associated with pipe installation is subsidiary to D-701 items used for the work.

**701-4.2 CONCRETE.** The volume of concrete for pipe cradles to be paid for will be the number of cubic yards of concrete which is completed in place and accepted.

**701-4.3 ROCK.** The volume of rock to be paid for will be the number of cubic yards of rock excavated. No payment will be made for the cushion material placed for the bed of the pipe.

**701-4.4 CULVERT MARKER POSTS.** Culvert marker posts will not be measured for payment.

## BASIS OF PAYMENT

**701-5.1** Payment will be made at the contract unit price per linear foot for each kind of pipe of the type and size designated; at the contract unit price per cubic yard of concrete for pipe cradles; and at the contract unit price per cubic yard for rock excavation. Culvert marker posts will not be paid for directly, but will be subsidiary to pipe items.

Payment will be made under:

Item D701.010.0018	CS Pipe, 18-inch – per linear foot
Item D701.010.0024	CS Pipe, 24-inch – per linear foot

## MATERIAL REQUIREMENTS

AASHTO M 36	Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
AASHTO M 45	Aggregate for Masonry Mortar
AASHTO M 85	Portland Cement
AASHTO M 157	Ready-Mixed Concrete
AASHTO M 190	Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M 196	Corrugated Aluminum Alloy Culverts and Underdrains
AASHTO M 198	Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets
AASHTO M 219	Aluminum Alloy Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M 243	Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M 252	Corrugated Polyethylene Drainage Tubing
AASHTO M 294	Corrugated Polyethylene Pipe, 300 to 1500 mm Diameter
AASHTO M 304	Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO M 324	Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

ASTM A760	Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
ASTM A761	Steel Galvanized, Corrugated Structural Plates and Fasteners for Pipe, Pipe-Arches, and Arches
ASTM A762	Precoated (Polymeric) Galvanized Steel Sewer and Drainage Pipe
ASTM A849	Post-Coated and Lined (Bituminous or Concrete) Corrugated Steel Sewer and Drainage Pipe
ASTM B745	Corrugated Aluminum Alloy Culvert Pipe
ASTM C14	Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C1433	Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers, 3 – 24 in
ASTM C76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C506	Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C655	Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C700	Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated
ASTM D1056	Flexible Cellular Materials--Sponge or Expanded Rubber
ASTM D3034	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F667	Corrugated Polyethylene Pipe and Fittings
ASTM F714	Polyethylene (PE) Plastic Pipe (DR PR) Based on Outside Diameter
ASTM F794	Poly (Vinyl Chloride) Ribbed Drain Pipe & Fittings Based on Controlled Inside Diameter
ASTM F894	Polyethylene (PE) Large Diameter profile Wall Sewer and Drain Pipe
ASTM F949	Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings
ASTM F2435	Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F2562	Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM F2736	Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
ASTM F2764	Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM F2881	Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications



## ITEM D-751 MANHOLES, CATCH BASINS, INLETS, AND INSPECTION HOLES

### DESCRIPTION

**751-1.1** This item shall consist of construction of manholes, catch basins, inlets, and inspection holes, and adjusting existing manholes and catch basins according to these Specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the Plans or required by the Engineer.

### MATERIALS

**751-2.1 BRICK.** The brick shall conform to the requirements of ASTM C32, Grade MS.

**751-2.2 MORTAR.** Mortar shall consist of one part by volume portland cement and two parts sand. The portland cement shall conform to the requirements of AASHTO M 85, Type I. The sand shall conform to the requirements of AASHTO M 45.

**751-2.3 CONCRETE.** Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

**751-2.4 PRECAST CONCRETE PIPE MANHOLE RINGS.** Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches nor more than 48 inches. There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443 or C990.

**751-2.5 CORRUGATED METAL.** Corrugated metal shall conform to the requirements of AASHTO M 36.

**751-2.6 FRAMES, COVERS, AND GRATES.** The castings shall conform to one of the following requirements:

- a. Gray iron castings shall meet the requirements of ASTM A48, Class 30B and 35B.
- b. Malleable iron castings shall meet the requirements of ASTM A47.
- c. Steel castings shall meet the requirements of AASHTO M 103.
- d. Structural steel for grates and frames shall conform to the requirements of ASTM A283, Grade D.
- e. Ductile iron castings shall conform to the requirements of ASTM A536.
- f. Austempered ductile iron castings shall conform to the requirements of ASTM A897.

All castings or structural steel units shall conform to the dimensions shown on the ~~Plans~~ Standard Details and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of AASHTO M 111.

**751-2.7 STEPS.** The steps or ladder bars shall be ~~gray or malleable cast iron, injection-molded polypropylene, or galvanized steel~~. The steps shall be the size, length, and shape shown on the Plans CPSS Standard Details ~~and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.~~

**751-2.8 PRECAST INLET STRUCTURES.** Manufactured in accordance with and conforming to ASTM C913.

**751-2.9 MARKER POSTS.** Provide posts in accordance with D-701.

**CONSTRUCTION METHODS**

**751-3.1 UNCLASSIFIED EXCAVATION.**

- a. Limits of Excavation.** The Contractor shall excavate for structures and structure footings to the lines and grades or elevations, shown on the Plans, or as staked by the Engineer. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the Plans, shall be considered as approximately only; and the Engineer may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.
- b. Excavation.** Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the Engineer. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed, and excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.
- c. Shoring.** The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.
- d. Shoring Removal.** All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not damage or disturb finished masonry. The cost of removal shall be included in the unit price bid for the structure.
- e. Engineer's Approval.** After excavation is completed for each structure, the Contractor shall notify the Engineer. No concrete or reinforcing steel shall be placed after the Engineer has approved the depth of the excavation and the character of the foundation material.

**751-3.2 BRICK STRUCTURES.**

- a. Foundations.** A prepared foundation shall be placed for all brick structures after the foundation excavation is completed and accepted. Unless otherwise specified, the base shall consist of reinforced concrete mixed, prepared, and placed according to the requirements of Item P-610.
- b. Laying Brick.** All brick shall be clean and thoroughly wet before laying so that they will not absorb any appreciable amount of additional water at the time they are laid. All brick shall be laid in freshly made mortar. Mortar that is not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted. An ample layer of mortar shall be spread on the beds and a shallow furrow shall be made in it which can be readily closed by the laying of the brick. All bed and head joints shall be filled solid with mortar. End joints of stretchers and side or cross joints of headers shall be fully buttered with mortar and a shoved joint made to squeeze out mortar at the top of the joint. Any bricks that may be loosened after the mortar has taken its set, shall be removed, cleaned, and relaid with fresh mortar. No broken or chipped brick shall be used in the face, and no spalls or bats shall be used except where necessary to shape around irregular openings or edges; in which case, full bricks shall be placed at ends or corners where possible, and the bats shall be used in the interior of the course. In making closures, no piece of brick shorter than the width of a whole brick shall be used; and wherever practicable, whole brick shall be used and laid as headers.
- c. Joints.** All joints shall be filled with mortar at every course. Exterior faces shall be laid up in advance of backing. Exterior faces shall be plastered or parged with a coat of mortar not less than 3/8 inch thick before the backing is laid up. Prior to parging, all joints on the back of face courses shall be

cut flush. Unless otherwise noted, joints shall be not less than 1/4 inch nor more than 1/2 inch wide and the selected joint width shall be maintained uniform throughout the work.

- d. **Pointing.** Face joints shall be neatly struck, using the weather struck joint. All joints shall be finished properly as the laying of the brick progresses. When nails or line pins are used the holes shall be immediately plugged with mortar and pointed when the nail or pin is removed.
- e. **Cleaning.** Upon completion of the work all exterior surfaces shall be thoroughly cleaned by scrubbing and washing with water. If necessary to produce satisfactory results, cleaning shall be done with a 5% solution of muriatic acid which shall then be rinsed off with liberal quantities of water.
- f. **Curing and Cold Weather Protection.** The brick masonry shall be protected and kept moist for at least 48 hours after laying the brick. Brick masonry work or pointing shall not be done when there is frost on the brick or when the air temperature is below 50 °F unless the Contractor has on the project ready to use, suitable covering and artificial heating devices necessary to keep the atmosphere surrounding the masonry at a temperature of not less than 60 °F for the duration of the curing period.

**751-3.3 CONCRETE STRUCTURES.** Concrete structures which are to be cast-in-place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the Plans. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the Plans and shall be approved by the Engineer before the concrete is placed.

All invert channels shall be constructed and shaped accurately so as to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

**751-3.4 PRECAST CONCRETE STRUCTURES.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another third party certification program approved by the Engineer.

Precast concrete structures shall conform to ASTM C478. Precast concrete structures shall be constructed plumb on prepared or ~~previously placed slab foundations~~ surfaces conforming to the ~~dimensions and~~ locations shown on the Plans. All precast concrete pipe sections necessary to build a completed structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall (1) ~~be full bedded in cement mortar or~~ (2) utilize a rubber gasket ~~per ASTM C443~~. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal, injection molded polypropylene, or metal encapsulated steps which are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

**751-3.5 CORRUGATED METAL STRUCTURES.** Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

**751-3.6 INLET AND OUTLET PIPES.** Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections and the annular space shall be sealed with cement mortar. ~~They~~ Pipes shall be cut off ~~flush with~~ 2 inches inside the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed

around these pipes so as to form a tight, neat connection. In the case of precast manhole barrel sections where holes need to be bored to provide for the storm drain pipe, the diameter of the bore shall not exceed the outside diameter of the storm drain pipe plus 1-1/2 inches.

**751-3.7 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES, AND FITTINGS.** All castings, frames, and fittings shall be placed in the positions indicated on the Plans or as directed by the Engineer, and shall be set true to line and elevation. ~~If~~ Frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Grade adjustment rings must be set centered over the manhole and catch basin cone or lid opening with no lateral offset. No more than ¼ inch lateral offset is permitted between grade adjustment rings. Total cumulative offset between grade adjustment rings shall not exceed ½ inch. Manhole rings and catch basin frames shall be set centered on the opening with a maximum lateral offset of ½" permitted.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface in order so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the Plans or as directed by the Engineer. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for 7 days, before the grates or covers are placed and fastened down.

**751-3.8 INSTALLATION OF STEPS.** The steps shall be installed as indicated on the ~~Plans~~ Standard Drawings or as directed by the Engineer. When the steps are to be set in concrete, they shall meet the requirements of ASTM C478. The steps shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least 7 days. After 7 days, the steps shall be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete pipe structures, they shall be ~~cast into the sides of the sections at the time the sections are manufactured or set in place after the structure is erected~~ in preformed holes or by drilling holes in the concrete and cementing/driving the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches.

~~Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the Engineer.~~

**751-3.9 BACKFILLING.** After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the Plans or as directed by the Engineer.

Backfill shall not be placed against any structure until approved by the Engineer. For concrete structures, approval shall not be given until the concrete has been in place 7 days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

**751-3.10 ADJUST MANHOLE.** This work includes labor, equipment, and incidental materials for installation, complete-in-place as accepted by the Engineer, including:

a. For paving projects, adjust existing manhole by removing and replacing existing frame and cover with new materials by raising or lowering the frame or ring casting 12 inches or less. Top of frame and cover shall be in compliance with Standard Detail 55-10 ¼-inch to ¾-inch below finish grade.

b. In unpaved areas, remove the existing frame and cover, rings, cone and/or portions of the barrel section as necessary to adjust the manhole top of frame and cover to be in compliance with Standard Detail 55-10 and replace with new materials. Each precast barrel section and cone section shall be set upon and sealed with a premolded plastic gasket. Any damage to manholes resulting from construction under this Contract shall be repaired or the damaged portion replaced at the Contractor's expense. All inverts, benchwalls, and/or catch areas shall be left clean and free from foreign material.

### METHOD OF MEASUREMENT

**751-4.1** Manholes, adjust manhole, catch basins, inlets, and inspection holes will be measured by the unit.

### BASIS OF PAYMENT

**751-5.1** The accepted quantities of manholes, adjust manholes, catch basins, inlets, and inspection holes will be paid for at the contract unit price per each, complete and in place. This price shall be full compensation for furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the Plans.

All excavation and backfill required to complete the items of this section shall not be measured for payment, and shall be considered as a subsidiary obligation of the Contractor, included in the contract unit price for the structure involved.

Payment will be made under:

Item D751.010.0072	Manhole, Type 2, 72-inch - per each
Item D751.100.0000	Adjust Manhole to Finish Grade – per each

### MATERIAL REQUIREMENT

AASHTO M 36	Zinc Coated (Galvanized) Corrugated Iron or Steel Culverts and Underdrains
AASHTO M 45	Aggregate for Masonry Mortar
AASHTO M 85	Portland Cement
AASHTO M 103	Steel Castings, Carbon, for General Application
AASHTO M 111	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A47	Malleable Iron Castings
ASTM A48	Gray Iron Castings
ASTM A283	Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes, and Bars
ASTM A536	Ductile Iron Castings
ASTM A897	Austempered Ductile Iron Castings
ASTM C32	Sewer and Manhole Brick
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Precast Reinforced Concrete Manhole Sections
ASTM C913	Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers



## ITEM D-785 SUBGRADE INFILTRATION SYSTEM

(New item in its entirety)

### DESCRIPTION

**785-1.1** This item shall consist of drainage chambers, culvert pipe, geotextile, embedment stone, foundation stone, and miscellaneous drainage structures constructed according to these Specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the Plans or required by the Engineer.

### MATERIALS

**785-2.1 DRAINAGE CHAMBER.** Chambers shall be arch-shaped and shall be manufactured from virgin, impact-modified polypropylene copolymers.

Chambers shall meet the requirements of ASTM F2418 chamber classification 45x76 designation SS.

Chamber rows shall provide continuous, unobstructed internal space with no internal supports that would impede flow or limit access for inspection.

The structural design of the chambers, the structural backfill, and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD bridge design specifications, Section 12.12, are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO design truck with consideration for impact and multiple vehicle presences.

Chambers shall be designed, tested and allowable load configurations determined in accordance with ASTM F2787. Load configurations shall include: 1) instantaneous (<1 min) AASHTO design truck live load on minimum cover 2) maximum permanent (75-yr) cover load and 3) allowable cover with parked (1-week) AASHTO design truck.

Requirements for handling and installation:

- a. To maintain the width of chambers during shipping and handling, chambers shall have integral, interlocking stacking lugs.
- b. To ensure a secure joint during installation and backfill, the height of the chamber joint shall not be less than 3".
- c. To ensure the integrity of the arch shape during installation, a) the arch stiffness constant (ASC) shall be greater than or equal to 450 lbs/ft/°. The ASC is defined in section 6.2.8 of ASTM F2418. And b) to resist chamber deformation during installation at elevated temperatures (above 73°F/ 23°C), chambers shall be produced from reflective gold or yellow colors.

Only chambers that are approved by the site design engineer will be allowed. Upon request by the site design engineer or owner, the chamber manufacturer shall submit a structural evaluation for approval before delivering chambers to the project site as follows:

- a. The structural evaluation shall be sealed by a registered professional engineer.
- b. The structural evaluation shall demonstrate that the safety factors are greater than or equal to 1.95 for dead load and 1.75 for live load, the minimum required by ASTM F2787 and by sections 3 and 12.12 of the AASHTO LRFD bridge design specifications for thermoplastic pipe.
- c. The test derived creep modulus as specified in ASTM F2418 shall be used for permanent dead load design except that it shall be the 75-year modulus used for design.

Chambers and end caps shall be produced at an ISO 9001 certified manufacturing facility.

**785-2.2 MANIFOLD PIPE.** Pipe shall consist of 24-inch diameter high density polyethylene pipe meeting the requirements of Item D-701.

**785-2.3 CONCRETE.** Concrete shall meet the requirements of Item P-610.

**785-2.4 GEOTEXTILE.** Non-woven geotextile shall meet the requirements of Item P-681 for separation. Woven geotextile shall meet the requirements of Item P-682 for subsurface drainage.

**785-2.5 EMBEDMENT STONE.** Material shall consist of clean, crushed, angular stone meeting the requirements for bedding material in Item D-701, except the gradation of the final embedment stone material shall meet the requirements of AASHTO M43 No. 3 or No. 4, as provided in Table 785-1.

**TABLE 785-1  
REQUIREMENTS FOR GRADATION OF EMBEDMENT AND FOUNDATION STONE**

Sieve Size	Percentage by weight passing	
	No. 3	No. 4
2-1/2"	100	
2"	90-100	100
1-1/2"	35-70	90-100
1"	0-15	20-55
3/4"		0-15
1/2"	0-5	
3/8"		0-15

**785-2.6 FOUNDATION STONE.** Material shall consist of clean, crushed, angular stone meeting the requirements for bedding material in Item D-701, except the gradation of the final foundation stone material shall meet the requirements of AASHTO M43 No. 3 or No. 4, as provided in Table 785-1.

**785-2.7 INSPECTION PORT.** Inspection port shall allow access to the interior of the chamber and shall be of the manufacturer’s standard design. Inspection port cover shall be traffic rated. Riser pipe shall be min 8-inch diameter SDR11 HDPE or DR 18 C900 PVC.

**CONSTRUCTION METHODS**

**785-3.1 UNCLASSIFIED EXCAVATION.**

- a. Trenches for chambers shall be excavated to the lines and grades or elevations shown on the Plans. The excavation shall be of sufficient size to permit the placing of the full width and length of the chambers and backfill material shown.
- b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed.
- c. The Contractor shall do all bracing, sheathing, or shoring necessary to perform and protect the excavation and the chambers as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for excavation.
- d. All bracing, sheathing, or shoring shall be removed by the Contractor after the completion of the chamber installation. The cost of removal shall be included in the unit price bid for excavation.

**785-3.2 CHAMBER INSTALLATION.**

- a. Drainage chambers shall be installed in accordance with manufacturer construction guide.



- b. The use of equipment over chambers is limited:
  - (1) No equipment is allowed on bare chambers
  - (2) No rubber tired loader, dump truck, or excavators are allowed until proper fill depths are reached in accordance with manufacturer construction guide.
  - (3) Weight limits for construction equipment are provided in manufacturer construction guide.
- c. 36" of cover over the chambers is required for dump truck travel or dumping.
- d. Joints between chambers shall be properly seated prior to placing stone.
- e. Maintain minimum 6" spacing between chamber rows. Stone must be placed on the top center of the chamber to anchor the chambers in place and preserve row spacing.
- f. Install one continuous layer of geotextile between first chamber row and foundation stone as shown on the Plans.
- g. Install inspection ports at locations shown on the Plans.

**785-3.3 PIPE INSTALLATION.** Construct manifold piping from inlet manhole to drainage chambers in accordance with manufacturer construction guide.

**785-3.4 BACKFILLING.**

- a. **Geotextile.** All sides of trench excavation shall be lined with nonwoven geotextile fabric meeting the requirements of P-681.
- b. **Foundation Stone.** Fill below chambers from bottom of excavation up to the chamber invert. Plate compact or roll to achieve a level surface.
- c. **Embedment Stone.** Chambers shall not be backfilled with a dozer or an excavator situated over the chambers. Acceptable backfill methods include:
  - 1. Stoneshooter located off the chamber bed.
  - 2. Backfill as rows are built using an excavator on the foundation stone or subgrade.
  - 3. Backfill from outside the excavation using a long boom hoe or excavator.

Fill from chamber inverts up to minimum 2' above top of chamber. Compaction of embedment stone is not required.

- d. **Unclassified Excavation.** Fill from top of embedment stone to finished ground as shown on the Plans. Begin compaction after 24" of material over the chambers is reached. Compact additional layers in 12" max lifts to a minimum 95% proctor density for well graded material and 95% relative density for processed aggregate materials. Backfill will not be measured for direct payment. Excavated material not needed for backfill shall be disposed of in the same manner as unclassified excavation. Performance of this work shall be considered as a subsidiary obligation of the Contractor.

**METHOD OF MEASUREMENT**

**785-4.1 Lump Sum.** Lump sum items will not be measured for payment. All work required downstream of the inlet manhole(s), including excavation, geotextile, drainage chambers, culvert pipe, inspection ports, and backfill is subsidiary to the subgrade infiltration system at the contract price.

### **BASIS OF PAYMENT**

**785-5.1** At the contract lump sum or unit price, for each of the pay items listed below that are shown in the bid schedule.

Payment will be made under:

Item D785.010.0000 Subgrade Infiltration System – per lump sum

### **MATERIAL REQUIREMENT**

ASTM F2418 Polypropylene Corrugated Wall Stormwater Collection Chambers

### **TESTING REQUIREMENTS**

ASTM F2787 Standard Practice For Structural Design Of Thermoplastic Corrugated Wall Stormwater Collection Chambers

## ITEM F-174 SINGLE AND DOUBLE POLE SWING GATE

### DESCRIPTION

**174-1.1** Furnish and install single or double pole swing gates at the locations and according to the details shown on the Plans. Include gate foundations, gate assemblies, installation, application of reflective tape, and all materials and incidentals necessary for complete and operational gates.

### MATERIALS

**174-2.1 STEEL.** Provide structural steel that conforms to the requirements of ASTM A36 (Standard specification for carbon structural steel). Use structural steel galvanized in conformance with ASTM A123 (standard specification for hot dipped galvanized zinc coatings on iron and steel products) 2.0 OZ/SF, or in conformance with ASTM A153 (standard specification for hot dip galvanized zinc coatings on iron and steel hardware) as appropriate. Galvanize gates and gate components after fabrication. Make repairs to damaged galvanizing in conformance with ASTM A780 (standard practice for repair of damaged and undercoated areas of hot dip galvanized coatings). Provide high strength bolt, nut and washer material conforming to the requirements of ASTM A325. Provide galvanized heavy hex-type bolts and nuts if components connected are galvanized. Provide galvanized machine bolts conforming to ASTM A307.

**174-2.2 CONCRETE.** Provide concrete in conformance to the requirements of Item P-610.

~~**174-2.3 LOCKS.** Provide brass restricted keyway padlocks for each gate with a shackle that is 3/8-inch in diameter and a closed clearance of 2-1/4 inches. Provide locks with control key removable cores and furnish a separate replacement core for each lock. Provide cores that are keyed differently. Provide 4 keys per lock, and 2 core removable keys.~~

**174-2.4 REFLECTIVE MARKINGS.** High intensity reflective sheeting per ASTM D4956.

### CONSTRUCTION REQUIREMENTS

**174-3.1 FABRICATION.** Give 15 days notice before beginning fabrication work at the shop so that inspection may be provided.

Provide workmanship and finish equal to the best practice in modern fabrication shops. Finish portions of the work exposed to view neatly. Perform shearing, flame cutting, and chipping carefully and accurately. Steel or wrought iron may be flame cut, provided a smooth surface is obtained by the use of a mechanical guide. Perform flame cutting by hand only where approved, and smooth the surface by planing, chipping, or grinding. Adjust and manipulate the cutting flame so as to avoid cutting beyond the prescribed lines. Fillet re-entrant cuts to a radius of not less than 3/4-inch.

Finishing and Shaping: Provide finished members true to line and free from twists, bends, and open joints. Store structural material, either plain or fabricated, at the fabricating shop above the ground on platforms, skids, or other supports. Keep free from dirt, grease, or other foreign matter, and protect from corrosion.

Perform welding in accordance with AWS D1.1.

**174-3.2 INSTALLING POSTS.** Set all gate posts in concrete at the required dimensions and depths and at the spacing shown on the Plans.

Properly align post holes so that there is a minimum of 3 inches of concrete on all sides of the posts. Thoroughly compact concrete around each post by tamping or vibrating and finish to a smooth surface slightly higher than the surrounding ground and sloped to drain away from the posts. Set all posts plumb

and to the required grade and alignment. Do not install materials on the posts or disturb the posts within 7 days after completion of the individual post footing.

Should rock be encountered at a depth less than the planned embedment depth, drill a hole 2 inches larger than the greatest dimension of the post and to a depth of 12 inches below the planned embedment depth. After the posts are set, fill the remainder of the drilled hole with grout, composed of one part Portland cement and two parts mortar sand. Fill any remaining space above the rock with concrete in the manner described above. In lieu of drilling, the rock may be excavated to the required embedment depth.

**174-3.3 INSTALLING GATES.** Install gates level and plumb with the swing as indicated on the Plans. Install reflective sheeting on clean, dry surfaces in accordance with the manufacturer's recommendations.

#### **METHOD OF MEASUREMENT**

**174-4.1** By the number of gates of each type installed and accepted.

#### **BASIS OF PAYMENT**

**174-5.1** Payment will be made at the contract unit price for each furnished, installed and accepted item.

Payment will be made under:

Item F174.010.0020      Single Pole Swing Gate, 20-feet Wide – per each

## ITEM G-100 MOBILIZATION AND DEMOBILIZATION

### DESCRIPTION

**100-1.1** This item consists of preparatory work and operations, including but not limited to operations necessary to move personnel, equipment, and supplies to the project site; to establish offices, buildings and other facilities, ~~except as provided under Item G-130~~; to perform all other work and operations, including costs incurred, before beginning work on the project; and to complete similar demobilization activities, including submittals such as as-builts, certificates, payrolls, civil rights reports, equipment warranties, etc.

**100-2.1 POSTED NOTICES.** ~~Prior to commencement of construction activities, the Contractor must display posters as provided under Section GCP 70. These notices must remain posted until final acceptance of the work by the Department.~~

### METHOD OF MEASUREMENT

**100-3.1** Payment for mobilization and demobilization will be made in partial payments for each bid schedule as follows:

- a. When equipment and supplies are landed in serviceable condition at the project site and other necessary preparation have been completed so that work can commence on other pay items, 40% of the pay item.
- b. When 25% or more of the original contract is earned, an additional 40%.
- c. With Final Payment, the remaining 20%.

The Department reserves the right to require submittal of invoices, receipted bills, payrolls, and other appropriate documents to justify any or all payments under this item.

### BASIS OF PAYMENT

**100-4.1** Payment will be made at the contract lump sum price for mobilization and demobilization for each bid schedule. This price and payment shall be full compensation for all costs associated with this item.

Payment will be made under:

Item G100.010.0000 Mobilization and Demobilization – per lump sum



## **ITEM G-105 INTERIM WORK AUTHORIZATION**

(New item in its entirety)

### **DESCRIPTION**

**105-1.1 GENERAL.** The Interim Work Authorization allows for the approval and continuation of work when additional work is needed due to unforeseen conditions.

### **METHOD OF MEASUREMENT**

**105-4.1** Measurement of work under this item will be by contingent sum at existing unit prices, at negotiated lump sum or unit prices, or, if negotiated prices cannot be determined, on a time and materials basis in accordance with GCP Section 90 Subparagraph 90-05.

### **BASIS OF PAYMENT**

**105-5.1** Payment will be made in accordance with GCP Section 90 and shall include full payment for all work under this Item.

Payment will be made under:

Item G105.010.0000 Interim Work Authorization - per contingent sum





## ITEM G-110 AIRPORT SAFETY REQUIREMENTS

(New item in its entirety)

### DESCRIPTION

**110-1.1 GENERAL.** It is the explicit intention of this Contract that the safety of aircraft, vehicles, and the public, as well as the Contractor's equipment and personnel, be of utmost importance during performance of the Work. The Contractor is solely responsible for all safety related to his operations on the airport. The contractor shall provide all safety training, procedures, coordination, notifications, equipment, barricades, markings, signs, flagging and personnel to comply with these safety requirements.

**110-1.2 CONSTRUCTION SAFETY AND PHASING PLAN.** A Construction Safety and Phasing Plan (CSPP) is included in Exhibit F for use during this project and specifies minimum requirements for operational safety during construction activities. The CSPP was prepared in conformance with the Federal Aviation Administration (FAA) Standard of Practice 2.0 (SOP 2.0), and FAA Advisory Circular (AC) 150/5370-2G *Operational Safety on Airports During Construction* (Safety AC), included as Exhibit D.

The purpose of the CSPP is to present information needed for construction in an effort to maintain airport safety, minimize disruption to the operations of air and ground traffic, and allow the project to be completed quickly. The designated work area for this project includes existing aircraft aprons, taxiways, and runways. The Contractor shall control his operations and the operations of his subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in areas that are not under construction.

The CSPP provides information on some of the coordination, limitations, and restrictions that will be required to accomplish this project. Some details have been left for the Contractor to provide, so that the Contractor may accomplish the work according to their own means and methods, as much as practical. The Contractor's plans to complete the work are subject to Engineer approval and will require coordination and review by the Airport Manager, FAA, and possibly other organizations or individuals. The Contractor is required to submit a Safety Plan Compliance Document (SPCD) to the Engineer describing how they will perform the work in compliance with the CSPP and the requirements set forth in the Safety AC.

The FAA requires the CSPP and the SPCD to be "stand-alone" documents that can be circulated to the relevant sections of the FAA for review and approval. The CSPP and SPCD are both enforceable parts of the contract documents.

The CSPP Drawings are included in the project Plans and are numbered using an S prefix.

**110-1.3 SAFETY PLAN COMPLIANCE DOCUMENT.** The Contractor shall submit to the Engineer a SPCD in accordance with the provisions set for the within the current version of the Safety AC. The SPCD shall be submitted to the Engineer prior to the commencement of any construction activities.

The SPCD shall include a general statement that the Contractor has read and will abide by the CSPP and shall include the Contractor's name, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (example statement: "I, Name of Contractor, have read the Title of the 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 merely duplicate information in the CSPP. No deviations or modifications may be made to the approved CSPP or SPCD unless approved in writing by the Engineer.

**110-1.4 COMPLIANCE.** The Contractor shall implement all necessary CSPP and SPCD measures prior to commencement of any work activity. The Contractor shall conduct daily checks of its workers, equipment, and construction methods to assure compliance with the CSPP and SPCD measures using

*Construction Project Daily Safety Inspection Checklist* (Appendix D of FAA AC 150/5370-2G). The Contractor shall document the checks in writing and sign them. Documented checks shall be available for inspection by the Engineer.

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

The CSPP and SPCD will indicate areas within airport property boundaries that may be used for material stockpile, and will indicate the maximum height of stockpile allowed. The Contractor shall obtain prior approval from the Engineer before using other areas within airport property. The Engineer may limit stockpile heights or equipment heights in any area, either inside or outside of airport property, based on requirements in the ACs or other factors necessary to ensure the free and unobstructed operation of aircraft.

**110-1.5 AIRPORT MANAGER AUTHORITY.** The Airport Manager is the operating authority of the airport and has the sole authority to close a runway or the airport to aircraft operations until, in the opinion of the Airport Manager, the safety hazard no longer exists. The Airport Manager, or designated representative, has the sole authority to file Notices to Airmen (NOTAMs) with the FAA. The Airport Manager is Rosalie Kelly, telephone number (907) 761-1334 or (907) 707-6577.

**110-1.6 CONTRACTOR'S SAFETY MANAGER.** The Contractor shall designate a superintendent or foreman of the company to act as Safety Manager for this project. The Safety Manager shall have full authority to direct all of the Contractor's activities, including stopping work, to ensure a safe worksite. The Safety Manager shall be involved with all phases of construction including bidding, pre-construction conference, training of personnel, weekly meetings, daily construction status reports (used to update NOTAMs) construction, and final inspections. The Safety Manager shall have an understanding of airport airspace and the local traffic control procedures. The Safety Manager shall be available 24 hours a day during the construction phase to respond to all safety needs. Prior to commencing any work on the airport, provide the following:

Safety Manager's Name: \_\_\_\_\_

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

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

Day Telephone: \_\_\_\_\_

Evening Telephone: \_\_\_\_\_

The Contractor shall provide names and phone numbers for not less than two additional safety alternates. The listed persons shall, at a minimum, have ability to install new batteries, flashers, cones, runway closure X's, or other items required to keep the airport marking system operational.

Alternate 1: \_\_\_\_\_

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

Telephone: \_\_\_\_\_

Alternate 2: \_\_\_\_\_

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

Telephone: \_\_\_\_\_

**110-1.7 AIRSPACE AND PERMITS.** Construction work adjacent to the runways will penetrate the airspace above the work site as outlined in AC 70/7460-2K. If the Contractor chooses to deviate from the CSPP, the Contractor shall obtain airspace clearance permits from FAA Airport Airspace Management for any work or phase of work that penetrates airport airspace. The FAA has indicated that permit processing typically takes 14 to 30 days. The Contractor shall file required paperwork with both the Engineer and FAA at least 30 days prior to commencement of any work deviating from the CSPP. The submittal shall include a “not-to-exceed” equipment height and a schedule of construction activities.

#### **METHOD OF MEASUREMENT**

**110-4.1** This item will not be measured for payment.

#### **BASIS OF PAYMENT**

**110-5.1** Payment will be made at the contract lump sum price for complying with the airport safety requirements in accordance with an approved Schedule of Values. This price and payment shall be full compensation for all associated with this item per each bid schedule. All work, materials, equipment, and flagging required to complete the work is incidental to this item.

Payment will be made under:

Item G110.010.0000    Airport Safety Requirements - per lump sum



## ITEM G-135 CONSTRUCTION SURVEYING AND MONUMENTS

### DESCRIPTION

**135-1.1 GENERAL.** Perform surveying and staking essential for the completion of the project and perform the necessary calculations required to accomplish the work in conformance with the Plans and specifications and standard survey and engineering practices.

The Contractor shall provide all survey work including, but not limited to: project layout, cross sections, slope stakes, grade stakes, as-built measurements, and quantity measurements. Immediately upon completion of initial cross sections, the Contractor shall furnish reduced and checked survey notes to the Engineer. From time to time throughout the work, as requested by the Engineer, the Contractor shall take appropriate sections and shall provide the Engineer with reduced and checked notes from which quantity calculations for progress payment purposes can be accomplished. Notes shall be kept in a neat, orderly, and legible form according to professional surveying practices.

Upon completion of each phase of the work, the Contractor shall furnish the Engineer with all necessary measurements for completion of the as-built drawings. The Contractor shall include identification and location of project features where actual locations differ from locations shown on the Plans. All original survey notes and field books shall become the property of the Department and shall be delivered to the Engineer as a condition to final payment on this contract.

Furnish and install survey monuments and monument cases in conformance with the Plans or as directed.

Furnish and maintain facilities, equipment, and services specified in this section for Digital Terrain Modeling (DTM). All furnished facilities and equipment remain the property of the Contractor once the work is completed

### 135-1.2 DEFINITIONS.

- a. **Monument:** A fixed physical object marking a point on the surface of the earth; used to commence or control a survey; mark the boundaries of a parcel of land; or the centerline of a right-of-way corridor. Monuments will be Primary or Secondary, as shown on the Plans.
- b. **Point:** An identified spot located on the surface of the earth. For purposes of this definition, a point can be either physical or electronic depending on the context in which it is used. Physical points include a PK nail, wooden hub, rebar, large nail or other structure capable of being utilized as a marker.
- c. **Witness Corner:** A ~~material mark monument~~ or point ~~usually placed on a property or survey line,~~ at a known distance from a property corner or other survey point. A witness corner is employed to witness the location of a corner/point that cannot be monumented at its true location.
- d. **Reference Monument:** A ~~material mark or point monument~~ placed at a known distance and direction from a property corner or other survey point, usually not on a property or survey line. A reference monument is employed to perpetuate a corner/point that cannot be monumented at its true location or where the corner monument is subject to destruction.
- e. **Surveyor:** The Contractor's Professional Land Surveyor placed in "responsible charge", and currently registered in the State of Alaska as defined in AS 08.48.341.
- f. **Break Line:** A break line defines the horizontal location where TIN lines must break, and snap to the vertical location of the break line.
- g. **Catch Point:** In the cross section, the point at which the fill or cut slope intersects the edge of the existing ground.

- h. CAD: Computer-Aided Design.
- i. CORS: Continuously Operating Reference Station.
- j. DTM: Digital Terrain Model. A computer generated 3D model representing the project terrain, and based on the association of features such as alignments, profiles, sections, grading lines, points, and surfaces.
- k. GLONASS: A radio-based satellite navigation system operated by Russia. GLONASS is an alternative and is complementary to the United States Global Positioning System.
- l. GNSS: Global Navigation Satellite System.
- m. GPS: Global Positioning System; A radio-based satellite navigation system operated by the United States.
- n. Hinge Point: In the cross section, the point at which any slope intersects another slope of different angle.
- o. Neat-line: Defines the geometric limits of a material, as indicated by the typical section, profile, and alignment.
- p. NGS: National Geodetic Survey; United States Government Agency that provides information and products related to the definition and management of the NSRS.
- q. NSRS: The National Spatial Reference System.
- r. OPUS: On-line Positioning User Service; The National Geodetic Survey operates OPUS as a means to provide GPS users easier access to the NSRS.
- s. PPK: Post Processed Kinematic; PPK surveys are similar to RTK surveys, except there is no radio communication between the reference station and the rover, so the rover cannot process a position in "real time". Survey data from both the reference station and rover is imported into GPS processing software to determine the measured position.
- t. RTK: Real Time Kinematic; RTK surveys utilize two or more receivers with at least one receiver remaining stationary over a known coordinate. The radio at the reference station broadcasts its position to the rovers and the system processes the baselines in "real time" allowing for project coordinate information to be gathered and analyzed during the actual field survey.
- u. Slope Staking: The process of using measurements and calculations to determine where to begin a cut or fill, the slope ratio, and the depth of the cut or fill.
- v. Static: Static survey methods require multiple GPS receivers to collect data over the course of a long period of time. The data collected by the receivers is downloaded into a GPS processing software program to determine the measured position.
- w. Tessellation Spacing: The distance along a line or an arc that a TIN point is created.
- x. TIN: Triangulated Irregular Network; A vector based representation of a physical land surface.
- y. Weeding: A procedure used to limit the frequency of information displayed.

## MATERIALS

**135-2.1 MONUMENT CASES.** Castings shall conform to AASHTO M 105, Class 30A. Castings shall be coated with a bituminous damp-proof coating. Bolting tops shall be used.

**135-2.2 PRIMARY MONUMENT.** A minimum 2-3/8-inch diameter nonferrous pipe at least 30 inches long, with a minimum 4-inch flange at the bottom and having magnets attached at the top and bottom. A minimum 2-1/4 3-1/4-inch diameter nonferrous metal cap must be permanently attached to the top. Mark the cap around the outside edge with the words "~~STATE OF ALASKA DOT&PF~~ PALMER AIRPORT". Permanently stamp every monument with the Surveyor's registration number, the year set, and the point/corner identification. Orient cap so that the data may be read when the reader is facing north, except for centerline monuments that will be oriented to be read facing up-station.

**135-2.3 SECONDARY MONUMENT.** A minimum 5/8-inch by 30-inch rebar with a 2-inch aluminum cap attached to the top. Permanently stamp every secondary monument with the Surveyor's registration number, the point/corner identification, and the year set.

## CONSTRUCTION REQUIREMENTS

**135-3.1 GENERAL.** Use competent, qualified personnel and suitable equipment for construction surveying activities. The Surveyor's personnel shall be supervised and trained in the avoidance of systematic errors. The Surveyor's personnel shall be familiar with geodetic concepts and least-squares adjustments. Correcting errors resulting from the operations of said personnel shall be at the Contractor expense. The Contractor is responsible for the accuracy of the work. ~~for the layout work required and f~~

Furnish all equipment including but not limited to vehicles, traffic control devices, stakes, measuring tapes, levels, rods, GPS receivers, total stations, safety devices, templates, straight-edges and other devices necessary for establishing, checking and maintaining the required points, lines and grades.

Schedule a mandatory Pre-Survey Conference with the Engineer, Contractor, Surveyor, and all personnel who are to be involved in the survey work, two weeks prior to beginning survey work. The purpose of this meeting will be to discuss methods and practices of accomplishing the required survey work.

Furnish computer services to accomplish the work. All data shall be signed by the Surveyor. Check data received from the computer to certify for completeness and accuracy. As soon as practical after completion of the work, and in no case later than acceptance of the project, deliver field books, computer forms and computer output data to the Engineer. Furnish all computer generated data in a file format and medium that is compatible with Department software. This data becomes the property of the Department.

Supervise construction surveying personnel. Correct errors resulting from the operations of said personnel at Contractor expense. The Contractor is responsible for the accuracy of the work.

Work classified as Land Surveying under AS 08.48, and work involving the location, control, and monumentation of construction centerline and right-of-way, shall be performed by or directly under the responsible charge of a Professional Land Surveyor.

Follow the State of Alaska DOT&PF Construction Surveying Requirements found in Appendix A. Department's Construction Surveying Requirements.

The Department will provide sufficient centerline or reference thereto, and at least one benchmark to enable the establishment of planned elevations and centerline.

Furnish field survey notes. Keep field notes in standard hardbound notebooks in a clear, orderly, and neat manner consistent with the State of Alaska DOT&PF Construction Surveying Requirements. Departmental procedures, including titles, numbering, and indexing. Make field books available for inspection by the Engineer's project personnel at any time. Legible copies of the reduced field notes shall be made daily. Store the field books in the Engineer's Project Office during periods of non-use. Copies of the field books shall be kept in a separate secure location.

Furnish traffic control necessary for surveying activities in accordance with the latest edition of the Alaska Traffic Manual (ATM). Outfit all field employees with appropriate High Visibility Clothing conforming to the

requirements of ANSI/ISA 107-2004, Class 2 for tops or Class E for bottoms, and Level 2 retroreflective material.

The Engineer may randomly spot check the Contractor's surveys, staking, and computations. The Department assumes no responsibility for the accuracy of the work.

The Engineer has the right to communicate directly with the Surveyor. Any communication regarding changes to the original scope of work shall go through the Contractor.

**a. Responsibilities of the Surveyor.** The Surveyor is responsible for:

- (1) Maintaining registration as a Professional Land Surveyor in the State of Alaska.
- (2) Maintaining familiarity with the site conditions and progress of the project.
- (3) Determining the accuracy required for each survey stake.
- (4) Following the *State of Alaska DOT&PF Construction Surveying Requirements*.
- (5) Notifying the Engineer of conflicts and changes necessary due to utilities, match point variations, design revisions, or other variables.
- (6) Slope Staking.
- (7) Staking all clearing and/or grubbing limits. Clearly identify all trees that are specified to remain.
- (8) Staking and hubbing all layers of material shown in the typical sections, including the bottom of excavation, top of borrow, top of base course, and top of surcharge.
- (9) Staking all culverts, curbs, inlets, and other drainage appurtenances.
- (10) Staking all bridge and pedestrian over/under-crossings.
- (11) Staking all right-of-way and material source limits.
- (12) Layout of all temporary and permanent pavement markings, and pavement marking devices.
- (13) Bi-weekly settlement platform elevation monitoring.
- (14) Development of DTM's, and plotted cross sections.
- (15) As-built and Topographic surveying.
- (16) Removal and disposal of all flagging, lath, stakes and other staking material after the Project is completed. Burning of material is not allowed on the project.
- (17) All other surveying and staking necessary to complete the project.

Perform the following:

- ~~(1) Staking necessary to delineate clearing and/or grubbing limits.~~
- ~~(2) Cross sections necessary for determination of excavation and embankment quantities, including intermediate and/or remeasure cross sections as needed. Take cross sections after clearing and grubbing has been completed.~~



- ~~(3) Slope staking.~~
- ~~(4) Staking of signs, culverts, minor drainage structures and other appurtenances, including the necessary checking to establish the proper location and grade to best fit the conditions on site.~~
- ~~(5) Bridge staking.~~
- ~~(6) Setting finishing stakes.~~
- ~~(7) Measurement of pay quantities that require measurement.~~
- ~~(8) Staking of right-of-way and material source limits.~~
- ~~(9) Staking, referencing and other actions required to preserve or restore land monuments and property corners.~~
- ~~(10) As-built surveying as required under Section 50-08 Survey Control. Tie as-built measurements and locations to project horizontal and vertical survey control.~~
- ~~(11) Staking and hubbing of bottom of excavation and the top of each layer in the pavement structure.~~
- ~~(12) Provide interim calculations for measured items to the Engineer prior to progress payments for each specific item. Ensure that the calculations are completed, checked, and signed by the person in responsible charge of the work.~~
- ~~(13) Other surveying and staking necessary to complete the project.~~

~~Notify the Engineer immediately if a Department established reference point is discovered to be in error or a reset point is not in relationship to the adjacent centerline points.~~

~~Furnish a notekeeper to record field survey notes, including documentation for quantity computations for payment. Ensure that the notekeeper is thoroughly familiar with generally accepted standards of good survey notekeeping practice and the Department's Construction Surveying Requirements.~~

~~The Engineer may randomly spot check the Contractor's surveys, staking, and computations. After the survey or staking has been completed, provide the Engineer with a minimum of 72 hours notice before performing work, and furnish the appropriate data, to allow for random spot checking. The Department assumes no responsibility for the accuracy of the work.~~

**b. Submittal Requirements.** ~~Measure, compute, and plot all field-measured pay item quantities, including but not limited to excavation and disposal of asphalt cement concrete (AC), Portland cement concrete (PCC) pavement, and classified/unclassified excavation volumes. Stake for measurement and calculation of excavation quantities after AC and PCC pavement removal. Submit a proposed method of measuring and computing volumes to the Engineer in writing for approval before performing any field work under this item.~~

~~Provide item quantities, including computations and plots to the Engineer prior to payment for each specific item. The Department will review and accept or modify the quantities provided.~~

~~Digital terrain modeling (DTM) will may be used in determining earthwork quantities, as an alternative to before and after cross sections by average end area if the Engineer has agreed in writing to the DTM method prior to commencement of any field work. If DTM is approved and used, Provide plotted cross-sections on 50-foot stations with elevations, offsets and computed end areas in square feet for each section prior to earthwork payments for each item. Provide these cross-sections and associated data for the entire area of earthwork computations along with the terrain model.~~

~~Accomplish staking in accordance with the following:~~

- (1)n- Perform the topographic survey by grid or cross section method of surveying 25 feet beyond the project match lines. Take elevation shots at 25-foot intervals, at all terrain breaks, and at topographic features.
- (2)e- Record and locate all baselines and connect them to the project's centerline, both horizontally and vertically.
- (3)p- Upon completion of the before and after survey, provide the Engineer a grid layout sheet showing the baseline, stations and all spot elevations.
- (4)q- Provide the Engineer a contour map of the original ground and an identical size map showing the final elevations with 0.5 foot contour intervals. Provide the Engineer with plotted cross-sections for each station grid with elevations and offsets shown.

At the end of each day's work, the surveyor shall email a copy of the downloaded raw data from the data collector, in its original format, to the Engineer. If editing is deemed necessary, send a separate email with the amended electronic data and a change log annotating the changes.

Provide the ~~the~~ in-above products to the Engineer before payment will be made for that work. Provide as-builts and electronic data to the Engineer prior to final inspection.

~~135-3.2 CROSS SECTION SURVEYS. When required, obtain right-angle cross sections to the construction centerline at the interval detailed in the Department's Construction Surveying Requirements.~~

The following will be supplied by the Department:

- ~~a. Construction Plans and specifications.~~
- ~~b. Design Cross Sections, if any.~~
- ~~c. State of Alaska Land Survey Monument Record forms.~~
- ~~d. Department's Construction Surveying Requirements. One copy.~~
- ~~e. Design centerline grades.~~

The following shall be required of the Contractor:

- ~~a. Field Books (Level, Cross Section, Slope Stake, etc.). Use "Rite in the Rain" or similar weather resistant hardbound field books. Field books become the property of the Department upon completion of the work.~~
- ~~b. Label the books and number the pages. Make a heading in the appropriate book (date, weather, names and duties of crew members) at the beginning of each day's work.~~
- ~~c. Update the index of the appropriate book at the end of each day's work.~~
- ~~d. Reduce, check, and adjust level notes.~~
- ~~e. The notekeeper shall compute the cross-section level notes and slope stake catches and a different crew member shall check the computation on a continual basis in the field.~~
- ~~f. Enter the grade data, shoulder width and/or ditch distance, stationing, slope, etc., in the slope stake books.~~
- ~~g. Maintain the position and identifying marks of slope stakes and reference points until used for their intended purpose.~~

- ~~h. Correct errors by drawing a line through them and writing the correct entry directly above. Erasures will not be allowed.~~
- ~~i. Return field books and copies of the field books to the Project office at the end of each work day or as directed.~~
- ~~j. Provide copies of grade sheets and temporary bench mark elevations to the Engineer 48 hours before beginning work on unclassified excavation or embankment.~~
- ~~k. The Contractor's survey crews shall comply with approved traffic control plans. Coordinate crew activities with the Worksite Traffic Supervisor.~~
- ~~l. Keep a survey Party Chief diary, and give a copy of the diary to the Engineer each day. The diary shall contain the following information:
 
  - ~~(1) Date.~~
  - ~~(2) Weather.~~
  - ~~(3) Crew members' names and duties.~~
  - ~~(4) Type and location of work performed.~~
  - ~~(5) Hours worked.~~
  - ~~(6) Type of equipment used (brand) and date equipment was double centered or "peg" test was performed.~~
  - ~~(7) Signature of person in responsible charge.~~~~
- ~~m. Submit the survey field notes, for the specific area, relating to monument referencing, before beginning clearing, grubbing or excavation.~~
- ~~n. Draw cross-sections and complete quantity calculations for all earthwork quantities.~~

**135-3.2 3-3 MONUMENTS.** Install primary and secondary monuments, as called for in the Plans, at the positions established by the Department. Prior to the start of construction, reference monuments, to include property markers/corners and accessories, that may be disturbed or buried during construction. In addition, reference monuments designated for referencing on the Plans. Prepare and record Monument Record Forms in the appropriate Recorder's Office before disturbing monuments. Monument Record Forms may be obtained from the Engineer. Re-establish monuments in their original position before completion of the project. Prepare and file a Monument Record Form for each reestablished monument.

Keep records and report to the Engineer evidence that a monument has been disturbed and is no longer reliable or cannot be located and is presumed to be missing. Establish a minimum of two in-line reference points, or three swing-tie reference points in situations where in-line referencing is not desirable. Set reference points outside of the construction limits. Measure distances from the monument to the nearest 0.01 foot. Record referencing of monuments in a separate field book stamped by the Surveyor.

Replace existing monuments disturbed by construction with Primary or Secondary Monuments meeting the requirements of subsections 135-2.1 through 3. When it is impractical to establish a monument in its original position, install a witness corner (WC). Place the WC to a property corner on the property line when the other property corner that defines said line is existing or there has been sufficient retracement to define said line. In other cases, place a reference monument (RM) perpendicular to the centerline at the station of the original position and at a distance from the original position measured in whole feet.

Those monuments found that are not shown on the Plans will be recognized by the Engineer when the following is provided by the Surveyor: Field notes identifying type and location of the monument, and a

description of the point the monument marks, with the reason to preserve its location. Monuments not shown on the Plans will be considered additional work and paid by Item G135.020.0000, Extra Three Person Survey Party.

The Surveyor shall complete a State of Alaska Land Survey Monument Record form for each primary and secondary monument referenced, removed, installed, relocated or replaced. Provide the required survey information on the form according to statutory requirements, including section, township and range. Meet requirements for recording at the District Recorder's Office in which the project is located for each monument record. Deliver conforming copies of the recorded forms to the Engineer before monument removal or disturbance, and after setting any final monuments requiring monument records.

Set each monument and monument case accurately to lines established at the required location and in a manner as to ensure being held firmly in place. Set existing monuments and monument cases to be adjusted to new elevations in the manner and at the elevations directed.

Primary Airport Control (PAC) and Secondary Airport Control (SAC) monuments are present in the project area as shown on the Plans. This control is important and if disturbed, must be reestablished by the Contracting Agency. For this reason, the Contractor is required to employ all reasonable measures to preserve the existing control monuments in an undisturbed condition. If a PAC or SAC is disturbed by the Contractor's actions, the Contractor shall reimburse the State of Alaska for the cost of replacing monuments, performing geodetic surveys and related data processing, and filing the completed survey with the National Geodetic Surveys office. The estimated cost for reestablishing a disturbed monument is approximately \$50,000, but costs will vary depending on location, season, availability of staff, and other factors.

**135-3.3 SURVEY CONTROL.** The basis of project control is identified in the *Survey Control Sheet*. Use the calibration parameters shown in the *Survey Control Sheet* to Calibrate/Localize/Convert to the local project coordinate system. Contact the Engineer for calibration parameters if they are not shown in the plans. Independently recover and verify all survey control points shown in the *Survey Control Sheet*. Establish and verify new reference points where required, to replace missing points. Notify the Engineer immediately if a reference point is discovered to be in error, or a reset point is not in harmonious relationship to the existing control points. Provide the Engineer a signed hard copy verifying vertical loop closure of project control points.

The use of RTK is not an acceptable method for establishing additional horizontal or vertical control. Horizontal control points may be established using Static GPS or conventional traversing methods. Vertical control points shall be established with differential levels.

Survey accuracy requirements shall conform to the minimums listed in the *State of Alaska DOT&PF Construction Surveying Requirements*.

**135-3.4 GPS SURVEYS.** The specifications described in this Section are not intended to discourage the use of new GPS procedures and techniques. Procedures that are not defined by this specification may be allowed if approved by the Engineer.

1. General Requirements:

- a. All surveying shall be done in the local project coordinate system.
- b. OPUS shall be used for the determination of Reference Station positions only, and shall not be used directly for producing final positions for any Static, Fast Static, RTK or PPK surveys. OPUS may be used as a tool for verification of the final positions obtained from these types of surveys.

2. GPS Equipment: Survey Grade dual frequency GPS receivers shall be used. For static surveys these shall be set up on adjustable leg tripods at a minimum. Fast or Rapid Static GPS surveys require a

bipod at a minimum. RTK or PPK surveys may use fixed or adjustable poles, or secure lashings to vehicles.

### 3. GPS Reference Stations:

- a. All Reference Stations shall be approved by the Engineer, prior to conducting any GPS surveys.
- b. Primary Reference Stations shall meet current NGS CORS standards. Secondary Reference Stations may be used temporarily when a Primary Reference Station is not available.
- c. Primary Reference Stations shall be permanently mounted and shall not change throughout the duration of the project.
- d. Secondary Reference Stations may be tripod mounted, however, GPS receivers shall never be mounted on aluminum tripods.
- e. All Reference Stations shall be tied to an OPUS derived position, and on the NAD83 datum. Submit GPS data files for a minimum of 2 days, 12 hours per day, 5 second epoch to OPUS to determine the final position. The OPUS derived position shall be determined at the beginning of the project, and shall not change throughout the duration of the project unless approved by the Engineer. Notify all users immediately if any changes are made to the Reference Station's position. If OPUS is unable to process a position, the Reference Station shall be tied to existing project control.
- f. Reference Stations shall be physically located in clear view of the sky. Avoid locations near cellular towers or other areas that may disrupt satellite signal reception. Avoid locations near large flat surfaces such as buildings, large signs, fences, and other objects that may cause multi-path interference.
- g. Reference Stations shall be located to provide maximum coverage of the project area.
- h. Store 5 second epoch data, and post data online for use by the Engineer.
- i. GNSS enabled Reference Stations are allowed.

### 4. RTK Surveys:

- a. The Surveyor shall follow prudent practices when conducting RTK surveys. The NGS has published a manual titled *National Geodetic Survey User Guidelines for Single Base Real Time GNSS Positioning*, v3.1 issued in April 2014. The Surveyor shall become familiar with this manual, in order to better understand prudent practices. Copies of the manual may be available upon request or may be downloaded from the following web site: [http://www.ngs.noaa.gov/PUBS\\_LIB/](http://www.ngs.noaa.gov/PUBS_LIB/).
- b. RTK surveys may not be used to permanently mark or delineate Right-Of-Way.

### 5. Local Coordinate Calibration:

- a. Use GPS calibration parameters if they are provided on the *Survey Control Sheet*. If GPS calibration parameters are not given, develop a local site calibration based on existing project control. All included control points shall have WGS84 positions that were observed by either a GPS Static or Fast Static network, as well as the final adjusted project control coordinate values that match the values listed on the *Survey Control Sheet*. The calibration shall consist of the following conversion parameters: Rotation, Translation, Scale, and GPS derived orthometric heights. Values listed on the *Survey Control Sheet* shall be held fixed in any adjustment, barring any large residuals. Notify the Engineer of any large residuals so that the problems can be identified and corrected. Submit a signed hard copy of the calibration parameters, residuals, and related control points to the Engineer for approval before staking activities begin.

b. Perform a local calibration each time the coordinates of the reference station change.

6. GPS Data Summary Report:

a. Generate reports for all surveyed points, including the Point Number, Northing, Easting, Elevation, Point Code, Annotation(s), Date, Time, residuals, observation (start and stop) times, and antenna height information. Summary reports shall bear the signature and seal of the Surveyor.

b. The Engineer may require the Contractor to re-survey specified points at no cost to the Department if the Survey doesn't meet the minimum accuracy requirements defined in the *State of Alaska DOT&PF Construction Surveying Requirements*.

7. Weather Conditions: The Surveyor shall follow prudent practices when conducting GPS surveys in inclement weather. The following is recommended as a guideline:

a. Regularly observe surface and solar weather forecasts prior to planning survey activities.

b. Use sound practical judgment when performing surveys during inclement weather conditions.

c. Observations should never be conducted during an electrical storm.

d. Note significant or unusual weather conditions in the field notes, data collector, or receiver.

**135-3.5 TOPOGRAPHIC SURVEYS.** Topographic surveys shall be conducted under the direct supervision of the Surveyor. The purpose of a topographic survey is to gather field data to determine the configuration (relief) of the surface of the earth (ground). Use all data collected to generate topographic DTM surfaces as defined in subsection 135-3.7, Digital Terrain Models. All data becomes the property of the Owner. Conduct topographic surveys as follows:

1. General Requirements:

a. Collect topographic data within the right-of-way limits.

b. Keep all shots 50-ft or closer, as necessary to accurately define all surface features.

c. Keep a field book of notes describing changes or errors of rod heights, point descriptors, or other annotations necessary to verify all electronic data.

d. Identify each point with a point number. Multiple points with the same point number are not permitted.

e. Identify each shot with the appropriate point code. Break line points shall be separately identifiable from ground shots.

f. Append any additional information required to further describe a point with point annotations.

g. Develop a summary of standard point codes for all points used on the project.

h. Develop a summary of standard point descriptors to identify all point codes used on the project (i.e. *Edge of Pavement* is the point descriptor corresponding to the *EP* point code).

2. Functional Requirements: The purpose of a topographic survey is to develop an appropriate DTM as defined in subsection 135-3.7. Conduct a topographic survey to meet the appropriate functional requirements as defined below:

- a. As-built Surfaces – Conduct a survey of all finished surfaces, embankments, ditches and other topographic features as required to accurately define the project topography.
  - b. Excavation Surfaces – Conduct a survey of original grade (upper) surfaces, and bottom of excavation (lower) surfaces, as necessary to produce DTM volumetric quantities. Follow the requirements listed below:
    - (1) Upper surface – Survey prior to excavation. Topographic data may be collected prior to grubbing and/or pavement removal, and adjusted by the average depth removed as measured in the field.
    - (2) Lower surface – Survey after the final grade has been established by excavation.
  - c. Embankment Surfaces – Conduct a survey of excavated or original grade (lower) surfaces, and top of embankment (upper) surfaces, as necessary to produce DTM volumetric quantities. Follow the requirements listed below:
    - (1) Upper surface – Survey after the final grade has been established.
    - (2) Lower surface – Survey prior to the placement of embankment. If only grubbing or pavement removal is required prior to placement of embankment, the topographic data may be collected prior to grubbing and pavement removal and adjusted by the average depth removed, as measured in the field. If excavation is required prior to placement of embankment, survey only after excavation activities have been completed.
3. Accuracy Tolerance Limits: The Surveyor shall check into and collect primary control monument locations to ensure the data being collected meets the minimum *Horizontal* and *Vertical Accuracy Tolerances*. This shall serve as a basis of acceptance for the topographic data collected by the Surveyor. The *Horizontal* and *Vertical Accuracy Tolerances* will be used to check for systematic error, and will be evaluated by comparing all control check shots taken during the topographic survey to the monument's location as defined on the *Survey Control Sheet*. The *Volumetric Accuracy Tolerance* will be used to check for random and operator error, and will be evaluated by comparing the Contractor furnished DTM with an independent DTM developed by the Department. The *Volumetric Accuracy Tolerance* shall be applied only to survey data that is used to calculate volumetric quantities.
- a. *Horizontal Accuracy Tolerance* – Check shots shall be within  $\pm$  five hundredths (0.05) of a foot of the monument's horizontal position. If any of the data doesn't meet the minimum the horizontal tolerance, the Engineer may require the Contractor to re-survey the non-conforming points at no additional cost to the Department.
  - b. *Vertical Accuracy Tolerance* – Check shots shall be within  $\pm$  one tenth (0.10) of a foot of the monument's vertical position. If any of the data doesn't meet the minimum vertical tolerance, the Engineer may direct the Contractor to re-survey the non-conforming points at no additional cost to the Department.
  - c. *Volumetric Accuracy Tolerance* – At the Department's option, tThe Department will determine the volumetric error on randomly selected areas, including at least 20% of the area within the slope limits. The Department will calculate the volumetric error as follows:
    - (1) Determine the *net volume* by comparing the Contractor's DTM to the Department's DTM.
    - (2) Determine the *accepted volume* by comparing the Department's DTM to the appropriate neat-line surface.
    - (3) Determine the volumetric error by dividing the *net volume* by the *accepted volume*.

The Engineer may require the Contractor to re-survey any areas that exceed 5% error at no additional cost to the Department.

4. Control Check Requirements: Collect local project control data at the following minimum frequency:
  - a. Every time the instrument is turned on, at the beginning of the survey session.
  - b. Prior to every time the instrument is turned off, at the end of the survey session.
  - c. Every time the instrument is moved (radial survey).
  - d. Every time the back sight is moved (radial survey).
  - e. Every time the actual or broadcasted position of the Reference Station changes (GPS survey).
5. Deliverables: Provide copies of the following to the Engineer:
  - a. Plotted and electronic as-built surfaces (developed per subsection 135-3.7) showing major and minor contours. Standard contour intervals shall be 5-ft (major) and 1-ft (minor).
  - b. All field books noting any errors, corrections, or changes to the data.
  - c. All electronic survey data in a comma delimited ASCII file in PNEZD format (Point number, Northing, Easting, Elevation, and Description).
  - d. Letter of conformance signed and sealed by the Surveyor, certifying that the Topographic Survey meets the minimum *Horizontal* and *Vertical* accuracy requirements. Attach all backup data and calculations.

**135-3.6 AS-BUILT SURVEYS.** As-built surveys shall be conducted under the supervision of the Surveyor. The as-built survey shall document the final locations of roadways, topographic surfaces, structures, and utilities within the ROW project limits. The Surveyor shall maintain communication with the Contractor, Sub-Contractor or Utility Company as necessary to coordinate surveying activities. Surveying activities shall be conducted as soon as possible as each phase of the project is completed, and to avoid scheduling conflicts. The survey will be used to verify that the contracted work items conform to the plans and specifications. All survey data becomes the property of the State of Alaska Owner.

1. General Requirements:
  - a. Topographic Survey in accordance with Subsection 135-3.5, Topographic Surveys.
  - b. Utility Survey of all existing and re-located utilities. Record the horizontal and vertical location of all underground and overhead utilities. Take digital photos of all exposed utility crossings. Identify the location of each photo taken, including the approximate northing, easting, and bearing.
  - c. Structural Survey of all existing and re-located structures, including bridges, tunnels, manholes, signs, fences, guard rails, walls, and foundations.
2. Deliverables: Provide copies of the following to the Engineer:
  - a. Plotted as-built drawings showing the final surveyed locations of all roadways, topographic surfaces, structures, and utilities. Plotted drawings shall be identified by the Project name and number, and bear the signature and seal of the Surveyor.
  - b. Printed color photos, identifying the location of all underground utility crossings.
  - c. All field books used to conduct the as-built survey.
  - d. All DTM and point data files generated by the as-built survey.



**135-3.7 DIGITAL TERRAIN MODELS.** Develop all Digital Terrain Models using CAD software that is compatible with the latest release of software used by the Department. All DTM's shall be approved by the Engineer.

1. DTM Development Methods: Develop all DTM's using the appropriate method as defined below:
  - a. Engineering Method - Use this method to define all neat-line surfaces. Develop the DTM by associating all appropriate engineered features such as alignments, profiles, sections, daylight surfaces, grading lines, and other features.
    - (1) CAD software shall generate and automatically update surfaces based on the association of alignments, profiles, sections, grading lines, and other parameters necessary to accurately represent neat-line geometry.
    - (2) Limit tessellation spacing to allow an accurate representation of a surface feature. The Engineer may require changes to the tessellation spacing, if necessary to allow an accurate representation of the feature.
    - (3) If the Contractor excavates or fills beyond the neat-line limit without the direction of the Engineer, only the neat-line limit shall be used.
  - b. Topographic Method - Use this method to define all topographic surfaces. Each vertex of a triangle in the TIN shall be formed by a field measured data point, and shall be located by its (XYZ) coordinate. Develop the TIN surface by connecting Topographic Survey points to their nearest neighboring points (in XY), except as outlined below:
    - (1) Break Lines – Create break lines by connecting Topographic Survey points that are identified by their appropriate break line descriptors. Break lines shall snap to vertices on adjacent break lines when two break lines intersect. Break lines shall not cross. Use break lines to establish the following features:
      - (a) Centerline.
      - (b) Edge of pavement.
      - (c) Shoulder hinge points.
      - (d) Bottom of ditch.
      - (e) Ditch back slope catch point.
      - (f) Ridge lines.
      - (g) Rim of pits or significant depressions.
      - (h) Areas of slope change or undulations in slope.
      - (i) Bottom of valleys or draws.
      - (j) Hydraulic features.
      - (k) Around buildings and structures (including top and bottom of walls).
    - (2) Boundaries – Boundaries break the TIN lines and define the edge of the surface. Use boundaries to trim all non-relevant edges from the DTM. Use either non-destructive or destructive trimming as necessary to preserve the accuracy of the DTM. Use boundaries to establish the following features:
      - (a) Outer boundary of the DTM.
      - (b) Edge of a void inside the surface.

(c) Edge of an island inside of a void.

(3) Surface Editing – Surface Editing allows changes that more accurately represent the actual terrain. Use surface editing to delete or swap edges of the triangulated network as necessary to best represent the actual site condition. Mathematically computed points for the purpose of surface smoothing may be used only if approved by the Engineer. The creation of contour lines for the purpose of DTM surface extraction is not acceptable.

c. Combination Method - Use this method when the Engineer approves a change to the neat-line limit.

(1) In areas where the Engineer approves a change to the neat-line limit, develop new surfaces using the Topographic Method.

(2) Replace the neat-line surface with the new topographic surfaces to create an appropriate single surface.

**135-3.8 CONTRACTOR FURNISHED COMPUTATIONS.** Provide computations for volumetric pay items using DTM's developed per subsection 135-3.7. Cross sections developed from the appropriate DTM's will be used as a supplementary quality control check on DTM parameters and quantities, and not for pay. The Contractor may use the *Average End Area Method* in accordance with subsection 90-02c(1) of the GCPs, only if approved in writing by the Engineer.

1. Deliverables: Provide copies of the following to the Engineer:

a. Plotted cross sections from the DTM surfaces. Develop separate cross sections for each volumetric pay item. More than one pay item per plotted cross section is not allowed.

(1) Plot every 50-ft on Station, including intermediate stations as required to define angle points, curves, or other significant changes in the geometry.

(2) Show the elevation and offset information for all vertex points. Weeding vertex point labels is not allowed. Elevation and offset information may be shown on a separate report if the amount of information exceeds what can be legibly shown on the plot.

(3) Show the area for each cross section.

(4) Label each plot with the project name, project number, pay item number, and pay item name.

(5) Label each plot with the Surveyor's Company name and address.

b. Plotted profiles from the DTM surfaces. Develop separate plots for each volumetric pay item. Each plot shall only identify the profiles appropriate to the volumetric pay item.

(1) Plot the profile along the alignment centerline as shown in the plans.

(2) Label each profile as original ground, bottom of excavation, and the top or bottom of embankment, as appropriate.

(3) Label topographic profiles with elevation and station information, using a weeding frequency of every 100-ft, or as necessary to match the frequency shown on the plans.

(4) Label the neat-line profiles with elevation and station information every 100-ft, and for the beginning, end, and VPI of all vertical curves and grade breaks. Label the percent slope between all grade breaks, to the fourth significant decimal.

(5) Label each plot with the project name, project number, pay item number, and pay item name.

(6) Label each plot with the Surveyor's Company name and address.

c. Electronic Data

- (1) Provide copies of all Topographic, Neat-line, and Combination surfaces to the Engineer. Include all electronic features (alignments, profiles, sections, etc.) used to generate the surfaces.
- (2) All data shall be delivered on a clearly labeled CD-ROM or DVD, unless specified otherwise by the Engineer. The label shall include the project name, project number, Surveyor's company name, and date. All data becomes the property of the State of Alaska.
- (3) DTM files shall be saved in Autodesk, TIN, XML, or other approved formats compatible with Department software.

d. Volume Reports

- (1) Provide interim volume reports showing quantities between every 50-ft station. The volume reports shall be summarized to allow the Department to reference the quantities per individual plan sheet, or as defined in any earthwork summary shown on the plan sheets.
- (2) Provide a final volume report reflecting the final total quantity. Attach all data, calculations, and plots to the report. The report shall be signed, sealed, and dated by the Surveyor. This report shall be used as the basis for final pay.

~~135-3.9 3.4 CONTRACTOR FURNISHED ENGINEERING TOOLS. Furnish and maintain Engineering Tools as directed by the Engineer, for the exclusive use of the Engineer throughout the duration of the project. The Contractor shall furnish all equipment specifications to the Engineer for approval prior to furnishing equipment. The equipment shall be in good working condition not more than 1 model year old. The Contractor shall insure and indemnify the Department against normal wear and tear, damage, theft, and all other events that may cause a loss of function of the furnished tools. The equipment shall be returned to the Contractor upon completion of the project, or when services are terminated by the Engineer. Furnish training for the Engineer's staff, as directed by the Engineer.~~

~~a. **Global Positioning System (GPS) Rover Unit.** All components shall be fully compatible to provide a stand-alone GPS Rover Unit. The Rover Unit shall be an "all on the pole" system equipped with the following:~~

~~(1) Receiver~~

- ~~(a) Bluetooth compatible.~~
- ~~(b) Meet waterproof specification IPX7.~~
- ~~(c) Shockproof for a drop onto a hard surface from a height of 4 feet.~~
- ~~(d) Dual frequency receiver capable of tracking at least twelve 12 satellites simultaneously on parallel channels.~~
- ~~(e) Capable of Real-Time Kinematic (RTK), Static, and Fast Static occupations.~~
- ~~(f) Capable of receiving L1, L2, and Global Navigation Satellite System (GNSS) frequencies.~~
- ~~(g) Antenna model shall have undergone antenna calibration by the National Geodetic Survey (NGS).~~
- ~~(h) Ensure the receiver contains the manufacturer's latest firmware upgrades.~~
- ~~(i) Provide the manufacturer's user guide.~~

~~(2) Controller~~

- ~~(a) Bluetooth compatible.~~
- ~~(b) Equipped with onboard software allowing for the configuration of RTK, Post Processed Kinematic (PPK), or Static rover modes.~~
- ~~(c) Meet waterproof specification IPX7.~~
- ~~(d) Shockproof for a drop onto a hard surface from a height of 4 feet.~~
- ~~(e) Full QWERTY keyboard with numeric keypad, and/or equivalent touch screen interface.~~
- ~~(f) Capable of collecting data in WGS84 and displaying local project coordinates.~~
- ~~(g) Equipped with onboard software that allows automatic point logging.~~
- ~~(h) Capable of creating and storing line work in DFX or DWG format.~~
- ~~(i) Equipped with onboard software to allow the user to stake out points, 3D lines, and DTM surfaces. Software shall allow the user to read cut/fill elevations relative to a Digital Terrain Model (DTM) surface.~~
- ~~(j) Capable of importing, exporting, and storing point, line, and DTM data.~~
- ~~(k) Capable of showing satellite, radio, and battery status.~~
- ~~(l) Equipped with onboard software that allow the user to create and manage survey jobs, point data, coordinate systems, and alignments.~~
- ~~(m) Equipped with a removable memory storage device with a minimum capacity of 512 megabytes (MB).~~
- ~~(n) Capable of storing custom configuration settings for the GPS Rover Unit.~~
- ~~(o) Ensure the controller contains the manufacturer's latest firmware upgrades.~~
- ~~(p) Provide the manufacturer's user guide.~~

~~(3) Radio System~~

- ~~(a) Meet waterproof specification IPX7.~~
- ~~(b) Support a frequency compatible with the Reference Station.~~
- ~~(c) Capable of storing multiple radio frequencies.~~
- ~~(d) Compatible with the Reference Station's broadcasting format and protocol.~~
- ~~(e) Power and programming cables.~~
- ~~(f) Provide the manufacturer's user guide.~~

~~(4) Batteries~~

- ~~(a) Provide all batteries required to fully power and operate the GPS Rover Unit.~~
- ~~(b) Batteries shall be capable of powering their respective equipment continuously, for not less than 6 hours under normal operating conditions.~~
- ~~(c) Each battery shall be rechargeable and commercially available.~~
- ~~(d) Provide an identical replacement backup battery for each primary battery required.~~
- ~~(e) Provide all power connectors necessary to connect the batteries to the equipment.~~
- ~~(f) Provide battery chargers to allow all onboard batteries to be charged simultaneously, and that safeguard against overcharging.~~

~~(5) Rod~~

- ~~(a) Fixed height (non-adjustable).~~
- ~~(b) Mounting hardware for GPS controller and radio.~~
- ~~(c) Pole grip with bubble level.~~
- ~~(d) Detachable bipod.~~
- ~~(e) Interchangeable flat and pointed footings.~~
- ~~(f) Quick release adapter for the GPS receiver.~~

~~(6) Carrying Case~~

- ~~(a) Hard Shell.~~
- ~~(b) Shockproof.~~
- ~~(c) Waterproof.~~
- ~~(d) Capacity to hold all components of the GPS rover, minus the rod.~~

~~**b. GPS Base/Repeater Station.** All components shall be fully compatible to provide a stand-alone GPS Base/Repeater Station setup. The setup shall include the following:~~

~~(1) Receiver~~

- ~~(a) Meet waterproof specification IPX7.~~
- ~~(b) Shockproof for a drop onto a hard surface from a height of 4 feet.~~
- ~~(c) Dual frequency receiver capable of tracking at least 12 satellites simultaneously on parallel channels.~~
- ~~(d) Antenna model shall have undergone antenna calibration by the NGS.~~
- ~~(e) Ensure the receiver contains the manufacturer's latest firmware upgrades.~~

- ~~(f) Carrying case.~~
- ~~(g) Tribrach with optical plummet and height rod.~~
- ~~(h) Provide the manufacturer's user guide.~~

~~(2) Controller~~

- ~~(a) Equipped with onboard software allowing for configuration as a GPS reference station in RTK, PPK, Static, and Fast Static modes.~~
- ~~(b) Capable of logging raw observations for post processing.~~
- ~~(c) Capable of showing satellite, radio, and battery status.~~
- ~~(d) Meet waterproof specification IPX7.~~
- ~~(e) Shockproof for a drop onto a hard surface from a height of 4 feet.~~
- ~~(f) Full QWERTY keyboard with numeric keypad, and/or equivalent touch screen interface.~~
- ~~(g) Equipped with a removable memory storage device with a minimum capacity of 512 MB.~~
- ~~(h) Equipped with 1 primary and 1 secondary power input port.~~
- ~~(i) Ensure the controller contains the manufacturer's latest firmware upgrades.~~
- ~~(j) Provide the manufacturer's user guide.~~

~~(3) Radio~~

- ~~(a) Transmission power, 25 Watts minimum.~~
- ~~(b) Meet waterproof specification IPX7.~~
- ~~(c) Shockproof for a drop onto a hard surface from a height of 4 feet.~~
- ~~(d) Support a frequency compatible with the Reference Station.~~
- ~~(e) Capable of storing multiple radio frequencies.~~
- ~~(f) Compatible with the CORS broadcasting format and protocol.~~
- ~~(g) Ensure the radio has a current license to broadcast in accordance with FCC requirements.~~
- ~~(h) Ensure the radio broadcast frequency doesn't conflict with other nearby broadcasting sources.~~
- ~~(i) Equipped with onboard software/firmware allowing for configuration as either a Reference Station or a Repeater Station.~~
- ~~(j) Carrying case.~~
- ~~(k) Antenna.~~
- ~~(l) Antenna/pole mounting adapter.~~

- ~~(m) Provide the manufacturer's user guide.~~
- ~~(4) Tripods — Provide one of each:
  - ~~(a) Conventional tripod with extendible range pole. Include carrying case.~~
  - ~~(b) Conventional wood tripod.~~~~
- ~~(5) Batteries
  - ~~(a) Provide all batteries required to fully power and operate the GPS Base/Repeater Station.~~
  - ~~(b) Batteries shall be capable powering their respective equipment continuously, for not less than 6 hours under normal operating conditions.~~
  - ~~(c) Each battery shall be rechargeable and commercially available.~~
  - ~~(d) Provide an identical replacement backup battery for each primary battery required.~~
  - ~~(e) Provide all power connectors necessary to connect the batteries to the equipment.~~
  - ~~(f) Provide battery chargers to allow all batteries to be properly charged, and that safeguard against overcharging.~~~~

**135-3.10 3.5 OFFICE ENGINEERING.** Calculate finish grades for the embankments as specified according to Plans and/or specifications. Use information available in the field, on as-builts, or as provided by the Engineer. This work shall be performed by or under the responsible charge of a Professional Land Surveyor or a Professional Engineer currently registered in the State of Alaska.

**135-3.11 3.6 FINAL TRAVERSE.** Within 30 days after the Engineer receives a letter stating that construction activities that may disturb the monuments have ceased, the Surveyor shall run a final closed traverse to verify the positional accuracy of installed survey monuments. Tie into the traverse the primary and secondary monuments placed or replaced and undisturbed Department-provided control points. Meet the requirements of a secondary monument for traverse points established during this work. The Surveyor shall sign and stamp a letter that lists each monument and its coordinates. The letter shall certify that the monuments are each located within 0.1-foot of their proposed position based on the project survey control points provided by the Department. Deliver the certification letter and field notes for this work to the Engineer.

**135-3.12 3.7 EXTRA THREE PERSON SURVEY PARTY.** This pay item is for extra, additional, or unanticipated work made necessary by changes in the project. Work performed under pay item G135.020.0000 may include field work, office engineering, or any work described under the construction requirements of item G-135.

## METHOD OF MEASUREMENT

**135-4.1 MEASUREMENT.** The work will be measured according to GCP Section 90, as directed by the Engineer, and as follows:

- a. Lump Sum. No measurement of quantities will be made.
- b. Hour. By the number of hours, as directed by the Engineer and as recorded by certified payrolls.

- c. Contingent Sum. As specified by the Engineer in the Directive authorizing the work.

### BASIS OF PAYMENT

**135-5.1 PAYMENT.** Pay Items include all necessary personnel, equipment, transportation, traffic control devices, and supplies to accomplish the work described in the Contract, or as directed by the Engineer.

- a. **Pay Item G135.010.0000 Construction Surveying by the Contractor,** includes all Contractor surveying work described in the Contract.
- b. **Pay Item G135.020.0000 Extra Three Person Survey Party,** includes payment by the hour for extra, additional or unanticipated work made necessary by changes in the project. Adjustment according to GCP Subsection 90-04 is not allowed for this pay item. Work accomplished by a three person survey party will be paid at 100% of the contract unit price, by a two person survey party at 75% of the contract unit price, or by a one person survey party at 32% of the contract unit price, for Pay Item G135.020.0000.
- c. **Pay Item G135.030.0000 Monuments by the Contractor,** includes all monument work described in the Contract.
- d. **Pay Item G135.040.0000 Extra Surveying by the Contractor,** includes payment according to a Directive from the Engineer authorizing the work. This pay item is for extra, additional, or unanticipated work made necessary by changes in the project.
- e. **Pay Item G135.050.0000 Contractor Furnished Engineering Tools.** The Engineer shall issue a directive defining and authorizing the work. Payment for a GPS Rover, Base/Repeater Station, CORS, or Computer System will be made on a time and materials basis in accordance with subsection 90-05c(5) of the GCPs, Leased or Rented Equipment. Payment for training will be made on a time and materials basis in accordance with subsection 90-05. If the training is beyond the Contractor's or their subcontractors' ability or expertise, payment will be made in accordance with subsection 90-05e, Work by a Specialty Subcontractor. The Engineer may withhold payment for this item if the minimum specifications are not met. The Engineer may issue a directive at any time to terminate or re-authorize the work, at no additional cost to the Department.
- f. **Pay Item G135.060.0000 Contractor Furnished Computations.** This item includes all work required to develop and furnish quantity computations in accordance with methods required by the contract. Earthwork computations, digital terrain model development, plotted cross sections, quantity reports, and associated topographic surveying are subsidiary to this item. The Engineer may withhold payment for this item if the minimum specifications are not met. 10% of the contract lump sum bid price will be withheld until final computations are accepted by the Engineer. If the Contractor excavates or fills beyond the neat-line limit without the direction of the Engineer, the calculated volume shall only extend to the neat-line limit.

Payment will be made under:

Item G135.010.0000	Construction Surveying by the Contractor – per lump sum
Item G135.020.0000	Extra Three Person Survey Party – per hour



## ITEM G-300 CRITICAL PATH METHOD SCHEDULING

### DESCRIPTION

**300-1.1** Provide and maintain a Critical Path Method (CPM) progress schedule for the project. Use the schedule in coordinating and monitoring of all work under the Contract including activity of subcontractors, manufacturers, suppliers, and utility companies, and reviews by the Department. Include Quality Control activities. Update the CPM schedule, as required.

Provide construction Plans.

### SUBMITTAL OF SCHEDULE

**300-2.1** Submit a detailed initial CPM Schedule at 5 working days prior to the pre-construction conference for the Engineer's acceptance as set forth below.

The construction schedule, for the entire project, may not exceed the specified contract time.

Allow the Engineer 14 days to review the initial CPM Schedule. If revisions are required, make them promptly. The finalized CPM Schedule must be completed and accepted prior to commencement of any work on the project.

Along with the CPM Schedule, submit a Schedule of Values for lump sum items, including rationale for milestone payments and monthly estimates of payments due.

### REQUIREMENTS AND USE OF SCHEDULE

#### 300-3.1

**a. Schedule Requirements.** Prepare the CPM schedule as a Precedence Diagram Network developed in the activity-on-node format which includes:

- (1) Activity description
- (2) Activity duration
- (3) Resources required for each of the project activities, including:
  - (a) Labor (showing work days per week, holidays, shifts per day, and hours per shift)
  - (b) Equipment (including the number of units of each type of equipment)
  - (c) Materials.

Show on the activity-on-node diagram the sequence and interdependence of all activities required for complete performance of all items of work under this Contract, including shop drawing submittals and reviews and fabrication and delivery activities.

No activity duration may be longer than 15 work days without the Engineer's approval.

The Engineer reserves the right to limit the number of activities on the schedule.

Consider that schedule float time is shared equally with the Department.

The contract completion time will be adjusted only for causes specified in this Contract.

- b. Schedule Updates.** Hold job site progress meetings with the Engineer for the purpose of updating the CPM Schedule. Meet with the Engineer monthly, or as deemed necessary by the Engineer. Review progress and verify finish dates of completed activities, remaining duration of uncompleted activities, and any proposed logic and/or time estimate revisions. Submit a revised CPM schedule within 5 working days after this meeting showing the finish dates of completed activities and updated times for the remaining work, including any addition, deletion, or revision of activities required by Contract modification.
- c. Work Plans.** In addition to the CPM schedule, submit a work plan every 2 weeks during construction, detailing your proposed operations for the forthcoming two weeks. Include:
- (1) Work activities
  - (2) Manpower involved by trade
  - (3) Work hours
  - (4) Equipment involved
  - (5) Location of the work to be performed

#### **METHOD OF MEASUREMENT**

**300-4.1** CPM Scheduling will not be measured for payment. Refer to GCP Section 90 for requirements regarding lump and contingent sum items.

#### **BASIS OF PAYMENT**

**300-5.1** At the lump sum price for CPM Scheduling.

Payment will be made under:

Item G300.010.0000 CPM Scheduling – per lump sum

## ITEM G-700 TRAFFIC CONTROL FOR AIRPORTS

### DESCRIPTION

**700-1.1** Provide suitably equipped airport flagger(s) with no other assigned duties to monitor and control the Contractor's personnel and equipment crossing or occupying any portion of the Air Operations Area of the airport, as required under ~~Section 80-04 Limitation of Operations~~ Item G-110. The airport flagger shall have no other assigned duties.

### REQUIREMENTS

**700-2.1** Furnish airport flaggers and all necessary equipment. Equip each airport flagger assigned to an aircraft operations area with a two-way radio that broadcasts and receives on the designated Common Traffic Advisory Frequency (CTAF) for the project airport as found in the Alaska Supplement of the United States Government Flight Information Publication. Provide each airport flagger with a two-way radio to contact construction equipment and other airport flaggers on the project. Equip each airport flagger for vehicular traffic control with a flagging paddle that conforms to the requirements of the Alaska Traffic Manual.

Locate each airport flagger at a position as shown on the Plans or as described in the Safety Plan, or at an alternate location as directed by the Engineer. Ensure that each airport flagger maintains their assigned post at all times. Airport flagger positions will be adjusted as conditions warrant.

### METHOD OF MEASUREMENT

**700-3.1** Airport flagger will be ~~measured by the hour for the actual number of hours that each airport flagger performed as directed by the Engineer~~ not be measured.

### BASIS OF PAYMENT

**700-4.1** Payment will be ~~made at the contract unit price for each Airport Flagger per hour. The hourly rate for Airport Flagger is set at [\$ ] per hour for this contract. The Engineer does not require a change order/directive for this pay item.~~ incidental to Item G-110.



# ITEM G-710 TRAFFIC CONTROL FOR ROADS, STREETS, AND HIGHWAYS

## DESCRIPTION

**710-1.1** Protect and control traffic during the contract. Furnish, erect, maintain, replace, clean, move and remove the highway traffic control devices required to ensure the public's safety. Perform all administrative responsibilities necessary to implement this work.

Maintain all public corridors affected by the work, including those on and off the airport used as haul routes, in a smooth and passable condition. Construct and maintain approaches, crossings, intersections, and other necessary features throughout the project for the life of the contract.

### **710-1.2 ACRONYMS AND DEFINITIONS.**

**ATM.** When used in this section, ATM stands for the *Alaska Traffic Manual*, which is the MUTCD with the *Alaska Traffic Manual Supplement*.

**HIGHWAY.** A main direct road. Used throughout this section for the sake of brevity, the word "highway" also applies to roads and streets.

**HIGHWAY TRAFFIC CONTROL ZONE.** A portion of a construction project, haul route, utility work, or similar operation that affects traffic and requires highway traffic control to safely guide and protect motorists, pedestrians, bicyclists, or workers, outside of the AOA.

**HIGHWAY TRAFFIC CONTROL PLAN (TCP).** A drawing or drawings indicating the method or scheme for safety guiding and protecting motorists, pedestrians, bicyclists, and workers in a highway traffic control zone. The TCP depicts the highway traffic control devices and their placement and times of use.

**TRAFFIC.** The movement of vehicles, ATV's, equipment, pedestrians, and bicyclists through public corridors, construction areas, utility work, or similar operations.

**710-1.3 HIGHWAY TRAFFIC CONTROL PLAN.** Design and implement an approved TCP before beginning work within a highway traffic control zone.

The TCP includes, but is not limited to, signs, barricades, traffic cones, plastic safety fence, sequential arrow panels, portable changeable message board signs, special signs, warning lights, portable concrete barriers, crash cushions, highway flaggers, pilot cars, interim pavement markings, temporary lighting, temporary roadways and all other items required to direct traffic through or around the highway traffic control zone according to these Specifications and the ATM. Address in the TCPs, placement of highway traffic control devices, including location, spacing, size, mounting height and type. Include code designation, size, and legend per the ATM and the ASDS. Include longitudinal buffer space for the posted speed limit, according to Table 6C-2 of the ATM unless project conditions or geometric features prohibit including all or a portion of the buffer length.

When a TCP is included in the Plans, use it, modify it, or design an alternative TCP. All TCPs must include the following information:

- a. Project name and number.
- b. A designated TCP number and name on each page.
- c. For TCPs more than one page, each page must be numbered.
- d. The posted speed limit for each roadway.
- e. Existing striping width, lane width, and road surfacing.

- f. Construction lane widths, striping layout, and temporary pavement marker layout.
- g. Provisions for Pedestrian, Bicycle, and ADA travel through the work zone.
- h. Dates and times the TCP will be in effect and why it is being used.
- i. The Worksite Traffic Supervisor's signature certifying that all TCPs conform with the ATM and the Contract.
- j. The Project Superintendent's signature confirming the TCP is compatible with the work plan.
- k. The name(s) of the Worksite Traffic Supervisor, his/her alternate and their 24 hour telephone number(s).
- l. Signs to be used and the ASDS designation number and size.
- m. Location and spacing of all devices and signs.
- n. A plan to address any possible slopes, drop offs, paving joints, or similar temporary features that may occur during use of the TCP.
- o. For TCPs proposed to be used at night, note how the requirements will be met for the required lighting and retroreflective material.

TCPs submitted for approval without all the required information will be rejected. Allow 7 days for review of each TCP submittal. All required modifications to a TCP require a new submission and an additional 7 days for review.

A minor revision to a previously approved TCP during construction requires 48 hours for review and approval by the Engineer.

The TCPs, Plans, and Alaska Standard Plans show the minimum required number of highway traffic control devices. If unsafe conditions occur, the Engineer may require additional highway traffic control devices.

Use of oversize and overweight equipment in a highway traffic control zone must conform to an approved TCP, including all highway traffic control devices these operations require.

**710-1.4 WORKSITE TRAFFIC SUPERVISOR.** Provide a Worksite Traffic Supervisor responsible for maintaining 24-hour traffic operations.

- a. **Qualifications.** The Worksite Traffic Supervisor shall be knowledgeable and experienced regarding the requirements of the ATM and the implementation of those requirements. The Worksite Traffic Supervisor shall be familiar with the Plans, the Specifications, proposed operations, and is certified as one of the following:
  - (1) Traffic Control Supervisor, American Traffic Safety Services Association (ATSSA).
  - (2) Work Zone Temporary Traffic Control Technician, or Work Zone Safety Specialist, International Municipal Signal Association (IMSA).

Certify according to Form 25D-124 that the Worksite Traffic Supervisor has a minimum 4,000 hours of temporary traffic control work experience, is competent and capable, and has the authority to perform the duties and responsibilities in accordance with this section.

- (a) Temporary traffic control work experience shall demonstrate an understanding of concepts, techniques, and practices in the installation and maintenance of traffic control devices, and skill in reading, interpreting, implementing, and modifying TCPs.

- (b) Temporary traffic control work experience includes: flagging; installing traffic control devices in accordance with TCPs; monitoring traffic control devices and TCPs for correction.
- (c) Temporary traffic control work experience is gained while serving as a Worksite Traffic Supervisor-in-training, temporary traffic control support personnel, and Flagger.
- (d) Four thousand (4,000) hours of experience serving solely as a flagger does not satisfy these requirements.

Worksite Traffic Supervisors shall maintain current certification and be able to show their certification anytime they are on the project.

**b. Duties.**

- (1) Prepare the TCPs and public notices and coordinate highway traffic control operations between the Project Superintendent and the Engineer.
- (2) Physically inspect the condition and position of all highway traffic control devices used on the project at least twice each day and at approximately 12 hour intervals. Ensure that highway traffic control devices work properly, are clean and visible, and conform to the approved TCP. Complete and sign a detailed written report of each inspection within 24 hours. Use Traffic Control Daily Review Form 25D-104.
- (3) Supervise the repair or replacement of damaged or missing highway traffic control devices.
- (4) Review and anticipate highway traffic control needs. Make available proper highway traffic control devices necessary for safe and efficient traffic movement.
- (5) Review work areas, equipment storage, and traffic-safety material handling and storage.
- (6) Hold traffic safety meetings with superintendents, foremen, subcontractors, and others as appropriate before beginning construction, prior to implementing a new TCP, and as directed. Invite the Engineer to these meetings. Conduct monthly open house public meetings to discuss the TCP and construction phasing.
- (7) Supervise all highway traffic control workers, highway flaggers, and pilot car drivers.
- (8) Certify that all highway flaggers are certified as required by subsection 710-3.4d. Submit a copy of all highway flagger certifications to the Engineer.

**c. Authority.** The Worksite Traffic Supervisor shall have the Contractor's authority to stop work and implement immediate corrective action to unsafe traffic control, in locations where unsafe traffic control is present.

**MATERIALS**

**710-2.1** Provide highway traffic control devices meeting the following requirements:

- a. **Signs.** Use signs, including sign supports that conform to ~~Section-Item~~ P-661, the ATM, the ASDS, and ASTM D4956. Use Type VIII or Type IX fluorescent orange reflective background sheeting at any time.
  - (1) **Construction Signs:** Regulatory, guide, or construction warning signs designated in the ASDS.
  - (2) **Permanent Construction Signs:** As designated on the Plans or an approved TCP.

**(3) Special Construction Signs:** All other signs are Special Construction Signs. Neatly mark the size of each sign on its back in 3-inch black numerals.

- b. Portable Sign Supports.** Use wind-resistant sign supports with no external ballasting. Use sign supports that can vertically support a 48 X 48 inch highway traffic control sign at the height above the adjacent roadway surface required by the ATM.
- c. Barricades and Vertical Panels.** Use barricades and vertical panel supports that conform to the ATM. Use Type III Barricades at least 8 feet long. Use retroreflective sheeting that meets ASTM D4956 Type II or III.
- d. Portable Concrete Barriers.** Use portable concrete barriers that conform to the Contract. For each direction of highway traffic, equip each 12.5-foot section of barrier with at least two side-mounted retroreflective tabs placed approximately 6 to 8 feet apart, or a continuous 4-inch wide horizontal retroreflective stripe mounted 6 inches below the top of the barrier. Use yellow tabs or stripe when barriers are placed at centerline. Use white tabs or stripe when barriers are placed on the roadway shoulder. Use retroreflective sheeting that meets ASTM D4956 Type III, IV or V.
- e. Warning Lights.** Use Type A (low intensity flashing), Type B (high intensity flashing) or Type C (steady burn) warning lights that conform to the ATM.
- f. Drums.** Use plastic drums that conform to the requirements of the ATM. Use reflective sheeting that meets ASTM D4956 Type II or III.
- g. Traffic Cones and Tubular Markers.** Use reflectorized traffic cones and tubular markers that conform to the requirements of the ATM. Use traffic cones and tubular markers at least 28 inches high. Use reflective sheeting that meets ASTM D4956 Type II or III.
- h. Plastic Safety Fence.** Use 4 foot high construction orange fence manufactured by one of the following companies, or an approved equal:
  - (1)** "Safety Fence" by Services and Materials Company, Inc., 2200 South "J" Street, Elwood, Indiana, 46036. Phone (800) 428-8185.
  - (2)** "Flexible Safety Fencing" by Carsonite, 1301 Hot Springs Road, Carson City, Nevada, 89706. Phone (800) 648-7974.
  - (3)** "Warning Barrier Fence" by Plastic Safety Systems, Inc. P.O. Box 20140, Cleveland, Ohio, 44120. Phone (800) 662-6338.
- i. Flagger Paddles.** Use flagger paddles with 24 inches wide by 24 inches high sign panels, 8 inch Series C lettering (see ASDS for definition of Series C), and otherwise conform to the ATM. Use reflective sheeting that meets ASTM D4956 Type VIII or IX. Use background colors of fluorescent orange on one side and red on the other side.

**710-2.2 CRASHWORTHINESS.** Submit documentation that all highway traffic control devices conform to the requirements of National Cooperative Highway Research Program (NCHRP) Report 350 (Test Level 3) or Manual for Assessing Safety Hardware MASH 2016 (Test Level 3).

Temporary work zone devices manufactured after December 31, 2019 must have been successfully tested to the 2016 edition of MASH. Such devices manufactured on or before this date, and successfully tested to NCHRP 350 or the 2009 edition of MASH, may continue to be used throughout their normal service lives.



## CONSTRUCTION METHODS

**710-3.1 GENERAL CONSTRUCTION REQUIREMENTS.** Keep the work, and portions of the project affected by the work, in good condition to accommodate traffic safely. Provide and maintain highway traffic control devices and services inside and outside the project limits, day and night, to guide traffic safely.

Unless otherwise provided in this Section, keep all roadways, business accesses, and pedestrian facilities within the project limits open to traffic. Obtain the Engineer's approval before temporarily closing residential, commercial, or street approaches. Provide access through the project for emergency vehicles and school and transit buses. Properly sign and/or flag all locations where the traveling public must be redirected or stopped. Organize construction operations so the total of all construction related stoppages experienced by a vehicle traveling through the project does not exceed 20 minutes except when indicated otherwise in the Contract.

Stop equipment at all points of intersection with the traveling public unless an approved TCP shows otherwise.

Operate flood lighting at night according to the ATM. Adjust flood lighting so that it does not shine into oncoming traffic.

Provide and maintain safe routes for pedestrians and bicyclists through or around highway traffic control zones at all times, except when regulations prohibit pedestrians or bicyclists.

Immediately notify the Engineer of any traffic related accident that occurs within the project limits as soon as an employee, or a subcontractor becomes aware of the accident.

**710-3.2 ROADWAY CHARACTERISTICS DURING CONSTRUCTION.** Obtain an approved TCP before starting construction. Maintain a clear area with at least 2 feet between the edge of traveled way and the work area. Use barricades, traffic cones, or drums to delineate this area. Place highway traffic control devices on the work side of the clear area. Space them according to the ATM.

If maintaining traffic on an unpaved surface, provide a smooth and even surface that public traffic can use at all times. Properly crown the roadbed surface for drainage. Before beginning other grading operations, place sufficient fill at culverts and bridges to permit traffic to cross smoothly and unimpeded. Use part-width construction techniques when routing traffic through roadway cuts or over embankments under construction. Excavate the material or place it in layers. Alternate construction activities from one side to the other. Route traffic over the side opposite the one under construction.

Detour traffic when the Plans or an approved TCP allows it. Maintain detour routes so that traffic can proceed safely. When detours are no longer required, obliterate the detour. Topsoil and seed appropriate areas.

If two-way traffic can't be maintained on the existing roadway or detour, use half-width construction or a road closure if it is shown on an approved TCP. Make sure the TCP indicates closure duration and conditions. Schedule roadway closures to avoid delay school buses and peak-hour traffic. For road closures, post closure-start and road-reopen times at the closure site, within view of waiting traffic.

**710-3.3 PUBLIC NOTICE.** Give notice of major changes, delays, lane restrictions, or road closures to local officials and transportation organizations, including but not necessarily limited to:

- a. Alaska Trucking Association
- b. Alaska State Troopers
- c. Division of Measurement Standards
- d. Local Police Department

- e. Local Fire Department
- f. Local Government Traffic Engineer
- g. School and Transit Authorities
- h. Local Emergency Medical Services
- i. Local Media (newspapers, radio, television)
- j. Railroads (where applicable)
- k. U.S. Postal Service
- l. Major Tour Operators

**710-3.4 HIGHWAY TRAFFIC CONTROL DEVICES.** Before starting construction, erect permanent and temporary highway traffic control devices required by the approved TCPs. The Engineer will determine advisory speeds when necessary.

For lane closures on multilane roadways, use sequential arrow panels. During hours of darkness when required by the approved TCP use flashing warning lights to mark obstructions or hazards and steady-burn lights for channelization.

Use only one type of highway traffic control device in a continuous line of delineating devices, unless otherwise noted on an approved TCP. Use drums or Type II barricades for lane drop tapers.

During non-working hours and after completing a particular construction operation, remove all unnecessary highway traffic control devices. Store all unused highway traffic control devices in a designated storage area, which does not present a nuisance or visual distraction to traffic. If sign panels are post mounted and cannot be readily removed, cover them entirely with either metal or plywood sheeting. Completely cover signal heads with durable material that fully blocks the view of signal head and will not be damaged or removed by weather.

Keep signs, drums, barricades, and other devices clean at all times.

Use only highway traffic control devices that meet the requirements of the "Acceptable" category in ATSSA "Quality Guidelines for Temporary Traffic Control Devices" and meet crashworthiness requirements per Section 710-2.2.

Immediately replace any devices provided under this Section that are lost, stolen, destroyed, inoperable or deemed unacceptable while used on the project. Stock repair parts for each Temporary Crash Cushion used on the project. Repair damaged crash cushions within 24 hours.

Maintain pre-existing roadside safety hardware at an equivalent or better level than existed prior to project implementation until the progress of construction necessitates removing the hardware. All existing hazards that are currently protected with roadside safety hardware or new hazards which result from project improvements shall be protected or delineated as required in the plans, specifications, and approved TCPs until permanent roadside safety hardware is installed.

All items paid under this Section remain the property of the contractor, unless noted otherwise in the contract. Remove them after completing the project.

- a. **Embankments.** Install portable concrete or steel barrier, plastic drums, barricades, tubular markers, plastic safety fence, and cones as specified on the Plans or TCPs to delineate open trenches, ditches, other excavations and hazardous areas when they exist along the roadway for more than one continuous work shift.

- b. Adjacent Travel Lane Paving.** When paving lifts are 2 inches or greater and adjacent travel lanes or paved shoulders are not paved to the same elevation before the end of the shift, install W8-11 (Uneven Lanes), W8-9 (Low Shoulder), W8-17 (Shoulder Drop-Off), W14-3 (No Passing Zone), R4-1 (Do Not Pass), R4-2 (Pass with Care), and W8-1 (Bump) signs as appropriate. Place additional signs every 1,500 feet if the section is longer than 1/2-mile.
- c. Fixed Objects and Construction Vehicles and Equipment Working On Or Next to the Traveled Way.** Do not park equipment in medians. Locate fixed objects at least 30 feet from the edge of traveled way. Fixed objects that exist prior to construction activity are not subject to this requirement unless the proposed temporary traffic routing moves the edge of traveled way closer to the pre-existing fixed object. Vehicles and other objects within parking lots in urban environments are considered preexisting fixed objects regardless of whether they are or are not present continuously throughout the day.

When worksite restrictions, land features, right of way limitations, environmental restrictions, construction phasing, or other construction conditions allow no practicable location meeting the preceding requirements, the Engineer may approve alternate locations for fixed objects. Alternate locations shall be as far as practicable from the edge of traveled way, the Engineer may verbally approve the alternate location. When the alternate location provides less than 15 feet separation, written approval is required.

When the Engineer determines a fixed object or fixed objects present unacceptable hazard, use drums or Type II barricades with flashing warning lights, or use portable concrete or steel barriers, or temporary crash cushion to delineate or shield the hazard, as approved by the Engineer.

- d. Flagging.** Furnish trained and competent highway flaggers and all necessary equipment, including lighting of the highway flagger position during nighttime operations, to control traffic through the highway traffic control zone. The Engineer will approve each highway flagging operation before it begins and direct adjustments as conditions change.

Flaggers must be certified by one of the following:

- (1) Flagging Level I Certification by IMSA
- (2) Flagger Certification by ATSSA
- (3) Traffic Control Supervisor, ATSSA
- (4) Work Zone Safety Specialist, IMSA
- (5) ATSSA Flagging Instructor

Flaggers shall maintain current flagger certification. Flaggers must be able to show their flagger certification anytime they are on the project.

Highway flaggers must maintain their assigned flagging location at all times, unless another qualified highway flagger relieves them, or the approved TCP terminates the flagging requirements. Remove, fully cover, or lay down flagger signs when no highway flagger is present. Keep the highway flaggers' area free of encumbrances. Keep the flagger's vehicle well off the roadway and away from the flagging location so the flagger can be easily seen.

Provide approved equipment for two-way radio communications between highway flaggers when they are not in plain, unobstructed view of each other.

Obtain the Engineer's written approval before flagging signalized intersections. When flagging a signalized intersection, either turn off and cover the traffic signal or place it in the All-Red Flash mode. Coordinate changing traffic signal modes and turning off or turning on traffic signals with the agency responsible for signal maintenance and operation and the Engineer. Get their written

approval in advance. Only uniformed police officers are permitted to direct traffic in an intersection with an operating traffic signal.

- e. **Watering.** Furnish, haul, and place water for dust control and pavement flushing, as directed. Use water trucks that can provide a high pressure water stream to flush the pavement and a light-water spray to control dust. If the flushing operations contaminate or fill adjacent catch basins, clean and restore them to their original condition. This requirement includes sections of roadway off the project where flushing is required. The Engineer will control water application.

When taking water from a lake, stream, or other natural water body, first obtain a water removal permit from the Alaska Department of Natural Resources. Comply with the Alaska Department of Fish and Game screening requirements for all water removal operations.

**710-3.5 AUTHORITY OF THE ENGINEER.** The Engineer will provide written notice when conditions may adversely affect the traveling public’s safety and/or convenience. The notice will state the defect(s), the corrective action(s) required, and the time required to complete such action(s). If corrective action(s) are not taken within the specified time, the Engineer will immediately close down the offending operations until the defect(s) are corrected. The Engineer may require outside forces to correct unsafe conditions. The cost of work by outside forces will be deducted from any monies due under the terms of this Contract.

**710-3.6 HIGHWAY TRAFFIC PRICE ADJUSTMENT.** A Highway Traffic Price Adjustment, under Item G-710c, will be assessed for unauthorized lane closures or reductions. Unauthorized lane reductions will be assessed as one full lane closure for each lane reduced without authorization.

Authorized lane closures and/or lane reductions are those shown in the Contract, an approved TCP, or authorized in writing.

Unauthorized lane reductions include unacceptable roadway, pedestrian walkway or route, and bicycle route or pathway surfaces, such as severe bumps, ruts, washboarding, potholes, excessive dust or mud, and non-conforming, or out of place highway traffic control devices. Failure to install temporary crash cushions or barriers, when required according to the contract or TCP, is also considered an unauthorized lane reduction. The Engineer will make the sole determination as to whether unauthorized lane reductions or closures are present.

Adjustment Rates are listed in Table 710-1. These rates are liquidated damages which represent highway user costs, based on Average Daily Traffic (ADT). The Engineer will use the rate shown for the current ADT for this project, as published in the Regional Traffic Volume Report prepared by the Department’s Planning Section. Adjustment rates for unauthorized reduction or closure of each lane of pedestrian walkways or route, and bicycle route or pathway, are the same as for one full lane closure.

**TABLE 710-1. ADJUSTMENT RATES**

Published ADT	Dollars/Minute of Unauthorized Lane Reduction or Closure
Less than 1,000	\$2.00
1,000 – 4,999	\$10.00
5,000 – 9,999	\$30.00
10,000+	\$40.00

**710-3.7 MAINTENANCE OF TRAFFIC DURING SUSPENSION OF WORK.** Approximately one month before work is suspended for the season, schedule a preliminary meeting with the Engineer and Maintenance and Operations to outline the work expected to be completed before shutdown. Schedule a field review with the Department for winter maintenance acceptance. At the field review the Engineer will prepare a punch list for implementation before acceptance.

To be relieved of winter maintenance responsibility, leave all roads with a smooth and even surface for public use at all times. Properly crown the roadbed surface for drainage and install adequate safety facilities. Make sure illumination and signals, including vehicle detectors, are in good working order.

After the project is accepted for winter maintenance and until ordered to resume construction operations, the Department is responsible for maintaining the facility. The Department will accept maintenance responsibility only for portions of the work that are open to the public, as determined by the Engineer. The Department will not accept maintenance responsibility for incomplete work adjacent to accepted roads. The contractor is responsible for maintaining all other portions of the work. The Engineer will issue a letter of "Acceptance for Winter Maintenance" that lists all portions of the work that the Department will maintain during a seasonal work suspension. The Contractor retains all contractually required maintenance responsibilities until receipt of this letter.

If the contractor suspends work due to unfavorable weather (other than seasonal) or due to failure to correct unsafe conditions, carry out Contract provisions, or carry out the Engineer's orders. All costs for highway traffic maintenance during the suspended period will be borne by the contractor.

When work is resumed, replace or renew any work or materials lost or damaged during temporary use. If the Department caused damage during winter suspension, payment will be made for repairs by unit pay item or in accord with GCP Subsection 90-05, Compensation for Extra Work. When the Engineer directs, remove any work or materials used in the temporary maintenance. Complete the project as though work has been continuous.

**710-3.8 CONSTRUCTION SEQUENCING.** The construction sequencing is detailed in these provisions, the Special Provisions, and the Plans. You may propose alternative construction sequencing.

Throughout the project, maintain the existing roadway configuration (such as the number of lanes and their respective widths) except for restrictions to traffic allowed in the Special Provisions or on the Plans, and addressed through approved TCPs. A restriction to traffic is any roadway surface condition, work operation, or highway traffic control that reduces the number of lanes or impedes traffic. Obtain an approved TCP before restricting traffic.

Obtain the local school bus schedule and coordinate your work to ensure the school buses are not delayed through the highway traffic control zone. Submit this plan, as a TCP, to the Engineer for approval before implementation.

**710-3.9 INTERIM PAVEMENT MARKINGS – RESERVED.**

**710-3.10 LIGHTING OF NIGHT WORK – RESERVED.**

**710-3.11 HIGH VISIBILITY GARMENTS.** Ensure all workers within project limits wear outer garments that are highly visible and comply with the following requirements:

- a. **Standards.** Use high visibility garments conforming to the requirements of ANSI/ISEA 107-2004, Class 2 for tops or Class E for bottoms, and Level 2 retroreflective material.
- b. **Labeling.** Use garments labeled in conformance with Section 11.2 of ANSI/ISEA 107-2004 or ANSI/ISEA 107-2010.
- c. **Tops.** Wear high visibility vests, jackets, or coverall tops at all times.
- d. **Bottoms.** Wear high visibility pants or coverall bottoms during nighttime work (sunset to sunrise). Worksite Traffic Supervisors, employees assigned to highway traffic control duties, and flaggers wear high visibility pants or coverall bottom at all times.
- e. **Outer Raingear.** Wear raingear tops and bottoms conforming to the requirements of this Subsection 710-3.11.

- f. **Exceptions.** When workers are inside an enclosed compartment of a vehicle, they are not required to wear high visibility garments.
- g. **Condition.** Furnish and maintain all vests, jackets, coveralls, rain gear, hard hats, and other apparel in a neat, clean, and presentable condition. Maintain retroreflective material to Level 2 standards.
- h. **Subsidiary.** Payment for high visibility garments for workers is subsidiary to other highway traffic contract items.

**710-3.12 OVERSIZE AND OVERWEIGHT VEHICLES.** Comply with the legal size and weight regulations of 17 AAC 25 and all restrictions of the *Administrative Permit Manual*, except when the Department waives the requirements.

The Engineer may waive the permit requirements of regulation 17 AAC 25 regarding oversize and overweight vehicles within the project limits when the contractor submits and follows an approved Highway TCP.

Permits shall be obtained from the Department's Division of Measurement Standards & Commercial Vehicle Enforcement, for movements of oversize and overweight equipment outside of the project limits, except when the Department waives the permit requirements outside of the project limits. Retain this permit for your records and submit a copy to the Engineer.

Submit a highway TCP for hauling operations from the material site(s) to the project. Include all the highway traffic control devices required for these operations in the highway TCP. Indicate the type, number and frequency of oversize and overweight hauling equipment.

The following items are required of oversize or overweight vehicles or equipment:

- a. Truck and equipment headlights must be on at all times during vehicle use;
- b. A roof mounted flashing or rotating amber beacon, visible from 360 degrees, must be on during vehicle use;
- c. For overweight street legal vehicles, mount clearly visible oversize signs on front and rear of vehicle; and
- d. For oversize equipment and/or overweight non-street legal equipment, mount 16 feet by 16 feet clean red/orange flags on the outboard points, in addition to clearly visible oversize signs on front and rear of equipment.

When oversize or overweight vehicles are used, add the following to the highway TCP:

- a. Install and maintain orange plastic safety fence that separates the haul route from any adjacent school, business, residence, community center or public gathering place;
- b. Furnish highway flaggers as specified by the highway TCP, and at additional locations where necessary, to control the haul route during all hauling operations. Coordinate their placement with the Engineer. Haul route highway flaggers will be in addition to airport flaggers required by FAA Advisory Circular 150/5370-2, and the CSPP;
- c. Limit haul unit speed to 10 mph when passing through any developed area or significant hazard. The Engineer is sole judge of what constitutes a developed area or significant hazard;
- d. Obey bridge load restrictions and all height restrictions on haul route;
- e. Maintain the haul route in a smooth and dust free condition. Remove all haul debris from the roadway and the surroundings;

- f. When overweight loads are hauled over existing pavement, remove the existing pavement and replace with new pavement of similar material and equal thickness to old pavement, as a subsidiary cost, after the haul is finished;
- g. Hauler is responsible for the costs of repair for damage to the highway structures, including but not limited to the bridge railings, guardrail, light poles, signs, signal, highway traffic control devices, utilities, and mailboxes on the roadways;
- h. Immediately reinstall all signs, signals, guardrail and other safety features that were removed for the haul; and
- i. If mailboxes were removed for the haul, reinstall mailboxes by the next day after the haul.
- j. Maintain a minimum 12-foot lateral separation between the non-street legal vehicles and the motoring public. Specify the highway traffic control devices required for these operations in the highway TCP.

## METHOD OF MEASUREMENT

~~710-4.1 Measure according to GCP Section 90 and the following.~~

- ~~a. **Highway Traffic Control Device Items.** By the number of units in the Highway Traffic Control Rate Schedule, under item G710.040.0000 Highway Traffic Control that are installed, accepted, and operational. Incomplete or unsatisfactory devices will not be measured. Special Construction Signs are measured by the total area of legend-bearing sign panel, as determined under subsection P-661-4.1. Items measured by the day are for each item per 24-hour period.~~
- ~~b. **Highway Flagger.** By the number of approved hours, supported by certified payroll.~~
- ~~c. **Watering.** By the 1,000 gallons (M-Gallon) of water applied. The Engineer may specify measurement by weight or volume. If by weight, convert to gallons at 8.34 pounds per gallon. If by volume, convert to gallons at 7.48 gallons per cubic foot.~~
- ~~d. **Highway Traffic Price Adjustment.** By each minute of unauthorized lane closure or lane reduction, per lane, measured to the nearest minute. The Engineer will determine whether the roadway is opened to full unimpeded use by the traveling public.~~
- ~~e. **Highway Traffic Control.** By the units specified.~~
- ~~f. **Plastic Safety Fence.** By the linear foot, as placed, to protect or channelize pedestrian traffic as shown on an approved TCP. Any adjustments in configuration of the fence at the same location that does not result in an increased amount of fence is not measured. Opening and closing the fence to gain access to and from the worksite is not measured.~~
- ~~g. **Temporary Guardrail.** By the linear foot, including end treatments, as shown on an approved TCP.~~

~~Quantities will not be measured during winter suspension of work. This item will not be measured for payment.~~

## BASIS OF PAYMENT

**710-5.1**

- a. **Highway Traffic Maintenance.** The contract price includes all resources required to provide the Worksite Traffic Supervisor, all required TCPs and public notices, monthly open house meetings,

the CSPP, and the maintenance of all roadways, approaches, crossings, intersections and pedestrian and bicycle facilities, as required. This item also includes any Highway Traffic Control Devices required but not shown on the bid schedule.

Items required by the Contract that are not listed on the bid schedule or not included in other items are subsidiary to Item G710.010.0000 Highway Traffic Maintenance.

Payment will be made under:

Item G710.010.0000 Highway Traffic Maintenance – per lump sum



# ITEM L-108 UNDERGROUND POWER CABLE FOR AIRPORTS

## DESCRIPTION

**108-1.1** This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or installing power cables within conduit or duct banks per these Specifications at the locations shown on the Plans. It includes excavation and backfill of trench for direct-buried cables only.

Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the Engineer. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities. This item also includes removing underground cables as shown on the Plans and according to these Specifications.

## EQUIPMENT AND MATERIALS

### 108-2.1 GENERAL.

- a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under *AC 150/5345-53 Airport Lighting Equipment Certification Program* (AC 150/5345-53), current version. AC 150/5345-53, the latest certified equipment list, and the address list of certified airport lighting equipment manufacturers are available on the FAA Airport Engineering, Design, & Construction web page: <https://www.faa.gov/airports/engineering/>.
- b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the Engineer.

**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 and 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, L-824 either Type B with ethylene propylene insulation or Type C with cross-linked polyethylene insulation, 5,000 volts, non-shielded, and shall be sized as shown on the Plans. 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 Electrical Code (NEC) requirements.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type XHHW-2, 90°C for installation in conduit and RHW-2, 90°C for direct burial installations. Conductors for parallel (voltage) circuits shall be of a type and size complying with, and installed in accordance with, NFPA 70, National Electrical Code. The minimum power circuit wire size shall be #12 AWG.

Underground electrical cable used to extend isolation transformer secondary leads shall be #14 AWG, 2 conductor, copper, 600 V, Type SOOW-A/SOOW. Cable shall remain flexible down to -40°F. The cable connectors shall be secondary connector kits for the plug and the receptacle meeting *AC 150/5345-26 L-823 Plug and Receptacle Cable Connectors* (AC 150/5345-26).

If telephone control cable is specified, shielded, polyethylene insulated and jacketed, No. 19 AWG telephone cable conforming to ICEA-S-85-625, Standard, Aircore, Polyolefin, Copper Conductor Telecommunications Cable for direct burial, shall be used.

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 Plans, or included in the Specifications. 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 will be as shown on the Plans, or included in the Specifications.

**108-2.3 COPPER WIRE (COUNTERPOISE, BARE COPPER WIRE GROUND AND GROUND RODS).**

Wire for counterpoise or ground installations for airfield lighting systems shall be #6 AWG minimum bare solid copper wire for counterpoise and/or #6 AWG minimum bare stranded for grounding bond wire per ASTM B3 and ASTM B8. For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Where counterpoise conductors are to be installed and where soil conditions would adversely affect bare copper wire, the Contractor may use cross-lined polyethylene wire conforming to Commercial Item Description A-A-59544A, Type XHHW-2, 600 V.

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 long by 3/4 inch in diameter.

**108-2.4 CABLE CONNECTIONS.** In-line connections or splices of underground primary cables shall be of the type called for on the Plans, or in these Specifications, and shall be one of the types listed in this subsection. When the Plans or these Specifications permit a choice of connection, the Contractor shall indicate in the bid the proposed type of connection to furnish.

- 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. Cast splicing is the only type of splicing approved for a telephone control cable.
- b. **The Field-Attached Plug-In Splice.** Field-attached plug-in splices shall be installed as shown on the Plans, or as indicated in these Specifications. 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 manufacturer's requirements. Primary connectors shall include a strain relief and O-rings at the cable entry and a factory-molded sealing flap at the connector interface. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.
  - (1) 600 V secondary receptacles shall be Type II, Class B, Style 11 or 12
  - (2) 600 V plugs shall be Type II, Class B, Style 4 or 5
  - (3) 5,000 V plugs shall be Type I, Class B, Style 3
  - (4) 5,000 V receptacles shall be Type I, Class B, Style 10
- c. **The Factory-Molded Plug-In Splice.** AC 150/5345-26, Factory-Molded to Individual Conductors, is acceptable.
- d. **The Taped or Heat-Shrink Splice.** Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall,

self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations.

The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

**108-2.5 SPLICER QUALIFICATIONS.** Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the Engineer proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

**108-2.6 CONCRETE.** Concrete shall be proportioned, placed, and cured per *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 *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, or these Specifications.

**108-2.9 TAPE.** Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inches wide) and Scotch™ 130C® linerless rubber splicing tape (2-inches wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equal.

**108-2.10 ELECTRICAL COATING.** Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equal.

**108-2.11 EXISTING CIRCUITS.** See subsection 108-3.10.

**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 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.

Notify the Engineer in writing and request inspection at least 48 hours prior to installing cables, making any splices, or covering any buried or concealed work. Immediately correct any deficiencies found during the inspection. Install cable in a manner to prevent harmful stretching of the conductors, injury to the insulation, damage to tapes and fillers or damage to the outer protective jacket or covering.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the Engineer or shown on the Plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the Plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. At L-823 connectors and 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 ~~two~~three feet vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the Engineer.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be heat stamped nylon identification tags bearing the circuit identification as indicated on the Plans. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4-inch in size. The cable circuit identification shall match the circuits as shown on the Plans.

**108-3.2 INSTALLATION IN DUCT BANKS OR CONDUITS.** This item includes the installation of the cable in duct banks or conduit per this subsection. 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 shown 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 *L-110 Airport Underground Electrical Duct Banks and Conduits*. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the Engineer of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with

moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the Engineer prior to any cable installation. If required by the Engineer, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the Engineer. Cable pull tensions shall be recorded by the Contractor and reviewed by the Engineer. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

Assemble connections in the runway and taxiway series lighting cable at the light assemblies using approved L-823 connector kits. The male end shall be coated with silicone compound. Properly seat both plug and receptacle ends onto cable and check for proper connector pin positioning prior to taping. When completed, seal the connection as indicated on the Plans and in subsection 108-3.5.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the Engineer, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

**108-3.3 INSTALLATION OF DIRECT-BURIED CABLE IN TRENCHES.** Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Mechanical cable-laying equipment may be used in conjunction with a trenching machine if shown on the Plans and indicated in the Specifications. The installation should provide for physical inspection of cable prior to backfilling. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. Inspect cable as it is removed from the reel to determine that the cable is free of visible defects. Support reel so that reel turns easily and without undue strain on the cable. 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 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 below finished grade per NEC Table 300.5, except as follows:

- (1) When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches unless otherwise specified.

(2) Minimum cable depth when crossing under a railroad track, shall be 42 inches unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches. 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 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 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:

(3) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.

(4) Trenching, etc., in cable areas shall then proceed, with approval of the Engineer, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

**b. Backfilling.** After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables; be 3 inches deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch sieve. This layer shall not be compacted. The second layer shall be 5 inches deep, loose measurement, and shall contain no particles that would be retained on a one inch sieve. The remaining third and subsequent layers of backfill shall not exceed 8 inches of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches 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 in accordance with the Plans and Specifications for the indicated materials.

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 turving operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the Engineer. If not shown on the Plans, the warning tape shall be located 6 inches above the direct-buried cable or the counterpoise wire if present. A 3 to 6-inch 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 minimum below finished grade.

- c. **Restoration.** Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the sodding, topsoiling, fertilizing, liming, seeding, sprigging, or 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. 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.** When called for in the Plans, the location of direct buried circuits shall be marked by a concrete slab marker, 2 feet square and 4 to 6-inch thick, extending approximately one inch 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 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 high and 3 inches wide, with width of stroke 1/2-inch and 1/4-inch deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the Engineer. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the Engineer. Furnishing and installation of cable markers is incidental to the respective cable pay item.

**108-3.5 SPLICING.** Connections of the type shown on the Plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

- a. **Cast Splices.** These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the Engineer.
- b. **Field-Attached Plug-In Splices.** These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one or more of the following methods as shown on the Plans:
  - (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 on each side of the joint.
  - (2) Covered with heat shrinkable tubing with internal sealant at ends only extending from cable to cable across the entire assembly.
  - (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 or more of the following methods as shown on the Plans:

- (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 on each side of the joint.
- (2) Covered with heat shrinkable tubing with internal sealant at ends only extending from cable to cable across the entire assembly.
- (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:

- (1) Bring the cables to their final position and cut so that the conductors will butt.
- (2) Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4-inch of bare conductor on each side of the connector.
- (3) 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.
- (4) Join the conductors by inserting them equidistant into the compression connection sleeve.
- (5) Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed.
- (6) Test the crimped connection by pulling on the cable.
- (7) Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.
- (8) 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 over the original jacket.
- (9) 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.
- (10) Heat shrinkable tubing shall be installed following manufacturer's instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminants prior to application.

**e. Assembly.** Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4-inch 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.

- f. **Insulation Removal.** Insulation of 5000V wire shall be trimmed with a proper trimming/pencil tool to exact barrel length as recommended by the manufacturer. Scoring insulation with a knife is not an acceptable method as it may damage the wire.

**108-3.6 BARE COUNTERPOISE WIRE INSTALLATION FOR LIGHTNING PROTECTION AND GROUNDING.** If shown on the Plans or indicated in the Specifications, a solid or stranded bare copper counterpoise wire, #6 AWG minimum size, shall be installed for lightning protection of the underground cables. The Engineer shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

The counterpoise system shall terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment grounding system. The connections shall be made as shown on the Plans and indicated in the Specifications.

- 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 minimum or 12 inches 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.

- b. **Isolation.** Counterpoise size is as shown on the Plans. The isolation method is an alternate method for use only with edge lights installed in turf and stabilized soils and raceways installed

parallel to and adjacent to the edge of the pavement. NFPA 780 uses 15 feet to define “adjacent to”.

The counterpoise conductor shall be installed halfway between the pavement edge and the light base, mounting stake, raceway, or cable being protected.

The counterpoise conductor shall be installed 8 inches minimum below grade. The counterpoise is not connected to the light base or mounting stake. An additional grounding electrode is required at each light base or mounting stake. The grounding electrode is bonded to the light base or mounting stake with a #6 AWG solid or stranded copper conductor.

See *AC 150/5340-30 Design and Installation Details for Airport Visual Aids* and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Isolation Method of lightning protection.

- c. Common Installation requirements.** When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a #6 AWG bare, annealed or soft drawn, solid or stranded 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 #6 AWG bare, annealed or soft drawn, solid or stranded copper conductor.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the 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 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 indicated 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 (NEC).
- e. Grounding System.** If shown on the Plans or indicated in the Specifications, a stranded bare copper wire, #6 AWG minimum size, shall be installed as grounding for the lighting system. The bare ground wire shall be installed in the same conduit it is designed to protect. The ground wire shall be securely attached to each light fixture base. The ground wire shall be continuous through each light base and handhole or be spliced using an irreversible compression connector. The circuit ground wire shall not rely on the mechanical ground lug in the light base for continuity. The ground wire shall also be securely attached to ground rods using exothermically welded connections as shown on the Plans but not more than 1,000 feet apart around the entire circuit.

The grounding system shall terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment grounding system. The connections shall be made as shown on the Plans and indicated in the Specifications.

The housing or baseplate of each light fixture shall be bonded to the light base ground using a bare or green insulated #6 AWG stranded copper wire or equivalent tinned-copper braid.

**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 as shown on the Plans.

**108-3.8 COUNTERPOISE INSTALLATION AT EXISTING DUCT BANKS.** When airfield lighting cables are indicated on the Plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

**108-3.9 EXOTHERMIC BONDING.** Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the Engineer. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the Engineer, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

- a. All slag shall be removed from welds.
- b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.
- c. If called for in the Plans, all buried copper and weld material at weld connections shall be thoroughly coated with 1/4-inch of 3M™ Scotchkote™, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

**108-3.10 TESTING.** The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the Engineer. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the Engineer. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

- a. Earth resistance testing methods shall be submitted to the Engineer for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the Engineer. All such testing shall be at the sole expense of the Contractor.
- b. Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The Engineer shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

After installation, the Contractor shall test and demonstrate to the satisfaction of the Engineer the following:

- c. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.
- d. That all affected circuits (existing and new) are free from unspecified grounds.
- e. That the insulation resistance to ground of all new non-grounded circuits or cable segments Meet the requirements in Table 108-1 Insulation Resistance Minimum Requirements. Test durations shall be 60 seconds (minimum) or until reading has stabilized. Tests shall be performed with all isolation transformers and connectors in place as a complete circuit.

Notify the Engineer of any test results not meeting the desired insulation resistance values for further consideration. Verify continuity of all series airfield lighting circuits prior to energization.

**TABLE 108-1. INSULATION RESISTANCE MINIMUM REQUIREMENTS**

Voltage Rating of Cable/Circuit	Minimum Test Voltage (DC)	Desired Insulation Resistance (megohms)	Minimum Insulation Resistance (megohms)
5000V	1000V	<del>2000</del>	<del>500</del> <u>2000</u>
600V	1000V	<del>4000</del>	<del>450</del> <u>1000</u>

Notes: 1. Minimum Table 108-1 values from AC 5340-26 and FAA Conditional MOS (ANC\_2021\_26294).

2. If calculating insulation resistance values, field test results or Table 108-1 minimums may not meet calculated values.

- f. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.
- g. 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.
- h. That the impedance to ground of the installed grounding electrode system at each building or structure does not exceed 25 ohms prior to acceptance and/or establishing connections to other grounding electrode systems. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the Engineer prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the Engineer. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested in the presence of the Engineer. The test shall be performed per these Specifications and prior to any activity that will affect the respective circuit. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again in the presence of the Engineer.

The Contractor shall record the results of both tests on forms acceptable to the Engineer. When circuits have similar conditions (length, number of transformers) before and after the project work, the two test results shall be similar. When circuits conditions have been changed, the results of the two tests shall be considered by the Engineer for differences deemed abnormal based on the circuit changes performed and the test results of the new circuit portions described above.

The Contractor shall make the necessary repairs to the existing circuit as required to correct test results inconsistent with the circuit changes made. All repair costs including replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, will be the Contractor's responsibility. All test results will be submitted in the Operation and Maintenance (O&M) Manual.

There are no approved "repair" procedures for items that have failed testing other than complete replacement of the materials causing the failed tests.

## METHOD OF MEASUREMENT

**108-4.1 TRENCHING.** Trenching will not be measured for payment. Excavation, backfill, bedding, dewatering and restoration will be subsidiary to the unit price bid for the work.

**108-4.2 CABLE OR COUNTERPOISE WIRE.** Cable or counterpoise wire installed in trench, duct bank or conduit will be measured by the number of linear feet installed, with grounding connectors, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement will be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item will include additional quantities required for slack as shown on the Plans and indicated in these Specifications.

**108-4.3 GROUND RODS.** Ground rods will be measured by the number of ground rods installed in place, completed, ready for operation, and accepted as satisfactory. If the pay item for ground rods is absent from the bid schedule, no separate payment will be made. All work, materials, and equipment required for ground rods will be subsidiary to the associated equipment or system.

**108-4.4 LUMP SUM.** Lump sum items will not be measured for payment per GCP section 90.

**108-4.5 UNDERGROUND CABLE REMOVAL.** Removal of underground cable shall be subsidiary to the removal of the associated equipment served by the cable as shown and described on the Plans, unless otherwise indicated.

**108-4.6 TEMPORARY JUMPER.** Temporary jumper by unit price shall be measured by the number of linear feet of new temporary jumper cable measured in place, ready for operation, and accepted as satisfactory. The unit price shall include all terminations, securing of cables, disconnections, and reconnections required for relocation of the jumpers due to construction activities; maintenance of the jumpers for the duration of their use; and removal when no longer required. Conduit and sand bags shall be subsidiary to the jumper.

**108-4.7 CABLE CONNECTIONS.** No separate payment will be made for cable connections.

## BASIS OF PAYMENT

**108-5.1** Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench (direct-buried), or cable and equipment ground installed in duct bank or conduit, in place by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L108.010.2008	Underground Cable #8 AWG, Copper, 5kV FAA Type C, L-824 - per linear foot
Item L108.030.0006	#6 Bare Copper Ground Conductor - per linear foot
Item L108.050.1006	Underground Cable #6 AWG, Copper, 600V, Type C, L-824 - per linear foot
Item L108.050.1010	Underground Cable #10 AWG, Copper, 600V, Type C, L-824 - per linear foot
Item L108.070.0000	Ground Rod – per each
Item L108.080.0014	Underground Cable #14 AWG, 2-Conductor, Copper, 600V, Type "SOOW-A/SOOW" - per linear foot
Item L108.180.0000	Temporary Jumper – 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 D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

### Mil Spec

MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive
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### 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
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### Federal Aviation Administration Standard

## ITEM L-109 AIRPORT TRANSFORMER VAULT AND VAULT EQUIPMENT

### DESCRIPTION

~~109-1.1~~ This item shall consist of ~~removing an existing airport transformer vault and equipment, and constructing an airport transformer vault or a prefabricated metal housing per these specifications and per the design and dimensions shown in the Plans. This work shall also include the installation of conduits in the floor and foundation, painting and lighting of the vault or metal housing, and the furnishing of all incidentals that are necessary to produce a completed unit. Included as a separate part under this item or as a separate item where an existing structure (vault, metal housing, enclosure or building) is to be utilized shall be~~ the furnishing of all vault equipment, wiring, electrical buses, cable, conduit, and grounding systems as shown on the Plans. This work shall also include the painting of equipment and conduit; the marking and labeling of equipment and the labeling or tagging of wires; the testing of the installation; and the furnishing of all incidentals necessary to place it in operating condition as a completed unit to the satisfaction of the Engineer.

### EQUIPMENT AND MATERIALS

**109-2.1 GENERAL.** Obtain approval of all materials and equipment proposed for the work. Submit to the Engineer five (5) complete listings of materials and equipment as indicated in the Specifications and shown on the Plans. Prepare the list to clearly identify the material or equipment by item, name, or designation used on the Plans or Specifications and indicate where specified. The submittals will be neatly bound, clearly indexed, and include applicable catalog number, cuts, wiring diagrams, performance data, operation and maintenance manuals, etc., for all material or equipment listed in this subsection, or elsewhere in these Specifications.

In addition, wherever called for in these Specifications, include in the submittal certificates of compliance, manufacturer's instructions and/or shop drawings, or proposed construction, or installation procedures. All materials of similar class or service will be from one manufacturer. Unless otherwise indicated, the capacities, sizes, and dimensions provided will be considered minimum values.

Deliver and store all manufactured materials in their original containers, with the manufacturer's name, brand, and identifying number clearly indicated on the container.

- a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be certified in *AC 150/5345-53, Airport Lighting Equipment Certification Program (AC 150/5345-53)* and listed in the AC 150/5345-53 Addendum. AC 150/5345-53, the latest certified equipment list, and the address list of certified airport lighting equipment manufacturers are available on the FAA Airport Engineering, Design, & Construction web page: <https://www.faa.gov/airports/engineering/>
- b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.
- c. Equipment and materials shall meet the Buy American requirements contained in ~~GCP section~~ 60CPSS Section 10.08.

### CONSTRUCTION OF VAULT AND PREFABRICATED METAL HOUSING

**109-3.1 ELECTRICAL VAULT BUILDING.** Not Used.

**109-3.2 CONCRETE.** The concrete for the vault or electrical enclosure shall be proportioned, placed, and cured per P-610 Concrete for Miscellaneous Structures.

**109-3.3 PRECAST CONCRETE STRUCTURES.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another third party certification program approved by the Engineer.

**109-3.4 REINFORCING STEEL.** Reinforcing steel bars shall be intermediate or structural grade deformed-type bars and shall be per ASTM A615.

**109-3.5 BRICK.** Brick shall be per ASTM C62, Grade SW.

**109-3.6 STEEL CONDUIT.** Rigid steel conduit and fittings shall be per Underwriters Laboratories Standards (UL) 6 and 514B. They shall be galvanized on the outside. All fittings shall conform to the same specification as the conduit.

- a. **Electrical Metallic Tubing (EMT).** EMT shall be according to UL Standard 797. All fittings shall be steel, compression type with insulated throats. EMT shall only be used in dry interior locations.

**109-3.7 PLASTIC CONDUIT AND FITTINGS.** Plastic conduit and fittings shall conform to the requirements of UL-651 schedule 40 polyvinyl chloride (PVC) suitable for use above or below ground.

**109-3.8 LIGHTING.** Vault, metal-housing or electrical enclosure light fixtures shall be of a vapor-proof type. Indoor lighting fixtures for metal-housing or electrical enclosures shall be LED type with frosted lens, surface mounted, approximately 4000 lumen output, 4000K color temperature.

Emergency lights shall include two LED lamp heads with battery backup and integral charging and transfer electronics with self-testing features and diagnostic indicators.

**109-3.9 OUTLETS.** Convenience outlets shall be heavy-duty duplex units designed for industrial service. Outlets shall be grounding-type, AC rated 20 amperes, 125 volts, 2-pole, 3-wire NEMA 5-20R, housed in device boxes with cover plates.

**109- 3.10 SWITCHES.** Vault, metal-housing or electrical enclosure light switches shall be single-pole switches. Switches shall be heavy-duty grade, 277 volts of Alternating Current (AC), rated for inductive and fluorescent lamp loads up to 20 amperes. Switches shall be of the type indicated by symbol on the Plans. Where more than 1 switch is shown at a point, they shall be set under 1 plate, unless otherwise noted.

**109-3.11 PAINT.**

- a. Priming paint for non-galvanized metal surfaces shall be a high solids alkyd primer compatible with the manufacturer's recommendations for the intermediate or topcoat.
- b. White paint for body and finish coats on metal and wood surfaces shall be ready-mixed paint conforming to the Master Painter's Institute (MPI), Reference #9, Exterior Alkyd, Gloss.
- c. Priming paint for wood surfaces shall be mixed on the job by thinning the specified white paint by adding 1/2-pint of raw linseed oil to each gallon.
- d. Paint for the floor, ceiling, and inside walls shall be a urethane-modified alkyd floor enamel. Walls and ceiling shall be light gray and the floor shall be medium gray.
- e. The roof coating shall be hot asphalt material per ASTM D2823. Asbestos-free roof coating per ASTM D4479 may be substituted if required by local codes.

**109-3.12 GROUND BUS.** Ground bus shall be 1/8 × 3/4-inch minimum copper bus bar.



**109-3.13 SQUARE DUCT.** Duct shall be square, factory finished steel with NEMA 1 or 3R rating for interior and exterior use, respectively. The entire front of the duct on each section shall consist of hinged or removable cover for ready access to the interior. The cross-section of the duct shall be not less than 4 x 4 inches except where otherwise shown in the Plans.

**109-3.14 GROUND RODS.** Ground rods shall be copper-clad steel, 3/4-inch x 10 feet.

**109-3.15 VAULT PREFABRICATED METAL HOUSING.** The prefabricated metal housing shall be a commercially available unit.

**109-3.16 FAA-APPROVED EQUIPMENT.** Certain items of airport lighting equipment installed in vaults are covered by individual FAA equipment specifications in ACs listed below.

AC 150/5345-3	Specification for L-821, Panels for Remote Control of Airport Lighting
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-13	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits.
AC 150/5345-49	Specification for L-854, Radio Control Equipment

The L-821 control panel shall be a custom-fabricated FAA-certified panel with controls for lighting systems as shown on the Plans. The control panel shall be wall-mounted with a NEMA 4 or 12 enclosure and shall include all components necessary for FAA certification and to accomplish the sequence of operations as described and depicted on the Plans.

**109-3.17 OTHER ELECTRICAL EQUIPMENT.** Distribution transformers, oil switches, cutouts, relays, terminal blocks, transfer relays, circuit breakers, and all other regularly used commercial items of electrical equipment not covered by FAA equipment specifications and ACs shall conform to the applicable rulings and standards of the Institute of Electrical and Electronic Engineers (IEEE) or the National Electrical Manufacturers Association (NEMA). When specified, test reports from a testing laboratory indicating that the equipment meets the specifications shall be supplied. In all cases, equipment shall be new and a first-grade product. This equipment shall be supplied in the quantities required for the specific project and shall incorporate the electrical and mechanical characteristics specified in the proposal and Plans. Equipment selected and installed by the Contractor shall maintain the short circuit current bracing rating and interrupting current rating of the existing systems or specified rating whichever is greater.

**109-3.18 WIRE.** Wire in conduit rated up to 5,000 volts shall be per AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits. For ratings up to 600 volts, thermoset wire conforming to Fed. Spec. A-A-59544, Type XHHW-2 shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the Plans or in the proposal.

**a. Control Circuits.** Unless otherwise indicated on the plans, wire shall be not less than #12 American wire gauge (AWG) and shall be insulated for 600 volts. If telephone control cable is specified, #19 AWG telephone cable per ANSI/Insulated Cable Engineers Association (ICEA) S-85-625 specifications shall be used.

**b. Power Circuits.**

- (1) 600 volts maximum – Wire shall be #12 AWG or larger and insulated for at least 600 volts.
- (2) 3,000 volts maximum – Wire shall be #8 AWG or larger and insulated for at least 3,000 volts.
- (3) Over 3,000 volts-Wire shall be #8 AWG or larger and insulated for at least the circuit voltage.

**109-3.19 SHORT CIRCUIT / COORDINATION / DEVICE EVALUATION / ARC FLASH ANALYSIS.** The Engineer shall ensure calculations and analysis are performed to ensure that all equipment bracing and overcurrent protection device interrupting ratings exceed the calculated available short circuit current. The Engineer shall ensure the arc flash incident energy has been calculated at all electrical equipment that is likely to be accessed while energized and shall provide the information required to produce arc flash labels containing at a minimum, equipment name, voltage/current rating, available incident energy and flash protection boundary. The Engineer shall ensure overcurrent protection devices are adequately coordinated. The analysis shall comply with NFPA 70E and IEEE 1584.

Provide supporting data on new and existing electrical equipment to allow the performance of the arc-flash calculations, as facilitated by the Engineer. The data shall include size of the utility transformer and impedance, if available; size, length, and material of feeder conductors; and make, model, trip rating, and AIC rating of circuit breakers.

**109-3.20 WOOD PLATFORM FOUNDATION.** If a wood platform foundation is specified, the Contractor shall construct the platform as shown on the Plans. The floor system shall consist of urethane foam core insulated panels with interior and exterior surfaces or similar manufacturer to the building structure. The panels shall be constructed on grade beams of the size shown. Grade beams may be of timber or steel. Timber shall be Douglas Fir-Larch. Timbers shall be pressure treated according to the American Wood Preservers Bureau (AWPB) FDN Standard and shall bear AWPB Quality Mark of an approved inspection agency as described in the AWPB Standard. Preservative salt retention shall be not less than 0.6-pound per cubic foot (lb/ft<sup>3</sup>). Wood shall be kiln dried after impregnation. Steel grade beams shall be hot-dipped galvanized according to ASTM A123. The building shall be anchored with soil anchors meeting the requirements of P-650 Aircraft Tie-Down, or as shown on the Plans.

**109-3.21 ELECTRICAL ENCLOSURE.** The electrical enclosure shall be a pre-engineered structure with minimum dimensions shown on the Plans. The enclosure shall be installed on either a concrete slab or wood platform floor/foundation as shown on the Plans.

The enclosure shall meet the following requirements:

**a. Panels and Facings.**

- (1) The enclosure may be constructed with separate interlocking panels forming the walls and roof or as a single unit. The enclosure exterior walls shall be foamed in place polyurethane core with 3/4- inch plywood on the interior surface. The exterior surface shall be 1/2-inch plywood with either a 26 gauge galvanized steel exterior skin or, fiberglass reinforced polyester. The exterior color shall be a factory applied and shall be white.
- (2) The side of the facings which contact the insulation core shall have a coating that will allow core-to-facing bond to be equal or greater than the cohesive strength of the core.

**b. Insulation Core.**

- (1) Factory foamed-in-place polyurethane between facings. Insulating value of the composite roof and floor systems shall be equal to or greater than R-38, and the wall system equal to or greater than R-19. No voids are allowed in the core.
- (2) Polyurethane shall have a minimum 2 lbs/ft<sup>3</sup> density.

(3) Polyurethane shall be certified UL flame spread 25 or less per ASTM E84.

- c. The panel joints shall have tongue and groove or ship lap interlock with continuous silicone sealant tape at interior and exterior faces.
  - d. Panels shall be full length in single piece where practical.
  - e. Panels shall have State Fire Marshal's approval if floor area exceeds 300 square feet.
  - f. Metal flashing and trim at corners, intersections, openings, eaves and ridges shall be of the same finish and 24 gauge thickness to effect a neat appearing, weather tight joint and closure. Provide wrap-around door jamb trim-flashing.
  - g. Enclosure shall have two 12-inch x 12-inch vent openings installed in two end or side walls. Each opening shall include a 90-degree weather hood with galvanized bird screen. One opening shall be provided with a manually adjustable damper and replaceable dust filter. One opening shall be provided with an exhaust fan and backdraft damper.
  - h. A refrigerator style door(s) of the dimensions shown shall be provided for the enclosure. The door(s) shall be of similar construction to the enclosure. Mounting hardware shall be of stainless steel or of forged brass with chrome plating, or approved equal. Provide neoprene weather-stripping. The door(s) shall be provided with a refrigerator safety lock with pushrod from interior, cast zinc with chrome plating. Provide lock(s) consisting of a brass, 6-pin E keyway padlock with a shackle that is 3/8-inch in diameter having a closed clearance of 2-1/4 inches. The lock shall have a control key removable core and shall have one separate replacement core. Provide 4 keys and 1 core removal key.
  - i. Enclosure construction shall meet the following or those indicated in the currently adopted version of the International Building Code for the project location, whichever is more stringent:
    - (1) Live Snow Load      70 pounds per square foot (psf)
    - (2) Live Floor Load      200 psf
    - (3) Wind Load              110 miles per hour (mph) basic wind speed, applied according to the International Building Code, Exposure Category D, Risk Category III
- Enclosure shall be an Equipment Enclosure for Runway Lighting Systems as manufactured by ALCHEM, Inc., of Anchorage, Alaska; Plaschem Shelter as manufactured by Plaschem Supply & Consulting, of Anchorage Alaska; or approved equal.
- j. Provide Metal Storage Cabinet and Wall Mounted Shop Desk. Provide 30-inch wide x 12-inch deep x 26-inch high wall mounted locking metal storage cabinet, and 24-inch wide x 23-inch deep x 12-inch high wall mounted shop desk securely fastened to the wall at the location and elevation shown on the drawings. Set bottom of desk surface 36 inches above floor surface.

**109-3.22 LIQUID-TIGHT FLEXIBLE METAL CONDUIT.** Liquid-tight flexible metal conduit – Type LFMC shall be water-tight, listed for exposed or direct bury per UL-360, as an equipment grounding conductor per NEC 350.60, and rated for temperatures between -67 °F and +220 °F. Conduit fittings shall have an insulated throat.

**109-3.23 TAPES.**

- a. Pipe sealing tape: "Scotch" No. 48, Teflon pipe sealing or approved equal.

b. Corrosion preventive tape: "Scotch" No. 50 or approved equal.

c. Electrical insulating tape: "Scotch" No. 88 or approved equal.

**109-3.24 RADIO CONTROL EQUIPMENT, L-854.** Radio Control Equipment, shall be L-854, Type 1, Style A, with a field-adjustable receiver frequency set to the Common Traffic Advisory Frequency (CTAF) for the project airport as found in the Alaska Supplement of the U.S. Government Flight Publication.

**109-3.25 ANTENNA FOR THE RECEIVER-CONTROLLER.** Antenna shall be a heavy-duty omnidirectional, tunable, ground plane antenna with vertical polarization in the 118 to 136 megahertz band, designed for 100 mph winds. The antenna shall be tuned for the correct system frequency as assigned with a bandwidth of 2 megahertz. The antenna shall be of 50 ohms nominal impedance and have an operating VSWR of less than 2:1 at system frequency. The antenna shall be equipped with an integral gap-type lightning arrester. The coaxial cable shall be 50-ohm, type RG-8. Antenna shall be designed to mount on 1-inch pipe support. The antenna ground planes shall be a minimum of 4 feet above the top of the adjacent roof or structure. Antenna mountings shall be fabricated as shown and noted.

**109-3.26 APRON FLOODLIGHT.** Apron floodlight shall be LED, 4000K color temperature, full-cutoff fixture, with light output and accessories as indicated on the Plans.

**109-3.27 PHOTOELECTRIC CONTROL.** Photoelectric control shall be a standard commercially available unit that will energize when the illumination on a vertical surface facing North decreases to 25 to 35 foot-candles (269 to 377 lux). The photoelectric switch should de-energize when the illumination rises to 50 to 60 foot-candles (538 to 646 lux). The unit shall comply with UL 773, with supply voltage rating of 120-277 volts AC, integral surge protection, -40°F to 140°F operating temperature range, and EEI-NEMA standard twist-lock mounting base with matching receptacle. The photoelectric switch shall be installed, connected, and adjusted according to the manufacturer's instructions.

**109-3.28 PANELBOARDS.** Panelboards shall be single phase, 3-wire, of sizes to provide all circuit breakers and spares indicated. The branch breakers shall be bolt-on type. The enclosure shall be NEMA 1 with lockable flush door front, provided with a circuit index card under plastic on the interior side of the panel door; and the enclosure shall have an engraved phenolic label, lettered to indicate the voltage and current rating of the panel, attached to the panel front exterior.

The panelboard circuit breakers shall be bolt-on molded case type, 120/240 volts, 10,000 amperes interrupting capacity minimum, with an insulation temperature rating of 60/75 °C or 75 °C to operate with conductors with insulation rated up to 75 °C per NEC Table 310.15(B)(16). 1- and 2-pole type with current ratings as shown on the Plans. Each pole of the breaker shall provide inverse time delay and instantaneous circuit protection. Breakers shall be operated by toggle type handle and have a quick-make, quick-break over center switching mechanism that is mechanically trip free so that contacts cannot be held closed against short circuits and abnormal currents. Tripping shall be clearly indicated. Non-interchangeable trip breakers shall have sealed covers and interchangeable trip units shall have sealed trip units. Ampere ratings shall be clearly visible.

Panelboard circuit breakers shall be UL listed (where procedures exist), and conform to the applicable requirements of the latest NEMA Standard. Breakers shall be standard thermal-magnetic type unless otherwise noted. Circuit breakers for the duplex receptacles shall incorporate overload, short circuit, and UL Class A ground fault circuit interruption.

**109-3.29 TRANSFER SWITCH.** Transfer switch shall be heavy-duty, 2-pole, 3-wire, solid neutral, double-throw, non-fusible type in a NEMA 1 enclosure.

**109-3.30 IDENTIFICATION TIES.** Identification ties shall be self-locking, heavy duty nylon ties and shall be labeled by heat stamp.

**109-3.31 SERVICE ENTRANCE EQUIPMENT.** The meter/main breaker combination service entrance unit for the Electrical Equipment Enclosure shall be an overhead source or an underground source as

shown on the Plans, bottom (underground) load type, 125 A, 120/240 volts, single phase, with 2-pole, 100 amperes, main breaker and 4-jaw kilowatt-hour (kWh) meter. The service entrance enclosure shall be rain tight NEMA 3R rated with a conduit entry hub fitting on top.

The service entrance disconnect switch shall be mounted as shown on the Plans. Disconnect switch shall be 100 amperes, 240 volts, 3-wire (third blade not used), with NEMA 3R enclosure, non-fused, with field installation kit, or as shown on the Plans.

**109-3.32 PLUG CUTOUT.** The plug cutout shall be a lockable, 2-pole type rated 20-ampere at 5,000 volts, 60 hertz. The plug shall be insertable in three positions for normal operations, maintenance, and testing. The plug cutout shall be mounted in a NEMA-1 enclosure with a hinged and lockable door sized to allow the plug and key to be operable by a worker standing in front of the enclosure.

**109-3.33 SUPPORTS FOR WALL-MOUNTED PANELS, PANELBOARDS, AND FIXTURES.** Supports for wall mounted panels, panelboards and fixtures shall be metal channels with accessory nuts and fittings; Unistrut or approved equal, or 3/4-inch plywood panels.

**109-3.34 PUSH-BUTTON STATIONS.** Push-button stations shall be off-on, momentary-contact types in water/dust-tight boxes. Provide metal labels identifying the function of each section.

**109-3.35 ELECTRIC HEATER.** The electric heater shall be surface mounted and rated 2,000 watts at 240 volts, with mounting kit as required. Thermostat shall be wall mounted on a suitable junction box and be of the line voltage type with an off position and a temperature range of 40 °F to 90 °F. Thermostat current rating shall be suitable to control the specified heater.

**109-3.36 HARDWARE.** All miscellaneous hardware items, nails, bolts, and screws shall be galvanized steel.

**109-3.37 EXHAUST FAN.** The exhaust fan shall be sidewall propeller fan rated for a minimum of 150 cubic feet per minute (CFM) at 0.20 in water gauge (WG). The fan shall include wire guards on the interior and a backdraft damper at the exterior wall. The fan shall be controlled by a wall-mounted thermostat, adjustable 40-85 °F minimum.

## CONSTRUCTION METHODS

### CONSTRUCTION OF VAULT AND PREFABRICATED METAL HOUSING

**109-4.1 GENERAL.** The Contractor shall construct the transformer vault or prefabricated metal housing at the location indicated in the Plans. Vault construction shall be reinforced concrete, concrete masonry, or brick wall as specified. The metal housing shall be prefabricated equipment enclosure to be supplied in the size specified. The electrical enclosure shall be a pre-engineered building placed on either a poured concrete foundation or a wood platform as specified. The mounting pad or floor details, installation methods, and equipment placement are shown in the Plans.

Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. If the vault, metal housing or electrical enclosure are to be placed on a site not prepared for that purpose under other items of work, the Contractor shall clear, grade, and seed the area around the vault or metal housing for a minimum distance of 10 feet on all sides. The slope shall be not less than 4% away from the vault, metal housing or electrical enclosure in all directions. Cost for site work will be considered incidental to this item and no separate payment will be made.

## 109-4.2 FOUNDATION AND WALLS.

- a. **Reinforced Concrete Construction.** The Contractor shall construct the foundation and walls per the details shown in the plans. Unless otherwise specified, internal ties shall be of the mechanical type so that when the forms are removed the ends of the ties shall be at least 1 inch beneath the concrete surface; the holes shall be plugged and finished to prevent discoloration. Reinforcing steel shall be placed, as shown in the drawings, and secured in position to prevent displacement during the concrete placement.

The external surfaces of the concrete shall be thoroughly worked during the placing operation to force all coarse aggregate from the surface. Thoroughly work the mortar against the forms to produce a smooth finish free from air pockets and honeycomb.

The surface film of all pointed surfaces shall be removed before setting occurs. As soon as the pointing has set sufficiently, the entire surface inside and outside of the vault shall be thoroughly wet with water and rubbed with a No. 16 carborundum stone, or equivalent quality abrasive, bringing the surface to a paste. All form marks and projections shall be removed. The surface produced shall be smooth and dense without pits or irregularities. The materials which have been ground into a paste during the rubbing process shall be spread or brushed uniformly over the entire surface, except the interior surfaces that are to be painted shall have all paste removed by washing before painting, and permitted to reset. Final exterior finish shall be obtained by rubbing with No. 30 carborundum stone, or an equivalent quality abrasive. The surface shall be rubbed until the entire surface is smooth and uniform in color.

- b. **Brick and Concrete Construction.** When this type of construction is specified, the foundation shall be concrete conforming to the details shown in the plans. The outer edge of the foundation at the floor level shall be beveled 1-1/2 inches at 45 degrees. Brick walls shall be 8 inches thick, laid in running bond with every sixth course a header course. Brick shall be laid in cement mortar (1 part masonry cement and 3 parts sand) with full mortar bed and shoved joints.

All joints shall be completely filled with mortar, and facing brick shall be back-parged with mortar as work progresses. All joints shall be 3/8-inch thick, exterior joints tooled concave, and interior joints struck flush. Both interior and exterior brick surfaces shall be cleaned and nail holes, cracks and other defects filled with mortar. When specified, a nonfading mineral pigment mortar coloring shall be added to the mortar. Steel reinforcing bars, 3/8-inch in diameter and 12 inches long, shall be set vertically in the center of the brick wall on not more than 2 feet centers to project 2-1/2 inches into the concrete roof slab.

Lintels for supporting the brickwork over doors, windows, and louvers shall consist of two 4 × 3 × 3/8-inch steel angles. Lintels shall be painted with one coat of corrosion-inhibiting primer before installation, and all exposed parts shall be painted similar to doors and window sash after installation.

Window sills may be concrete poured in place or precast concrete as indicated in the plans. All exposed surfaces shall have a rubbed finish as specified under reinforced concrete construction. After completion, all interior and exterior faces of walls shall be scrubbed with a solution of muriatic acid and water in the proportions of not less than 1 part acid to 10 parts of water. All traces of efflorescence, loose mortar, and mortar stain shall be removed, and the walls washed down with clear water.

- c. **Concrete Masonry Construction.** When this type of construction is specified, the foundation shall be concrete conforming to the details shown on the Plans. The concrete masonry units shall be standard sizes and shapes and shall conform to ASTM C90 and shall include the closures, jambs, and other shapes required by the construction as shown in the plans. Standard construction practice shall be followed for this type of work including mortar, joints, reinforcing

steel for extensions into roof slab, etc. Plaster for interior walls, if specified, shall be Portland cement plaster.

**109-4.3 ROOF.** The roof shall be reinforced concrete as shown in the plans. Reinforcing steel shall be placed as shown in the drawing and secured in position to prevent displacement during the pouring of the concrete. The concrete shall be poured monolithically and shall be free of honeycombs and voids. The surface shall have a steel-troweled finish and shall be sloped as shown in the drawing. The underside of the roof slab shall be finished in the same manner as specified for walls.

One brush or mop coat of hot asphalt roof coating shall be applied to the top surface of the roof slab. The asphalt material shall be heated to within the range specified by the manufacturer and immediately applied to the roof. The finished coat shall be continuous over the roof surface and free from holidays and blisters. Smears and dribbles of asphalt on the roof edges and building walls shall be removed.

**109-4.4 REINFORCED CONCRETE FLOOR.** The floor shall be reinforced concrete as shown on the Plans. When present, all sod, roots, refuse, and other perishable material shall be removed from the area under the floor to a depth of 8 inches, unless a greater depth is specified. This area shall be backfilled with materials consisting of sand, cinders, gravel, or stone. Fill shall be placed in layers not to exceed 4 inches and shall be thoroughly compacted by tamping or rolling. A layer of building paper shall be placed over the fill prior to placing concrete. The floor surfaces shall have a steel-troweled finish. The floor shall be level unless a drain is specified, in which case the floor shall be pitched 1/4-inch per foot downward toward the drain. A 1/4-inch asphalt felt expansion joint shall be placed between floor and foundation walls. The floor shall be poured monolithically and shall be free of honeycombs and voids.

**109-4.5 FLOOR DRAIN.** If shown in the Plans, a floor drain and dry well shall be installed in the center of the floor of the equipment room. The dry well shall be excavated 4 x 4 feet square and to a depth of 4 feet below the finished floor elevation and shall be backfilled to the elevation of the underside of the floor with gravel - which shall all pass a 2-inch mesh sieve and shall all be retained on a 1/4-inch mesh sieve. The gravel backfill shall be placed in 6-inch maximum layers, and the entire surface of each layer shall be tamped either with a mechanical tamper or with a hand tamper weighing not less than 25 pounds and having a face area of not more than 36 square inches nor less than 16 square inches. The drain inlet shall be set flush in the concrete floor. The drain shall have a clear opening of not less than 8 inches in diameter.

**109-4.6 CONDUITS IN FLOOR AND FOUNDATION.** Conduits shall be installed in the floor and through the foundation walls per the details shown in the plans. All underground conduit shall be painted with an asphalt compound. Conduit shall be installed with a coupling or metal conduit adapter flush with the top of the floor. All incoming conduit shall be closed with a pipe plug to prevent the entrance of foreign material during construction. Space conduit entrances shall be left closed.

**109-4.7 DOORS.** Doors shall be metal-clad fireproof Class A (three (3) hour rated) doors conforming to requirements of the National Electrical Code (NEC) and local electrical codes. Panic bar exit hardware shall be installed per NEC requirements. Refer to the new electrical vault detail plan sheets for construction requirements.

**109-4.8 PAINTING.** The floor, ceiling, and inside walls of concrete construction shall first be given a hardening treatment, after which the Contractor shall apply two coats of paint as specified below, except that interior face brick walls need not be painted. The hardening treatment shall consist of applying two coats of either a commercial floor hardener or a solution made by dissolving 2 pounds of magnesium fluorosilicate or zinc sulfate crystals in one gallon of water.

Each coat shall be allowed to dry at least 48 hours before the next application. After the second treating coat has dried, the surfaces shall be brushed clean of all crystals and thoroughly washed with clear water. Paint for walls and ceiling shall be a light gray color approved by the Engineer. The floor paint shall be a medium gray color approved by the Engineer. Before painting, the surfaces shall be dry and clean. The first coat shall be thinned by adding 2/3-quarts of spar varnish and 1/3-quarts of turpentine to each gallon

of paint. The second coat shall be applied without thinning. All doors, lintels, and windows shall be cleaned to remove any rust or foreign material and shall be given one body and one finish coat of white paint. Bare metal surfaces shall be given a prime coat of corrosion-inhibiting primer prior to the body and finish coats.

**109-4.9 LIGHTS AND SWITCHES.** The Contractor shall furnish and install a minimum of two duplex convenience outlets in the vault room. Where a control room is specified, at least two duplex outlets shall be installed.

## **INSTALLATION OF EQUIPMENT IN VAULT, PREFABRICATED METAL HOUSING, ENCLOSURE OR BUILDING**

**109-5.1 GENERAL.** The Contractor shall furnish, install, and connect all equipment, equipment accessories, conduit, cables, wires, buses, grounds, and support necessary to ensure a complete and operable electrical distribution center for the airport lighting system as specified herein and shown in the Plans. When specified, an emergency power supply and transfer switch shall be provided and installed.

The equipment installation and mounting shall comply with the requirements of the NEC and local authority having jurisdiction.

**109-5.2 POWER SUPPLY EQUIPMENT.** Transformers, regulators, booster transformers, and other power supply equipment items shall be furnished and installed at the location shown in the plans or as directed by the Engineer. The power supply equipment shall be set on steel "H" sections, "I" beams, channels, or concrete blocks to provide a minimum space of 1-1/2-inch between the equipment and the floor. The equipment shall be placed so as not to obstruct the oil-sampling plugs of the oil-filled units; and name-plates shall, so far as possible, not be obscured. All equipment shall be securely anchored to the floor.

If specified in the Plans and specifications, equipment for an alternate power source or an emergency power generator shall be furnished and installed. The alternate power supply installation shall include all equipment, accessories, an automatic changeover switch, and all necessary wiring and connections. The emergency power generator set shall be the size and type specified.

**109-5.3 SWITCHGEAR AND PANELS.** Oil switches, fused cutouts, relays, transfer switches, panels, panelboards, and other similar items shall be furnished and installed at the location shown in the plans or as directed by the Engineer. Wall or ceiling mounted items shall be attached to the wall or ceiling with galvanized bolts of not less than 3/8-inch diameter engaging metal expansion shields or anchors in masonry or concrete vaults.

**109-5.4 DUCT AND CONDUIT.** The Contractor shall furnish and install square-type exposed metallic ducts with hinged covers for the control circuits in the vault. These shall be mounted along the walls behind all floor-mounted equipment and immediately below all wall-mounted equipment. The hinged covers shall be placed to open from the front side with the hinges at the front bottom.

Wall brackets for square ducts shall be installed at all joints 2 feet or more apart with intermediate brackets as specified. Conduit shall be used between square ducts and equipment or between different items of equipment when the equipment is designed for conduit connection. When the equipment is not designed for conduit connection, conductors shall enter the square-type control duct through insulating bushings in the duct or on the conduit risers.

**109-5.5 WIRING AND CONNECTIONS.** The Contractor shall make all necessary electrical connections in the vault per the wiring diagrams furnished and as directed by the Engineer. In wiring to the terminal blocks, the Contractor shall leave sufficient extra length on each control lead to make future changes in connections at the terminal block. This shall be accomplished by running each control lead the longest



way around the box to the proper terminal. Leads shall be neatly laced in place. Wiring shall be installed according to the Plans and L-108. Circuits rated 60 or greater amperes shall be tested in accordance with L-108.

**109-5.6 MARKING AND LABELING.** All equipment, control wires, terminal blocks, etc., shall be tagged, marked, or labeled as specified below:

- a. **Wire identification.** The Contractor shall furnish and install self-sticking wire labels or identifying tags on all control wires at the point where they connect to the control equipment or to the terminal blocks. Wire labels, if used, shall be of the self-sticking preprinted type and of the manufacturer's recommended size for the wire involved. Identification -markings designated in the plans shall be followed. Tags, if used, shall be of fiber not less than 3/4-inch in diameter and not less than 1/32-inch thick. Identification markings designated in the plans shall be stamped on tags by means of small tool dies. Each tag shall be securely tied to the proper wire by a nonmetallic cord.
- b. **Labels.** The Contractor shall stencil identifying labels on the cases of regulators, breakers, and distribution and control relay cases with white oil paint as designated by the Engineer. The letters and numerals shall be not less than one inch in height and shall be of proportionate width. The Contractor shall also mark the correct circuit designations per the wiring diagram on the terminal marking strips, which are a part of each terminal block.
- c. **Warning Labels.** The Contractor shall install self-adhesive arc-flash warning labels on service disconnects, panelboards, and transfer switches. Arc-flash data for the labels will be provided by the Engineer.

## **METHOD OF MEASUREMENT**

**109-6.1 VAULTS.** The quantity of vaults to be paid for under this item shall consist of the number of vaults constructed in place and accepted as a complete unit.

**109-6.2 PREFABRICATED METAL HOUSINGS.** The quantity of prefabricated metal housings to be paid for under this item shall consist of the number of housings constructed in place and accepted as a complete unit.

**109-6.3 ELECTRICAL ENCLOSURES.** The quantity of electrical enclosures to be paid for under this item shall consist of the number of enclosures constructed in place and accepted as a complete unit. Removal of existing electrical enclosures shall be subsidiary to installation of new enclosures.

**109-6.4 INSTALLATION OF ELECTRICAL EQUIPMENT IN NEW OR EXISTING STRUCTURE.** The quantity of electrical equipment installed in a new or existing structure (vault, prefabricated metal housing, electrical enclosure or building) to be paid for under this item shall consist of all equipment installed, connected, and accepted as a complete unit ready for operation. Removal of existing electrical equipment from existing structures shall be subsidiary to installation of new electrical equipment.

## **BASIS OF PAYMENT**

**109-7.1** Payment will be made at the contract unit price for each completed and accepted vault or prefabricated metal housing equipment installation. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the work.

- a. **Work Items Paid in this Subsection.** Completed and accepted work paid at the contract unit price for each.

~~(1) L109.010.0000 Transformer Vault in Place Pay Item. This pay item includes all work required to construct, or install, the complete transformer vault in place.~~

~~(2) L109.020.0000 Prefabricated Metal Housing and Foundation Pay Item. This pay item includes all work required to construct and install the complete prefabricated metal housing and foundation.~~

~~(3) L109.030.0000 Electrical Enclosure and Foundation in Place Pay Item. This pay item includes all work required to construct the electrical enclosure and foundation in place.~~

~~L109.040.0000 Installation of Electrical Equipment in New or Existing Structure Pay Item. This pay item includes all work required to install electrical equipment in new or existing structure.~~

(4)(1) L109.050.0000 Installation of Electrical Equipment in New or Existing Structure Pay Item. This pay item includes a lump sum of all work required to install electrical equipment in new or existing structure.

**b. Work Items Paid in other Subsections.**

**(1) Lighting Regulators.** Lighting regulators are paid for under L-125 pay items.

Payment will be made under:

Item L109.050.0000      Installation of Electrical Equipment in New or Existing Structure - lump  
sum

**REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-3	Specification for L-821, Panels for Remote Control of Airport Lighting
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-13	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits
AC 150/5345-49	Specification L-854, Radio Control Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/ICEA S-85-625 Standard for Telecommunications Cable Aircore, Polyolefin Insulated, Copper Conductor Technical Requirements

ASTM International (ASTM)

ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM C62 Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale)

ASTM C90 Standard Specification for Loadbearing Concrete Masonry Units

ASTM D2823 Standard Specification for Asphalt Roof Coatings, Asbestos Containing

ASTM D4479 Standard Specification for Asphalt Roof Coatings – Asbestos-Free

Commercial Item Description (CID)

A-A 59544 Cable and Wire, Electrical (Power, Fixed Installation)  
Institute of Electrical and Electronic Engineers (IEEE)

IEEE 1584 Guide for Performing Arc-Flash Hazard Calculations

Master Painter's Institute (MPI)

MPI Reference #9 Alkyd, Exterior, Gloss (MPI Gloss Level 6)

Underwriters Laboratories (UL)

UL Standard 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 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

National Fire Protection Association (NFPA)

NFPA-70 National Electrical Code (NEC)

NFPA-70E Standard for Electrical Safety in the Workplace



## 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, 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, drain conduits, drywells, and all incidentals for providing positive drainage of the system as shown on the Plans.

### EQUIPMENT AND MATERIALS

**110-2.1 GENERAL.** All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.

**110-2.2 STEEL CONDUIT.** Use rigid galvanized steel (RGS) conduit and fittings, hot-dipped galvanized inside and out, and conform to the requirements of Underwriters Laboratories (UL) Standards 6, and 514B.

**110-2.3 PLASTIC CONDUIT.** Use polyvinyl chloride (PVC) and high density polyethylene (HDPE) underground plastic duct, listed by an OSHA- and a State of Alaska-approved nationally recognized testing laboratory (NRTL), installed per and in compliance with NEC Articles 352 and 353 as applicable, and conforming to one of the following plastic conduit and fittings requirements:

- a. **PVC Plastic Duct.** Use rigid, non-metallic, conduit, Schedule 40 or Schedule 80 PVC conforming to UL Standard 651 and NEMA TC-2, nominal size as indicated on the Plans. Use Schedule 40 or Schedule 80 PVC conforming to UL Standard 514B and NEMA TC-3 for all fittings such as elbows, couplings, connectors, expansion joints, adapters, etc., used in the installation.
- b. **HDPE Plastic Duct.** Use rigid, HDPE conduit conforming to UL Standard 651A, with a cell classification of 334420C or better according to ASTM D3350. Use the nominal size indicated on the Plans. Use HDPE for all fittings such as saddle fittings, couplings, connectors, adapters, etc., used in the installation. Use fittings that are third-party listed, watertight, and do not rely on gaskets alone for conduit pull-out resistance. Electrofusion couplings or other welded HDPE fittings may be used, but if not third-party listed, Contractor will obtain approval for their use from the authority having jurisdiction prior to ordering materials and include approval with the product submittals.

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 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 third party certification program approved by the Engineer. 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 P-153 Controlled Low Strength Material.

**110-2.9 DETECTABLE WARNING TAPE.** Detectable warning tape shall be plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling), aluminum-backed, polyethylene film 6 inches wide by 5 mils thick continuous legend "Caution – Buried Electrical Line Below".

**110-2.10 CONDUIT THREAD SEALING AND CORROSION PREVENTION.** Conduit corrosion inhibitor and thread sealant shall be electrically conductive. Corrosion inhibitor, thread sealant, and corrosion preventative tape shall be NRTL-listed for the applications in which they are used. The installations shall comply with NEC 300.6.

**110-2.11 LIQUIDTIGHT FLEXIBLE METAL CONDUIT.** Liquidtight Flexible Metal Conduit – Type LFMC shall be water-tight, listed for exposed or direct bury per UL 360, and rated for temperatures between - 67°F and +220°F.

**110-2.12 ELECTRICAL MANHOLES.** Refer to L-115 for requirements regarding all work and materials to install electrical manholes.

**110-2.13 DRYWELLS.** Drywells shall consist of buried drain rock surrounded by filter fabric installed at the ends of drain conduits to provide free drainage of excess water in the conduit system. Filter fabric shall conform to the requirements of AASHTO M 288 for Subsurface Drainage, except provide a minimum permittivity of 0.5 sec<sup>-1</sup>, and meet Class 2 Strength Property Requirements. Meet drain rock gradation in Table 110-1, or as otherwise approved by the Engineer.

**TABLE 110-1. GRADATION OF DRYWELL DRAIN ROCK**

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
2 in.	100
1-1/2 in.	95-100
3/4 in.	0-20
3/8 in.	0-5

## CONSTRUCTION METHODS

**110-3.1 GENERAL.** The Contractor shall install underground duct banks and conduits at the approximate locations shown on the Plans. The Engineer shall indicate specific locations as the work progresses, if required to differ from the Plans. Duct banks and conduits shall be of the size, material, and type shown on the Plans or indicated in the Specifications. Where no size is indicated on the Plans or in the

Specifications, conduits shall not be less than 2 inches 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 otherwise shown on the Plans, grades shall be at least 3 inches per 100 feet. 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 or drywell. 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 below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches below finished grade.

Seal all joints in the rigid steel conduit runs with conductive corrosion inhibitor/thread sealant applied to the threaded couplings. Wrap the completed joint with 2 layers of corrosion preventative tape, 1/2-lapped and extending 1-1/2 inches on both sides of the joints. 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 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. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the Engineer of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound 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 shown 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.

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.

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.

Trenches for burial of duct or conduit shall be of sufficient width to provide a minimum of 2 inches of lateral clearance between the duct or conduit and trench walls on both sides. Trenches for burial of duct or conduit shall be of sufficient depth as to assure 1.5-foot minimum duct or conduit burial depth below

finished grade, plus 4 inches minimum of below duct or conduit bedding, plus adequate over excavation depth as required to slope and grade all duct or conduit installations to drain toward light bases or handholes.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches below the required conduit or duct bank depth and it shall be replaced with concrete or bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch sieve. Flowable backfill may alternatively be used.

Detectable underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits. 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.

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the Engineer, the unsuitable material shall be removed per P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the Engineer.

All excavation shall be unclassified. Unless otherwise specified, excavated materials that are deemed by the Engineer to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite as directed by the Engineer.

Any excess excavation shall be filled with suitable material approved by the Engineer and compacted per 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 shown 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.

Excavate foundations, footings, slabs, pads, handholes, ducts and/or duct banks, or light base assemblies so as to permit the placing or construction of the full width, length, and depth of the structure or object and the layer of bedding material, whenever bedding is required.



**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 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 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 beyond the edges of the pavement or 3 feet 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 thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches 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 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 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 intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot intervals.

All pavement surfaces that are to have ducts installed shall be neatly saw cut to form a vertical face.

Install a plastic, detectable, color as noted, minimum 6 inches wide tape, 8 inches minimum below grade above all underground conduit or duct lines not installed under pavement. For duct banks equal to or greater than 24 inches in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the Engineer shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the Plans or as required by the Engineer.

**110-3.3 CONDUITS WITHOUT CONCRETE ENCASEMENT.** Trenches for single-conduit lines shall be not less than 6 inches nor more than 12 inches 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.

Where HDPE or steel conduit is specified, place a layer of bedding material, at least 4-inches thick (loose measurement) in the bottom of the trench to bed the duct. Use bedding material that meets the requirements for the applicable lift of material (P-152, P-154, P-209, and P-299) except that 100% of the bedding material will pass a 1-inch sieve.

Where conduit other than HDPE or steel is specified, a layer of sand, at least 4 inches thick (loose measurement) shall be placed in the bottom of the trench as bedding for the duct. The bedding material

shall consist of sand, and it shall contain no particles that would be retained on a 1/4-inch sieve. The bedding material shall be tamped until firm.

Unless otherwise shown on Plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches 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 below the finished grade per National Electrical 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 apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches 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 apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches 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 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 intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer for review prior to use.

**110-3.4 MARKERS.** When shown on the Plans, 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 square and 4 - 6 inches thick extending approximately one inch 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 along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the Engineer, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the Engineer. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the Engineer. The letters shall be 4 inches high and 3 inches wide with width of stroke 1/2-inch and 1/4-inch 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, bedding material that conforms to the requirements specified in subsection 110-3.3 for the conduit that is used 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 P-152 except that material used for back fill shall be select material not larger than 4 inches in diameter. If duct is placed in the structural section of a pavement such as for a runway or taxiway, the Contractor shall construct the backfill according to the specifications (P-154, P-209, and P-299) for the material in which the duct is placed.

Flowable backfill may alternatively be used. Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the Engineer.

**110-3.6 BACKFILLING FOR DUCT BANKS.** After the concrete has cured, the remaining trench shall be backfilled and compacted per P-152 except that the material used for backfill shall be select material not larger than 4 inches in diameter. If duct bank is placed in the structural section of a pavement such as for a runway or taxiway, the Contractor shall construct the backfill according to the specifications (P-154, P-209, and P-299) for the material in which the duct bank is placed.

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 as directed by the Engineer.

**110-3.7 RESTORATION.** Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include any necessary seeding, sprigging, topsoiling, mulching, or installing vegetative mat according to T-901, T-903, T-905, T-908, and T-920, respectively, as shown on the Plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. 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.

**110-3.8 OWNERSHIP OF REMOVED CABLE.** Not Used.

**110-3.9 PVC CONDUIT.** Install PVC conduit where indicated on the Plans.

Fabricate the conduit runs as recommended by the conduit manufacturer. Make all joints square, tight, and leakproof. Do not allow bends or breaks in the joints. Use only solvents and cements, which are specifically recommended by the conduit manufacturer. Join together the complete run between each light base alongside the trench. Place in the trench and connect to the base assembly after the minimum cure time of the joint cement has elapsed and after inspection and approval is granted by the Engineer.

Make field cuts of the conduit true and square with a tool or lathe designed for the purpose. Deburr and ream the conduit as required.

Bend PVC conduit at the job site only with a "Hot Box" or as recommended by the conduit manufacturer. Heat the conduit uniformly to obtain smooth bends without overheating. Conduit with a brown appearance shall not be used. Conduit with extremely sharp bends, kinks in the bends or which exhibits a significant visual defect shall not be used.

Install expansion fittings in each run of conduit between light base assemblies, at spacing not exceeding 60 feet. The expansion fitting shall be of the same manufacturer as the conduit and shall be installed according to the manufacturer's instruction. Expansion joints shall be installed a maximum of 10-feet from the edge light bases or hand holes and shall be installed with joints 1/4-inch expanded, resulting in a minimum requirement of four expansion joints per 190-foot run of conduit.

**110-3.10 HDPE CONDUIT.** Assemble high-density polyethylene conduit into runs on the surface and install in trenches after coupling of the section. Butt-weld the duct using the manufacturer's recommended procedures and equipment. Assure that the conduit is open, continuous and free of water and debris prior to installing cable. In underground conduit, pull a flexible mandrel and swab through the entire length of the conduit run immediately prior to the cable being installed.

Make changes in direction, other than long sweeping curves, and stub-ups to equipment using rigid steel conduit elbows. HDPE conduit splices and fittings shall be watertight. Where electrofusion couplings are used to join HDPE to rigid steel conduit, the rigid steel conduit shall be threaded. Where gasketed fittings are used to connect to rigid steel conduit, the rigid steel conduit shall not be threaded to ensure a proper seal at the gasket.

Continuous HDPE conduit shall be removed from the reel using a conduit straightening mechanism to remove the reel memory from the conduit.

**110-3.11 DRYWELLS.** Drywells shall be excavated to a minimum depth of 24-inches below the drain conduit. The excavated hole shall be lined with filter fabric and filled with drain rock. The drain rock shall be hand tamped, the fabric wrapped over the top of the drain rock, and the hole backfilled. In areas within the project limits, backfill shall be in accordance with the material sections shown in the Plans. In other areas, backfill shall consist of the removed material, unless deemed unsuitable by the Engineer.

## METHOD OF MEASUREMENT

**110-4.1 UNDERGROUND CONDUITS.** Underground conduits and duct banks shall be measured by the linear feet of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

**110-4.2 DRYWELLS.** The quantity of drywells to be paid for will be the number of units in place, completed, ready for operation, and accepted by the Engineer.

**110-4.3 LUMP SUM.** Pay items shown as lump sum will not be measured for payment per GCP section 90.

## 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 the work.

**a. Subsidiary Work.** Work listed is subsidiary to the respective L-110 pay items requiring its use.

- (1) Installing detectable warning tape.
- (2) Cleaning ducts, base cans, manholes, etc., and verifying existing ducts.
- (3) Furnishing and installing duct markers.
- (4) Dewatering necessary for duct installation and erosion protection per federal, state, and local requirements.

(5) All unclassified excavation, subgrade and embankment work.

(6) FOD inspection and removal.

(7) All Portland cement concrete work.

**b. Other Subsidiary Work.**

(1) Removing underground ducts is subsidiary to removing associated equipment served by the duct as shown and described in the Plans, unless otherwise indicated.

(2) Removing old and abandoned cables from existing conduit is subsidiary to removing associated equipment serviced by the cable as shown and described in the Plans, unless otherwise indicated.

Payment will be made under:

Item L110.050.1004	Rigid Steel Conduit, 4-inch – per linear foot
Item L110.080.1002	HDPE Conduit, 2-inch - per linear foot

**REFERENCES**

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C478	Circular Precast Reinforced Concrete Manhole Sections
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ASTM D3350	Polyethylene Plastics Pipe and Fittings Materials
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National Electrical Manufacturers Association (NEMA)

NEMA TC-2	Electrical Polyvinyl Chloride (PVC) Conduit
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National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
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Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit - Steel
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UL Standard 514B	Conduit, Tubing, and Cable Fittings
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UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
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UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
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UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit
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## ITEM L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS

### DESCRIPTION

**125-1.1** This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). This item includes removal and disposal of existing lighting equipment as shown on the Plans and indicated in these Specifications. The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the Engineer. This item shall also include furnishing, installing, maintaining, and removing temporary runway lighting as specified and shown in the Plans.

### EQUIPMENT AND MATERIALS

#### 125-2.1 GENERAL.

- a. Airport lighting equipment and materials covered by the Federal Aviation Administration (FAA) advisory circulars (ACs) shall be certified under *AC 150/5345-53 Airport Lighting Equipment Certification Program (ALECP)* and listed in the ALECP Addendum. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not perform as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly. The AC 150/5345-53, the latest certified equipment list, and the address list of certified airport lighting equipment manufacturers are available on the FAA Airport Engineering, Design, & Construction web page: <https://www.faa.gov/airports/engineering/>.
- b. Lighted airport signs shall be guaranteed for a period of two (2) years, and LED light fixtures shall be guaranteed for a period of four (4) years. All other 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 Department, according to GCP section 90. The defective materials and/or equipment shall be repaired or replaced, at the Department's discretion, with no additional cost to the Department.

**125-2.2 CONDUIT/DUCT.** Conduit shall conform to L-110 Airport Underground Electrical Duct Banks and Conduits.

**125-2.3 CABLE AND COUNTERPOISE.** Cable and Counterpoise shall conform to L-108 Underground Power Cable for Airports.

**125-2.4 TAPE.** Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 130C and 88 respectively, as manufactured by 3M Company or an approved equal.

**125-2.5 CABLE CONNECTIONS.** Cable Connections shall conform to 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 and P-660 Retroreflective Markers and Cones. Provide the type and style shown on the Plans.

**125-2.7 RUNWAY AND TAXIWAY LIGHTS.** Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Provide the type of light fixture as shown on the Plans and in Table 125-1. 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.

**TABLE 125-1. LIGHTS**

	<b>ITEM</b>	<b>DESCRIPTION</b>	<b>FAA AC 150 /</b>
<b>a.</b>	Runway Edge and Threshold Light, Bi-directional High-Intensity	L-862 and L-862E, with 6.6 amperes (A) halogen lamp or LED, support column, metal frangible coupling with stainless steel hex head set screws, upper plug and cord assembly with separable connector, and stainless steel lens encircling clamp band. Complete with lens coloration, lamp wattage, and specified support column height. Fixtures shall be left and right toe-in as required.	5345-46
<b>b.</b>	Runway Edge and Threshold Light, Medium Intensity	L-861 and L-861E, with 6.6 A halogen lamp or LED and glass lens, support column, metal frangible coupling with stainless steel hex head set screws, upper plug and cord assembly with separable connector, and stainless steel lens encircling clamp band. Complete with lens coloration, lamp wattage, and specified support column height.	5345-46
<b>c.</b>	Taxiway Edge Light, Medium Intensity	L-861T, with 6.6 A halogen lamp or LED <u>as indicated on the Plans</u> , and glass lens, support column, metal frangible coupling with stainless steel hex head set screws, upper plug and cord assembly with separable connector, and stainless steel lens encircling clamp band. Complete with lamp wattage and specified support column height.	5345-46
<b>d.</b>	Flush Taxiway Centerline Light Fixture	Uni or Bi-Directional, Type L-852C, L-852D, or L-852K, Class 2, Mode 1, Style 3, a flat fixture with 1/4-inch or less clearance above finish surface, with halogen or LED lamps, plug and cord assembly, 1/2-inch watertight connector, fixture bolts, 2-piece cam-lock washers, "Dry" system with replaceable lens in the optical assembly sealed above and below with "O" rings, and without optional arctic heater for LED fixtures.	5345-46
<b>e.</b>	Flush Runway Light Fixture	Uni or Bi-Directional, Type L-850A or L-850B, Class 2, Mode 1, Style 3, as indicated, with 1/4-inch or less clearance above finish surface, with halogen or LED lamps, plug and cord assembly, 1/2-inch watertight connector, fixture bolts, 2-piece cam-lock washers, "Dry" system with replaceable lens in the optical assembly sealed above and below with "O" rings.	5345-46
<b>f.</b>	Elevated Runway Guard Light	L-804, with LED lamps, support column with adjustable fitting for fixture aiming, metal	5345-46



		frangible coupling with stainless steel hex head set screws, heavy baseplate, internal flasher circuitry, and upper plug and cord assembly with separable connector.	
<b>g.</b>	Flush Guard Light Fixture	Uni Directional, Type L-852G, Class 2, Mode 1, Style 3, a flat fixture with 1/4-inch or less clearance above finished surface, with LED lamps, internal flasher circuitry, plug and cord assembly, 1/2-inch watertight connector, fixture bolts, 2-piece cam-lock washers, "Dry" system with replaceable lens in the optical assembly sealed above and below with "O" rings, and without optional arctic heater.	5345-46
<b>h.</b>	Flush Runway Edge Light Fixture	Bi-Directional, Type L-850C, Class 2, Mode 1, Style 3, as indicated, with 1/4-inch or less clearance above finish surface with halogen or LED lamps, color filters, plug and cord assembly, 1/2-inch watertight connector, fixture bolts, 2-piece cam-lock washers, "Dry" system with replaceable lens in the optical assembly sealed above and below the "O" rings. Fixtures shall be left or right toe-in as required.	5345-46
<b>i.</b>	Flush Taxiway Edge Light Fixture	Omni-Directional, Type L-852T, Class 2, Mode 1, Style 3, a flat fixture with 1/4-inch or less clearance above finish surface, with LED lamps, plug and cord assembly, 1/2-inch watertight connector, fixture bolts, 2-piece cam-lock washers, "Dry" system with replaceable lens in the optical assembly sealed above and below with "O" rings, and without optional arctic heater.	5345-46
<b>j.</b>	Flush Taxiway Intersection Light Fixture	Omni-Directional, Type L-852F, Class 2, Mode 1, Style 1, a flat fixture with 1/2-inch or less clearance above finish surface, with halogen lamp, plug and cord assembly, 1/2-inch watertight connector, fixture bolts, 2-piece cam-lock washers, "Dry" system with replaceable lens in the optical assembly sealed above and below with "O" rings, and high-strength ductile iron top housing.	5345-46

**125-2.8 RUNWAY AND TAXIWAY SIGNS.** Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44. Provide type, size, style, class, and mode of signs as shown on the Plans and in Table 125-2.

**TABLE 125-2. SIGNS**

	ITEM	DESCRIPTION	FAA AC 150 /
a.	Airport Signs	L-858, internally lighted, Class 2, size, style, and mode as indicated on the Plans, with acrylic panels, LED lamps, and on/off switch with protective cover. Panels shall be smooth and free from aberration with the exception of the panel joints in modular signs. Panel joints shall not interfere with the legibility of the sign.	5345-44
b.	Airport Signs	L-858, unlighted.	5345-44

**125-2.9 RUNWAY END IDENTIFIER LIGHT (REIL).** Not Used.

**125-2.10 PRECISION APPROACH PATH INDICATOR (PAPI).** Not Used.

**125-2.11 CIRCUIT SELECTOR CABINET.** The circuit selector cabinet shall meet the requirements of AC 150/5345-5. Provide the type, number of circuits controlled, class, and rating as shown on the Plans.

**125-2.12 LIGHT BASE AND TRANSFORMER HOUSINGS.** Light Base and Transformer Housings shall conform to the requirements of AC 150/5345-42. Provide the type, class, and size shown on the Plans and in Table 125-3. Provide all base plates, cover plates, and adapter plates to accommodate various sizes of fixtures.

**TABLE 125-3. LIGHT BASE AND TRANSFORMER HOUSINGS**

	ITEM	DESCRIPTION	FAA AC 150 /
a.	Airport Light Base	L-867, transformer housing, Class I, Size B or D, 12 or 16 inches diameter by 24 inches deep, galvanized steel one piece light base with internal grounding lug, gasket, steel cover, base extension (where required), drain opening and conduit hubs or openings as indicated.	5345-42
b.	Airport Light Base	L-867, watertight, transformer housing, Class II, Size B, 12 inches diameter by 24 inches deep, non-metallic one piece light base made from Type III, ultra-high molecular weight, heavy-wall, high-density polyethylene pipe having a cell classification of 345434C or better according to ASTM D3350. Conduit stubs made of the same material as the light bases shall be sidewall fused to the bases using saddle fittings, or other approved method for a watertight connection.	5345-42

<b>c.</b>	Airport Light Base	L-868, transformer housing, Class I, Size B, 12 inches diameter by depth as indicated on the Plans, galvanized steel two section light base assembly with grooved and "O" ringed flange ring with concrete ring. Step the top flange of the light base bottom section to fit outside a standard top section. Complete with any necessary spacer rings, internal grounding lug, mud plate, anti-rotational fins and conduit hubs. Light base and cover shall be suitable for vehicle and aircraft wheel loading.	5345-42
<b>d.</b>	Primary Handhole	L-868, Class I, Size B, 12 inches diameter by 24 inches deep, galvanized steel, one piece with conduit hubs or openings and drain hole as indicated, steel cover and gasket, internal ground lug with connector, and other items as indicated. Handhole and cover shall be suitable for vehicle and aircraft wheel loading.	5345-42
<b>e.</b>	Handhole	L-867, watertight, transformer housing, Class II, Size B, 12 inches diameter by 24 inches deep, non-metallic one piece light base made from Type III, ultra-high molecular weight, heavy wall, high density polyethylene pipe having a cell classification of 345434C or better according to ASTM D3350. A conduit stub made of the same material as the light bases shall be sidewall to ASTM D3350. Conduit stubs made of the same material as the light bases shall be sidewall fused to the bases using saddle fittings, or other approved method for a watertight connection. Complete with 1/2-inch galvanized steel cover and gasket.	5345-42
<b>f.</b>	Spacer Ring	L-867 or L-868, galvanized steel spacer ring with bolt hole pattern to match light base.	5345-42
<b>g.</b>	Light Base Extension	L-867, Class I, Size B or D, depth as required or indicated, galvanized steel light base extension with bolt hole pattern to match light base.	5345-42

**125-2.13 ISOLATION TRANSFORMERS.** Isolation Transformers shall conform to AC 150/5345-47. Provide the type, rating, and size as shown on the Plans and in Table 125-4.

**TABLE 125-4. ISOLATION TRANSFORMERS**

	<b>ITEM</b>	<b>DESCRIPTION</b>	<b>FAA AC 150 /</b>
<b>a.</b>	Isolation Transformer	L-830, individual lamp type, series-to-series, 5000 V, 6.6 A to 6.6 A.	5345-47

<b>b.</b>	Isolation Transformer	L-830, individual lamp type, series-to-series, 5000 V, 20 A to 6.6 A.	5345-47
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**125-2.14 CONSTANT CURRENT REGULATOR.** Constant Current Regulators shall conform to AC 150/5345-10. Provide the type, class, style, and rating as shown on the Plans and in Table 125-5.

**TABLE 125-5. CONSTANT CURRENT REGULATORS**

	ITEM	DESCRIPTION	FAA AC 150 /
<b>a.</b>	Constant Current Regulator	L-828, class, style, and size as indicated on Plans, 60 hertz (Hz) input, with brightness control for remote operation. Regulator shall be ferroresonant, dry-type with 6.6 A output current and front-mounted digital meter.	5345-10

**125-2.15 RADIO CONTROLS.** Radio Control Equipment shall conform to AC 150/5345-49. Provide the type and style as shown on the Plans and in Table 125-6.

**TABLE 125-6. RADIO CONTROL EQUIPMENT**

	ITEM	DESCRIPTION	FAA AC 150 /
<b>a.</b>	Radio Control Equipment	L-854, Type I, Style A, with enclosure for surface mounting, antenna and feedline and field-adjustable frequency set to the Common Traffic Advisory Frequency (CTAF) for the project airport as found in the Alaska Supplement of the U.S. Government Flight Publication.	5345-49

**125-2.16 SEALER.**

- a. Adhesive Sealant.** Adhesive sealant shall be a self-leveling silicone sealer.
- b. Conduit Sealant.** Conduit sealant shall be a two-part, high expansion polyurethane foam duct sealant that is fast setting, easily installed, easily removed and re-enterable. Sealant shall be dispensed with a multi-use, single plunger caulking tube package that automatically mixes the sealant in a correct ratio. Sealant shall create a strong, resilient, chemically resistant seal that is compatible with cable and wire jackets, and will expand, cure, and seal even with water present. Sealant shall be American Polywater Corporation AFT or FST Foam Sealant, Chemque Q-Pak 2000, or approved equal product.

**125-2.17 TRANSFORMER SUPPORT PLATFORM.** When called for on the Plans, light bases equipped with L-830 type isolating transformers shall, in addition to the other specified items, be provided with 12 inch high non-metallic, fixed height or folding type, transformer support platforms as shown on the Plans.

**125-2.18 POWER ADAPTER.** Power adapter, when called for in the Plans shall be a series primary to 120 V regulated-voltage power supply suitable for use with a 3- or 5-step constant current regulator

source. The power adapter shall be oil filled and include two replaceable internal fuses. Power adapter ratings shall be 670 VA at 120 V alternating current (ac) with ± 3% regulation at 2.8 to 6.6 A primary current.

**125-2.19 REGULARLY USED COMMERCIAL ITEMS.** All regularly used commercial items of electrical equipment not covered by FAA equipment specifications shall conform to the applicable NEMA rulings and standards for equipment of its type, be listed and labeled as defined in NFPA 70, Article 100, by an OSHA and State of Alaska-approved nationally recognized testing laboratory agency acceptable to the Department, and be marked for the intended use.

**125-2.20 LOCK WASHERS.** Lock washers shall be two piece cam-type lock washer.

**125-2.21 FREE FLOWING INSULATING MATERIAL.** Insulating material for filling of light bases shall be an inorganic, non-flammable, free-flowing granular material. The material shall be chemically treated to be hydrophobic. It shall be free of asbestos. The material shall have a density of 40 to 42 pounds per cubic feet (lb/cf), and a load bearing strength of 83 pounds per square inch (psi).

**125-2.22 LUBRICANT AND SEALANT.** Lubricant and sealant shall be a general purpose "O"-ring and valve lubricant. Temperature range shall be -40 °F to +400 °F. Anti-seize for use on fixture bolts shall be a marine-grade, metal-free anti-seize compound for wet, corrosive environments and shall be compatible with steel, stainless steel, and aluminum.

**125-2.23 SOFT GASKET.** Gaskets to be installed between the base plate and base shall be soft neoprene.

**125-2.24 PEDESTALS.** The power and communications pedestals shall be fiberglass enclosures constructed to meet the requirements of ANCI C 57.12.28 Standard for Pad-mounted Equipment Enclosure Integrity, an attachment to ANSI C 37.72. Construction details and overall dimensions shall be according to the Plans.

**125-2.25 JUNCTION BOX, TYPE II.** Junction boxes shall be pre-cast reinforced concrete boxes of the size and details shown on the Plans. Junction boxes shall have metal covers. The covers shall be effectively grounded with a 3-foot copper braid.

**125-2.26 CONCRETE.** Concrete shall be proportioned, placed, and cured per P-610 Concrete for Miscellaneous Structures.

**125-2.27 FIXTURE BOLTS.** Bolts for securing flush-mounted light fixtures shall be fluoropolymer-coated, SAE J429 Grade 5 carbon steel, and fully threaded. Bolts shall extend a minimum of 1/4-inch beyond the underside of the light base top flange and shall be a maximum of 3-1/2 inches long unless otherwise approved by the engineer.

**125-2.28 TEMPORARY RUNWAY LIGHTING SYSTEM.** Temporary lighting shall be portable lighting units meeting the requirements of AC 150/5345-50 or equipment meeting the requirements of this Specifications installed in a manner to facilitate temporary use. When cabling is required, use L-824 cabling and L-823 connectors in minimum 1-inch schedule 40 HDPE conduit unless otherwise indicated.

**125-2.29 DRAIN ROCK.** Drain rock shall meet gradation requirements in Table 125-7, or as otherwise approved by the Engineer.

**TABLE 125-7. GRADATION OF DRAIN ROCK**

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
2-inch	100
1-1/2-inch	95-100

3/4-inch	0-20
3/8-inch	0-5

**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.

All work in connection with the airport lighting system shall be according to the applicable provisions of the current edition of NFPA 70 (National Electrical Code) and all State and local codes. Location of all new fixtures, conduit, cables, etc., shall be as shown on the Plans.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the Plans, and in this subsection.

Level and align light fixtures according to manufacturer's instructions. Level to within 1 degree. Align to within 1/2-inch at right angles to centerline and to within 1-inch parallel to centerline. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction.

Where electrical cable or duct is required, such work will be covered under L-108 or L-110, as applicable.

Where remote relay assembly and/or remote control panel is required, such work will be covered under L-109.

Refer to P-610 for requirements regarding all work and materials to place concrete.

Special requirements for providing and maintaining temporary lighting include the following:

- a. Install runway, threshold, and taxiway lighting as required with spacing in accordance with AC 150/5340-30.
- b. Test temporary lights and system connections prior to their use being required to ensure no delays or service interruptions.
- c. Install temporary light units using black sand bags and/or stakes to hold fixtures and conduit in place.
- d. On completion of work, remove temporary equipment, repair any damaged light units and turn over all units to the Department.
- e. Where hardwired lighting equipment is utilized:
  - (1) Connect temporary lighting to existing and/or new lighting circuits served from the existing or new regulator and lighting controls.
  - (2) Use HDPE conduit to provide appropriate physical cable protection. Conduit is not required for short term cable installations that will be removed within 2 days of installation.
  - (3) Remove HDPE conduit from around cable and dispose of upon completion of use.
  - (4) Reinstall used cabling on metallic cable drums and turn over to the Department for future use.

(5) At the Contractor's option, cabling may be assembled in the field or by the manufacturer. Each section along the runway edges shall be 200 feet minimum in length.

- f. Maintain temporary lighting system and existing lights used as part of the temporary lighting system in good repair to keep the system in working condition. Relocate temporary lights and circuits and adjust circuit connections and configuration as required as construction progresses.

Provide all labor, materials, systems, equipment, facilities, and other incidental items as may be required to provide temporary electrical power for construction and testing of all contract work.

**125-3.2 TESTING.** All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

**125-3.3 SHIPPING AND STORAGE.** Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the Engineer, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the Department. 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.

**125-3.5 INSTALLATION OF IN-PAVEMENT LIGHTS.** 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. Surplus Portland cement concrete (PCC) shall be removed. The holding device shall remain in place until PCC has reached its initial set.

Install flush runway and taxiway light fixtures in existing pavement after the old pavement has been cold planed, and before the new asphalt is placed. Install flush taxiway and runway light fixtures on new runways or taxiways before the first asphalt lift.

Core remaining asphalt or base course at the light base locations a minimum diameter of 36 inches and remove the base course material to the depth shown. Compact the bottom of the cored hole before pouring concrete.

Use a setting jig to install the bottom section of the light base assembly, as shown in the Plans. The bottom of the light base shall be at least 12 inches above the bottom of the excavation. Provide no more than 4 threaded hubs for the bottom section of the light base, as shown on the Plans. Connect the bottom section of the light bases to the conduit system, using rubber grommets or waterproof nipples and couplings.

Call for inspection of the light base assembly prior to the backfilling of the excavations. Backfill with poured PCC meeting the requirements of P-610. Fill the excavation only to the level shown.

After the PCC has cured at least 72 hours or as approved by the Engineer, apply tack coat and overlay with Asphalt Concrete Pavement.

Plug the conduit ends during the course of construction to prevent accumulation of water or debris in the conduit.

When ready to install the inset lights, determine the location of the light base and drill a small diameter core hole to locate the center of the mud plate. Next, drill a 16-inch diameter core hole over the center of the mud plate ( $\pm 1/4$  inch tolerance). Use a coring machine of adequate stability to prevent "wobble". After removing the core, mud plate, plywood cover, and any water or debris that has accumulated, apply a thin layer of self-leveling silicone sealer between the bottom flange of the top section and the top flange of the bottom section and bolt the top section using 18-8, 410, or 416 stainless steel all-thread bolts. Coat the bolts with a suitable corrosion inhibitor prior to installing. Use two-piece cam-type lock washers and torque the bolts to 180 inch-pounds or as recommended by the manufacturer.

Make a "dry system" light fixture installation, using a grooved flange ring, "O" ring, and concrete ring. If the actual elevation of the pavement overlay does not equal the estimated elevation, provide spacer rings or flange rings of different thickness. Bolt the fixture to the top section using fluoropolymer-coated Grade 5 bolts. Do not use anti-seize corrosion inhibitor on coated bolts. Use two piece cam-type lock washers, and torque the bolts to 336 - 360 inch-pounds, or as recommended by the manufacturer. Set the outboard edge of the fixture  $1/8$  inch ( $\pm 1/16$  inch tolerance) below the adjacent finished pavement measured at the downslope side.

Install the light fixtures per the Plans and the Specifications and the manufacturer's recommended procedure. Do not deviate from these procedures, or the materials shown or specified, without the prior approval of the Engineer.

Install isolating transformers and cable connectors as described for non-watertight edge lights.

**125-3.6 INSTALLATION OF NON-WATERTIGHT EDGE LIGHTS.** The light base shall be placed on a layer of bedding material of minus  $1/4$ -inch material that is not less than 6 inches in depth. Bedding material shall be, sand, gravel, crushed aggregate, or other suitable material containing no organic, frozen, or other deleterious material. Where called for on the Plans, install drain rock below light base in lieu of bedding material. Compact drain rock to the satisfaction of the Engineer. If the light base is placed in the structural section (P-154, P-209, P-299) of a pavement such as for a runway or taxiway, the Contractor shall construct the backfill according to the Specifications for the material in which the light base is placed. The material shall be compacted to the requirements of the material into which it is placed. The light base shall be placed at an elevation that will place the frangible break point below finished grade as indicated on the Plans. The base shall be level to within  $\pm 1/4$ -inch tolerance.

Connect the isolating transformer with L-823 connector kits and heat shrink tubing as shown on Plans. Ensure that all field installed primary cable connectors have the plug pin connectors and receptacle socket connectors properly positioned within their respective connector bodies, as detailed by the connector manufacturer, prior to the shrinking of heat shrink tubing, where required at the cable-connector interface.

Install isolating transformers in the light bases as shown on the Plans. Where called for on the Plans, install isolating transformers in all light bases by placing on top of an approved transformer supporting platform as specified. Train all connections to the isolating transformer to lay in the upper section of the light base, above the transformer platform and below the cover flange, as shown on the Plans. Provide adequate primary and secondary cable slack in each light base to assure that all connectors can be grouped and trained in the upper section of the light base without subjecting the connector to tension.

Install the light fixtures with stainless steel hardware and coat the bolts and frangible couplings with a suitable corrosion inhibitor prior to being installed. Install the light fixtures with lamp, clean the lenses, align and adjust each optical system according to the manufacturer's instructions.

**125-3.7 INSTALLATION OF WATERTIGHT EDGE LIGHTS.** Place the light base on a layer of bedding material that is not less than 6 inches in depth and backfill around the lighting base with bedding material. Use bedding material that meets requirements for the applicable lift of material (P-152, P-154, P-209, P-299) except that 100% of the bedding material will pass a 1-inch sieve.



~~Test the base assemblies, saddle fittings, and plastic duct as a complete system or in sections to insure that it is watertight. If a pneumatic test is performed to meet this requirement, the minimum pressure shall be 5 pounds per square inch (psi) for a minimum of 10 minutes.~~

Base assemblies shall be sealed watertight and conduit openings and any holes shall be caulked with approved sealant to prevent any water from entering the base assemblies. When called for on the Plans, after the connection of the isolating transformer with L-823 connector kits the light bases shall be completely filled with free flowing insulating material.

The light base assemblies shall be sealed watertight using the following method and materials or approved equal:

- a. ~~Spot weld~~ Plug the weep hole in the bottom of the base plate hub, if present, with adhesive sealant.
- b. Apply conduit sealant to all conduit openings, with the sealant applied on all sides and between cables to fully seal annular and interstitial spaces.
- c. To insure that no water leaks into the can, use a soft neoprene gasket under the base plate. The gasket shall be covered on both sides with a generous coating of lubricant and sealant to prevent water seepage during freeze-thaw cycles.
- d. Install seal washers with stainless steel cups under the bolt heads. The torque on the six bolts should be approximately 25 inch-pounds,  $\pm 5$  inch-pounds tolerance. A torque wrench must be used.
- e. After installation of the base plate, plug in the edge light. Using clear adhesive sealant, coat the threads of the frangible coupling and screw into place. Plug the weep hole with adhesive sealant. Put adhesive sealant around the bottom of the frangible coupling at the junction with the base plate.
- f. Install the edge light stem securely. Then, using more adhesive sealant, fill the space between the edge light stem and the inside diameter of the frangible coupling. Install the light fixtures with lamp, clean the lenses, align and adjust each optical system according to the manufacturer's instructions

**125-3.8 INSPECTION.** Notify the Engineer in writing and request inspection at least 48 hours prior to installing lighting fixtures, making any splices, or covering any buried or concealed work. Immediately correct any deficiencies found during the inspection.

**125-3.9 RECORD DOCUMENTS.** Maintain at the project site a complete set of contract Plans, Specifications and approved changes thereto. In addition to the above, 2 complete sets of electrical plans shall be maintained for as-built purposes upon which all changes, connections, part numbers and conductor routings shall be legibly shown and noted. Where changes to Plans are involved, make notations to show the dates and authorities approving the changes. Permanently store one set of annotated electrical plans in a dry, secure location at the project site. Deliver the second set to the Engineer.

As-built plans shall show locations of all buried items such as conduit, including any existing active lines encountered. All dimensions shall be from runway and taxiway centerlines or other permanent objects. As-built plans shall include complete wiring diagrams, (both power and control), identifying terminals, cables, and connections. As-built plans shall be kept current as the work progresses.

**125-3.10 SPARE PARTS.** Provide a quantity of spare light fixtures, transformers, and other components equal to 10%, rounded down, of the installed quantity of each piece of equipment or component in the

following list. Deliver spare parts to airport maintenance as directed by the Engineer. Spare parts shall be divided into airport visual aid categories as follows:

- a. **Constant Current Regulators.** Fuses, contactors, and other maintenance components as recommended by the regulator manufacturer
- b. **Runway and Taxiway Elevated Edge Lighting System.** Each type and size of fixture and transformer
- c. **Runway and Taxiway In-Pavement Lighting System.** Each type and size of fixture and transformer
- d. **Runway Elevated and In-Pavement Guard Lighting System.** Each type and size of fixture and transformer
- e. **Illuminated Runway and Taxiway Signs.** LED light bar, power supply, and transformer
- f. **Rotating Beacons.** See L-101 for specification of spare parts where applicable
- g. **Wind Cones.** See L-107 for specification of spare parts where applicable
- h. **Obstruction Lights.** See L-119 for specification of spare parts where applicable

#### METHOD OF MEASUREMENT

**125-4.1** Not Used.

**125-4.2 LUMP SUM.** Lump sum quantities will not be measured for payment per GCP section 90.

**125-4.3 UNIT PRICES.** The quantity to be paid will be the number of units installed, complete, in place, accepted by the Engineer, and ready for operation, or the number of units acceptably removed.

**125-4.4 CONTINGENT SUM.** For spare parts, the total cost of spare parts for each airport visual aid category listed above shall not exceed \$10,000 or 10% of the cost of the visual aid, per FAA Order 5100.38 AIP Handbook. If necessary, reduce the quantity of each spare part within a category equally until the costs are at or below the \$10,000 or 10% limit. Maintain a minimum of one of each size and type of spare part.

#### BASIS OF PAYMENT

**125-5.1** Payment will be made at the Contract unit price for completed work listed in this subsection installed by the Contractor and accepted by the Engineer, according to GCP section 90. 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.

- a. **Items of Work Paid in This Subsection.** Completed and accepted work paid at the contract lump sum, contingent sum, or unit prices.

~~(1) L125.010.0000 Airport Lighting Pay Item. This pay item includes all work required under this item to provide the complete airport lighting system, except work listed below which is paid for under other items.~~

~~(2) L125.020.0000 Regulator, L-828 Pay Item. This pay item includes mounting and electrical connections, with all input control and output circuits.~~

~~(3) L125.025.0000 High Intensity Runway Edge and Threshold Light, L-862 and L-862E Pay Item.~~ This pay item includes L-867 base assembly, grounding lug and connector, baseplate with ground lug, gasket, support column, frangible coupling, L-830 isolating transformer, transformer mounting platform (when shown on Plans), and L-823 cable connectors.

~~(4) L125.030.0000 Medium Intensity Runway Edge and Threshold Light, L-861 and L-861E Pay Item.~~ This pay item includes specified light fixture, L-867 base assembly, grounding lug and connector, baseplate with ground lug, baseplate, ground conductor, bolts, gasket, support column, frangible coupling, L-830 isolating transformer, transformer mounting platform, when shown on Plans, and L-823 cable connectors, drain rock, geotextile fabric, RSC nipples, and NRTL fittings.

~~(5)(1) L125.040.0000 Taxiway Edge Light, L-861T Pay Item.~~ This pay item includes specified light fixture, L-867 base assembly, spacer rings, grounding lug and connector, baseplate with ground lug, ground conductor, bolts, gasket, support column, frangible coupling, L-830 isolating transformer, transformer mounting platform (when shown on Plans), and L-823 cable connectors, weed control disk, drain rock, geotextile fabric, RSC nipples, and NRTL fittings.

~~(6) L125.050.0000 Wind Cone Handhole, L-867, Size D Pay Item.~~ This pay item includes steel cover and gasket, grounding lug and connector, L-823 primary and secondary cable connectors, and PA-4 power adapter, when shown on the Plans and indicated in these Specifications.

~~(7) L125.060.0000, Primary Handhole, L-868, Size B Pay Item.~~ This pay item includes traffic rated steel cover and gasket, grounding lug and connector.

~~(8)(2) L125.070.0000 Remove Runway and Taxiway Light Pay Item.~~ This pay item includes removal of fixtures, transformers, bases, and other associated materials as shown or directed in the Plans. Also includes removal of L-867 handholes.

~~(9) L125.080.0000 Flush Runway Centerline Light, L-850A or L-850B Pay Item.~~ This pay item includes L-868 base assembly, spacer rings, flange ring, L-830 isolating transformer, L-823 cable connectors, concrete work, asphalt patching and sealing.

~~(10)L125.095.0000 Flush Taxiway Light, L-852C, L-852D, L-852F, L-852G, L-852K, or L-852T Pay Item.~~ This pay item includes L-868 base assembly, spacer rings, flange ring, L-830 isolating transformer, L-823 cable connectors, concrete work, asphalt patching and sealing.

~~(11)L125.100.0000 Flush Runway Edge Light, L-850C Pay Item.~~ This pay item includes L-868 base assembly, spacer rings, flange ring, L-830 isolating transformer, L-823 cable connectors, concrete work, asphalt patching and sealing.

~~(12)(3) L125.110.0000 Relocate Airport Sign, Type L-858 Pay Item.~~ This pay item includes L-867 base, frangible couplings, transformer, concrete base, sign faces as shown on the Plans, and removal of existing sign foundation.

~~(13)L125.120.0000 Runway Guard Light, L-804 Pay Item.~~ This pay item includes L-867 base assembly, spacer rings, grounding lug, gasket, support column, frangible coupling, heavy baseplate with ground lug, L-830 isolating transformer, and L-823 cable connectors.

~~(14)(4) L125.130.0000 Airport Sign, Type L-858 Pay Item.~~ This pay item includes sign, L-867 base, frangible couplings, transformer, concrete base, sign faces as shown. Where required, removal of existing sign and foundation is subsidiary to this pay item.

~~(15)~~**L125.140.0000 Power or Communications Pedestal Pay Item.** This pay item includes anchor stake and conduits as shown on the Plans.

~~(16)~~**(5) L125.150.0000 Handhole, L-867, Size B Pay Item.** This pay item includes grounding lug and connector, steel cover with ground lug and ground conductor, and gasket, cover bolts, drain rock, geotextile fabric, RSC nipples, and NRTL fittings.

~~(17)~~**L125.160.0000 Junction Box, Type II Pay Item.** This pay item includes junction box, cover, and grounding as shown on the Plans.

~~(18)~~**(6) L125.170.0000 Spare Parts Pay Item.** This pay item includes spare light fixtures, transformers, and and other components specified paid by actual invoiced material and delivery cost, plus 15% markup. Where applicable, include rotating beacon, wind cone, and obstruction light spare parts specified in sections L-101, L-107, and L-119.

**(7) L125.180.0000, Temporary Runway Lighting System.** Includes temporary lights, all HDPE conduit, assemblies, adapters, couplings, transformers, L-823 cable connectors, cables, and all necessary incidentals to provide and maintain a complete, operable, and acceptable temporary lighting system installation. Includes installation, ongoing maintenance and relocations as required, and removal of temporary equipment.

~~(19)~~**(8) L125.250.0000 Remove Airport Sign Pay Item.** This pay item includes removal of sign, foundation, L-867 base, frangible coupling, transformers, concrete bases, and other associated materials as shown or directed in the Plans.

**b. Items of Work Paid in Other Sections.**

**(1) L-108 and L-110 Pay Items.** All work and materials required to install cable, conduit, and ground rods is paid for under L-108 and L-110 pay items.

**(2) L-109 Pay Items.** All work and materials required to install remote relay assembly and remote control panel are paid for under L-109 pay items.

**(3) P-660 Pay Items.** All work and materials required to install retroreflective markers and cones are paid for under item P-660 unless otherwise indicated.

**c. Subsidiary Work.**

**(1) Portland Cement Concrete.** Portland cement concrete is subsidiary to L-125 items requiring its use. Refer to P-610 for requirements regarding all work and materials to place Portland cement concrete.

**(2) Bedding, Backfill, and Drain Rock.** All bedding, backfill, and drain rock around and below light bases and handholes is subsidiary to the light fixture or handhole installation and no separate measurement or payment will be made.

Payment will be made under:

Item L125.040.0000	Taxiway Edge Light, L-861T – per each
Item L125.070.0000	Remove Runway and Taxiway Light – per each
Item L125.110.0000	Relocate Existing Airport Sign, L-858 – per each
Item L125.130.0000	Airport Sign, L-858 – per each
Item L125.150.0000	Handhole, L-867, Size B – per each
Item L125.170.0000	Spare Parts – per contingent sum
Item L125.250.0000	Remove Airport Sign – per each

## REFERENCES

The publications listed below form a part of these Specifications 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 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
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 150/5345-53	Airport Lighting Equipment Certification Program



# ITEM L-150 WEATHERPROOF OUTLETS

## DESCRIPTION

**150-1.1** Provide a complete and operational system of weatherproof outlets, 120 volts Alternating Current (AC) receptacles, at designated locations as shown on the Plans.

This work shall include all materials and incidentals necessary to place the outlets in operation as a completed unit to the satisfaction of the Engineer. This work shall also include removal and disposal of equipment and materials as shown on the Plans, and testing of the system. Excavation and backfill required for installation of new system components are included in this work.

The system shall include a timer to control the receptacles such that half are energized while the other half are not energized. Set timer to alternate every 20 minutes.

## MATERIALS

**150-2.1 GENERAL.** All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer. Provide materials that are listed for their intended use.

**150-2.2 ELECTRICAL** Unless otherwise noted, comply with L-108 Underground Power Cable for Airports, L-110 Airport Underground Electrical Duct Banks and Conduits, and L-125 Installation of Airport Lighting Systems for handholes, junction boxes, conduit, wiring, grounding, and other associated work and equipment.

Receptacles shall be 20-amp, 120-volt, GFCI type with LED protection indicator. Receptacles shall be rated weather-resistant and provided with a padlock capable, metallic weatherproof-in-use cover plate.

Unless specifically described elsewhere, use standard commercial grade wiring devices, boxes, and other equipment suitable for the location where they will be installed.

~~Provide load center or meter center and electrical service to power weatherproof outlets. Unless otherwise noted, comply with L-160 Electrical Load Centers and L-161 Electrical Meter Centers as applicable. Provide quantity of meters and circuit breakers as indicated on the Plans.~~

**150-2.3 CONCRETE.** Concrete shall be proportioned, placed, and cured per P-610 Concrete for Miscellaneous Structures.

**150-2.4 RACEWAY, CONDUCTORS, AND CONNECTORS.** Provide wiring with copper conductors, type XHHW-2 insulation, in rigid steel or HDPE conduit outdoors and ~~Electrical Metallic Tubing (EMT) or Intermediate Metal Conduit (IMC) indoors~~ except where specifically noted or specified otherwise.

Use solderless lug connections for #6 American Wire Gauge (AWG) copper conductors and larger. Use insulated wire nut connections for #8 AWG copper conductor and smaller.

Identify conductors with the system voltage color code. Conductors larger than #6 AWG may be color-coded by wrapping ends with colored tape at each termination, except that white (or gray) and green insulated conductors shall not be phase-taped for any use other than neutral and ground respectively. Color-coding for the installation shall follow Table 150-1.

**TABLE 150-1. COLOR-CODING FOR CONDUCTORS**

	240/120 volts, 1-phase, 3-wire	<del>208/120 volts, 3-phase, 4-wire</del>
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Phase A	Black	Black
Phase B	Red	Red
Phase C	-	Blue
Neutral	White	White
Ground	Green	Green

### CONSTRUCTION METHODS

**150-3.1** Perform sitework, and installation of distribution panel, equipment supports, wiring systems, and all components and accessories as shown on the Plans and included in these Specifications.

Perform work in accordance with the latest versions of National Electrical Code (NEC) and International Building Code (IBC) as adopted by the State of Alaska and in accordance with other applicable codes and statutes. Unless otherwise indicated, install material and equipment in accordance with the manufacturer's recommendations, instructions, and installation drawings, and in accordance with National Electrical Contractors Association's (NECA) National Electrical Installation Standards (NEIS).

~~When penetrating building wall assemblies with conduit, seal penetrations with Underwriters Laboratories (UL) listed fireproofing materials to maintain fireproofing integrity and watertightness, as applicable.~~

When penetrating electrical enclosures, maintain integrity of enclosure rating and watertightness.

Support receptacle and service equipment on approved types of wall brackets, receptacle posts, and other support structures as shown on the Plans.

Repair damage to finished surfaces where caused by installation of electrical equipment.

Make trenches for placement of underground circuits. Install conduit, wiring, and grounding as shown on the Plans and according to L-108 Underground Power Cable for Airports and L-110 Airport Underground Electrical Duct Banks and Conduits.

**150-3.2 TESTING.** Furnish all necessary testing equipment, labor, materials, supplies, and power for conducting operating tests on the completed installation. Include functional demonstrations of all installed equipment.

Provide operational test and insulation resistance test per L-108 Underground Power Cable for Airports. Repair systems that do not test satisfactorily at no additional cost to the Department and retest.

### METHOD OF MEASUREMENT

**150-4.1 LUMP SUM.** Lump sum quantities will not be measured for payment per GCP section 90.

### BASIS OF PAYMENT

**150-5.1** Payment will be made according to GCP Section 90 at the contract price for provision of the weatherproof outlet system and the following. Payment is for a complete, operating system. The lump sum price is full compensation for removal and disposal of existing materials, furnishing all supplies, material and labor required to prepare the site and to install all equipment and materials to complete the work, including all installation, connections, testing, and commissioning.

#### a. Subsidiary Work.



- (1) Portland Cement Concrete.** Portland cement concrete is subsidiary to L-150 pay items requiring its use. Refer to P-610 for requirements regarding all work and materials to place Portland cement concrete.
- (2) Underground Power Cables.** Underground power cables are subsidiary to L-150 pay items requiring their use. Refer to L-108 for requirements regarding all work and materials to install underground power cables.
- (3) Underground Electrical Duct Banks and Conduits.** Underground electrical duct banks and conduits are subsidiary to L-150 pay items requiring their use. Refer to L-110 for requirements regarding all work and materials to install underground electrical duct banks and conduits.
- (4) Handholes and Junction Boxes.** Handholes and junction boxes are subsidiary to L-150 pay items requiring their use. Refer to L-125 for requirements regarding all work and materials to install handholes and junction boxes.

Payment will be made under:

Item L150.010.0000      Weatherproof Outlets – per lump sum



## ITEM L-155 FLOOD LIGHTING

### DESCRIPTION

**155-1.1** Furnish and install a flood lighting system to include driven pile ~~or concrete~~ bases, poles, bullhorns, fixtures, ~~obstruction lighting,~~ photoelectric cells, lighting contactors, wiring systems, and appurtenances.

This work shall include all sitework, wiring, connections to new service equipment, and all other materials, equipment, accessories, and labor necessary to provide a complete and operational flood lighting system to the satisfaction of the Engineer. This work shall also include ~~removal and disposal of all equipment and materials as shown on the Plans,~~ and testing of the system. Excavation and backfill required for installation of new system components is included in this work.

### MATERIALS

**155-2.1 GENERAL.** All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer. Unless specifically described elsewhere, use standard commercial grade light fixtures, wiring devices, boxes and other equipment that are suitable for the location installed.

Provide new materials, listed for the intended use, that conform to the requirements indicated in these Specifications and as shown on the Plans.

**155-2.2 ELECTRICAL** Unless otherwise noted, comply with L-108 Underground Power Cable for Airports, L-110 Airport Underground Electrical Duct Banks and Conduits, and L-125 Installation of Airport Lighting Systems for handholes, junction boxes, conduit, wiring, grounding, and other associated work and equipment.

**155-2.3 CONCRETE.** Concrete shall be proportioned, placed, and cured per P-610 Concrete for Miscellaneous Structures.

**155-2.4 RACEWAY, CONDUCTORS, AND CONNECTORS.** Provide wiring with copper conductors, type XHHW-2 insulation, in rigid steel or HDPE conduit ~~outdoors and Electrical Metallic Tubing (EMT) or Intermediate Metal Conduit (IMC) indoors~~ except where specifically noted or specified otherwise.

Use solderless lug connections for #6 American Wire Gauge (AWG) copper conductors and larger. Use insulated wire nut connections for #8 AWG copper conductor and smaller.  
Use solderless lug connections for #6 American Wire Gauge (AWG) copper conductors #6 and larger. Use insulated wire nut connections for #8 AWG copper conductors #8 and smaller.  
Identify conductors with the system voltage color code. Conductors larger than #6 AWG may be color-coded by wrapping ends with colored tape at each termination, except that white (or gray) and green insulated conductors shall not be phase-taped for any use other than neutral and ground respectively. Color-coding for the installation shall follow Table 155-1.

**TABLE 155-1. COLOR-CODING FOR CONDUCTORS**

	240/120 volts, 1-phase, 3-wire	<del>208/120 volts, 3-phase, 4-wire</del>
Phase A	Black	Black
Phase B	Red	Red
<del>Phase C</del>	-	Blue
Neutral	White	White

Ground	Green	Green
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**155-2.5 APRON FLOODLIGHT.** Apron floodlight shall be ~~LED, 4000K maximum color temperature, full-cutoff fixture, with light output and accessories as indicated on the Plans.~~

**155-2.6 PHOTOELECTRIC CONTROL.** If shown on the Plans or indicated in these Specifications, the Contractor shall furnish and install an automatic control switch at the location shown on the Plans. The switch shall be a photoelectric type, standard commercially available unit complying with UL 773, with supply voltage rating of 120-277V AC, integral surge protection, -40°F to 140°F temperature range, and EEL-NEMA standard twist-lock mounting base with matching receptacle. The photoelectric switch shall be installed, connected, and adjusted per the manufacturer's instructions.

### CONSTRUCTION METHODS

**155-3.1** Perform work in accordance with the latest versions of National Electrical Code (NEC) and International Building Code (IBC) as adopted by the State of Alaska, in accordance with other applicable codes and statutes, and according to the requirements of the utility company furnishing services to the installation. Secure and pay for all inspections, fees, permits, etc. required by local and state agencies.

Unless otherwise indicated, install material and equipment in accordance with the manufacturer's recommendations, instructions, and installation drawings, and in accordance with National Electrical Contractors Association's (NECA) National Electrical Installation Standards (NEIS).

~~When penetrating building wall assemblies with conduit, seal penetrations with Underwriters Laboratories (UL) listed fireproofing materials to maintain fireproofing integrity and watertightness, as applicable.~~

When penetrating electrical enclosures, maintain integrity of enclosure rating and watertightness.

Repair damage to finished surfaces where caused by installation of electrical equipment.

Make trenches for placement of underground circuits. Install conduit, wiring, and grounding as shown on the Plans and according to L-108 Underground Power Cable for Airports and L-110 Airport Underground Electrical Duct Banks and Conduits.

Apply conspicuity tape to light poles, alternating red/white, spacing on one foot centers, starting at one foot above grade to 12 feet above grade, 6" width, 3M Product 983-32 or equal.

**155-3.2 TESTING.** Furnish all necessary testing equipment, labor, materials, supplies, and power for conducting operating tests on the completed installation. Include functional demonstrations of all installed equipment. Provide operational test and insulation resistance test per L-108 Underground Power Cable for Airports. Repair systems that do not test satisfactorily at no additional cost to the Department and retest.

### METHOD OF MEASUREMENT

**155-4.1 LUMP SUM.** Lump sum quantities will not be measured for payment per GCP section 90.

### BASIS OF PAYMENT

**155-5.1** Payment will be made according to GCP Section 90 at the contract price for provision of the flood lighting system and the following. Payment is for a complete, operating system. The lump sum price is full compensation for removal and disposal of existing materials, furnishing all supplies, material and labor

required to prepare the site and to install all equipment and materials to complete the work, including all installation, connections, testing, and commissioning.

**a. Subsidiary Work.**

- (1) Portland Cement Concrete.** Portland cement concrete is subsidiary to L-155 pay items requiring its use. Refer to P-610 for requirements regarding all work and materials to place Portland cement concrete.
- (2) Underground Power Cables.** Underground power cables are subsidiary to L-155 pay items requiring their use. Refer to L-108 for requirements regarding all work and materials to install underground power cables.
- (3) Underground Electrical Duct Banks and Conduits.** Underground electrical duct banks and conduits are subsidiary to L-155 pay items requiring their use. Refer to L-110 for requirements regarding all work and materials to install underground electrical duct banks and conduits.
- (4) Handholes and Junction Boxes.** Handholes and junction boxes are subsidiary to L-155 pay items requiring their use. Refer to L-125 for requirements regarding all work and materials to install handholes and junction boxes.

Payment will be made under:

Item L155.010.0000      Flood Lighting – per lump sum



## ITEM L-160 ELECTRICAL LOAD CENTERS

### DESCRIPTION

**160-1.1** Furnish and install load center assemblies at the locations indicated in the Plans. ~~Modify existing load centers when indicated.~~

The work shall include all materials and incidentals necessary to place the system in operation as a completed unit to the satisfaction of the Engineer. This work shall also include removal and disposal of all equipment and materials as shown on the Plans, and testing of the system. Excavation and backfill required for installation of new system components is included in this work.

Use load centers of the following types as shown on the Plans in load center detail sheets:

- ~~a. Type 1. Pad mounted with underground service (large)~~
- ~~b. —~~
- ~~c. Type 1A. Pad mounted with underground service (small)~~
- d.a. Type 2.** Post mounted with underground service
- ~~e. Type 3. Pole mounted with overhead service~~

### MATERIALS

**160-2.1 GENERAL.** All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.

**160-2.2 ELECTRICAL** Unless otherwise noted, comply with L-108 Underground Power Cable for Airports, L-110 Airport Underground Electrical Duct Banks and Conduits, and L-125 Installation of Airport Lighting Systems for handholes junction boxes, conduit, wiring, grounding, and other associated work and equipment.

**160-2.3 CONCRETE.** Concrete shall be proportioned, placed, and cured per P-610 Concrete for Miscellaneous Structures.

**160-2.4** Conform to the standards of National Electrical Code (NEC), the National Electrical Safety Code (NESC), and local safety codes as adopted and amended by the authority having jurisdiction. Use materials that conform to applicable National Electrical Manufacturers Association Standards (NEMA) and American National Standards Institute (ANSI) standards, the Materials Certification List, the Plans, specifications, and the following:

- a. Grout.** Use non-shrink, non-corrosive, non-metallic, cement-based grout meeting requirements of American Society for Testing and Materials (ASTM) C1107, except develop a 28-day compressive strength of 9,000 psi when tested according to AASHTO T 106 or ASTM C109.
- b. Wood Posts.** ~~6" diameter schedule 40 galvanized steel pipe, filled with concrete. Construction grade, 6 x 6-inch nominal dimension S4S Douglas Fir, Hem Fir, Western Larch, Western Hemlock, Mountain Hemlock or Southern Pine meeting Standard Grading and Dressing Rules, West Coast Lumber Inspection Bureau. Treat posts using preservatives and treatment processes in accordance with American Association of State Highway Transportation Officials (AASHTO) M 133 and Best Management Practices for the Use of Treated Wood in Aquatic Environments (BMPs), published by the Western Wood Preservers Institute, 12503 SE Mill Plain Blvd., #205, Vancouver, WA 98684 (Phone: 360-693-9958). Treat products according to American Wood~~

~~Protection Association (AWPA) Standard U1, Commodity Specification A: Sawn Products for soil and freshwater applications meeting Use Category 4B.~~

- ~~**c. Load Center.** NEMA 3R enclosure constructed of zinc-coated A60 finish sheet steel per ASTM A653 and ASTM A924, with no external screws, bolts, or nuts.~~

~~Shop coat cabinet components with a 2-part urethane paint undercoat and 2-part urethane finish coats. Finish coats must be standard white for removable panels and non-gloss silver-gray, closely matching FSS No. 5950 Color No. 36622, for the enclosure.~~

~~The load center must be labeled as a unit by a State of Alaska approved independent electrical testing laboratory (such as UL, ETL, CSA, etc.) defined by ANSI Standard Z34.1 *Third-Party Certification Programs for Products Processes and Services* and conform to applicable published standards noted herein, the Plans, and Special Provisions. The load center must be marked with the maximum available fault current and the date the fault current calculation was performed. The marking must be sufficiently durable to withstand the environment. The load center must be labeled as service entrance equipment.~~

- ~~**d.c. Panelboards.** Load panels in load centers must conform to FSS W-P-115C, Type 13R - Circuit Breaker Panelboards; Underwriters Laboratories (UL) 67 - *Panelboards*; and NEMA PB1 - *Panelboards with Molded Case Circuit Breakers*. The rated voltage of the panels must be as noted on the load center summary in the Plans, 120/240volt or 240/480 volt single phase or 120/208 volt or 277/480 volt three phase. The ampacity rating of panels must not be less than the ampacity noted on the load center summary, 400-200 amps minimum, at rated voltage. Provide separate copper neutral and ground buses.~~

~~A label must be applied to the exterior of the panelboard indicating the potential arc flash hazard at the enclosure. The label must comply with NEC 110.16(A) and must include the information required by NFPA 70E, including the estimated arc flash incident energy as calculated per IEEE 1584.~~

- ~~**e.d. Circuit Breakers.** Use bolt-on type circuit breakers. The series rated interrupting capacity of the circuit breakers in the panels must not be less than shown on the load center summary, or 10,000 ampere interrupting capacity (AIC) minimum, at rated voltage. Ensure that the circuit breakers installed are rated to be operated in the ambient temperatures to which they will be exposed.~~

~~Use circuit breakers that are molded-case thermal-magnetic types with single-trip indicating switch handle. They must have an enclosed toggle type operating mechanism with quick-make/quick-break action and have a trip-free disconnect from the switch handle that will prevent the contacts from being held in the closed position. The circuit breakers must have the frame size, interrupting capacities, and trip rating clearly marked on the breaker. Multi-pole circuit breakers must have a common trip mechanism.~~

~~Contacts must be silver alloy enclosed in an arc quenching chamber. Overload trip ratings must be self-compensating for ambient temperatures from 14 °F to 140 °F. Circuit breakers must be 240 or 277-volt maximum rated for 120/240/277-volt circuits, whichever is applicable, and have an interrupting capacity (RMS - symmetrical) of not less than 10,000 amperes. They must have not less than 480-volt rating for circuits above 277 volts and have an interrupting capacity (RMS - symmetrical) of not less than 14,000 amperes.~~

- ~~**f.e. Contactor.** Electrically-held type consisting of an operating coil, a laminated armature, contacts, and terminals. Contacts must be fine silver, silver alloy, or superior alternative material rated to switch the specified load, 30 amperes minimum at rated voltage, and be normally open, unless otherwise noted. Contactor coils must be rated for operation at 240 volts Alternating Current (AC).~~



**~~g.f. Meters.~~** ~~The meter/main breaker combination service entrance unit shall be as shown on the Plans, bottom (underground) load type, 200 A, 120/240 volts, single phase, with 2-pole, 200 amperes, main breaker and 4-jaw kilowatt-hour (kWh) meter, or as shown on the Plans. The service entrance enclosure shall be rain tight NEMA 3R rated. Equip all meter sockets mounted in Type 1 and Type 1A load centers with internal mounted meters with manual circuit closing devices. The devices may be either the link or lever type. Do not use the horn and sliding types. Equip all load centers with internal mounted meters with safety sockets (that is, provisions for de-energizing the meter jaws). The test section cover must be sealable with a 0.047-inch stainless steel bail.~~

**~~h. Transformers.~~** ~~Transformers in load centers containing load panels of different nominal voltages must be isolated winding type with primary and secondary voltages and kilo-volt amperes (kVA) ratings as noted on the Plans. Transformers must carry rated volt-amperes continuously without exceeding a 240°F temperature rise above a 100°F ambient temperature.~~

~~Where installed outside of the load center enclosure, use a non-ventilated transformer enclosure fabricated from aluminum, stainless steel, or galvanized steel and filled with high melting point, thermal setting, or epoxy insulating compounds to prevent moisture from entering the winding enclosure. Coat enclosures fabricated from sheet metal with moisture resistant paint. Insulate transformer leads with non-hygroscopic material and extend them 9 inches beyond the winding chamber seal.~~

**~~i.g. Conductors.~~** ~~Stranded copper with either type XHHW-2 or RHW insulation.~~

**~~j.h. Conduit.~~** ~~Galvanized rigid conduit made of mild steel meeting UL standard UL-6.~~

**~~k.i. Terminals.~~** ~~Size all terminals according to the amperage ratings of the conductor used. They must be suitable for termination of copper and aluminum conductors.~~

**~~l. Photoelectric Controls.~~** ~~Photoelectric controls shall be standard commercially available unit complying with UL 773, with supply voltage rating of 120-277V AC, integral surge protection, -40°F to 140°F temperature range, and EEL-NEMA standard twist-lock mounting base with matching receptacle. The photoelectric switch shall be installed, connected, and adjusted per the manufacturer's instructions.~~

**~~m.j. Galvanizing.~~** ~~Hot-dip galvanize all anchor bolts, nuts, washers, tie-rods, clamps, and other miscellaneous ferrous parts in conformance with AASHTO M 232. After galvanizing, ensure that the bolt threads accept galvanized standard nuts without requiring tools or causing removal of protective coatings.~~

~~Galvanize rigid metal conduit in conformance with AASHTO M 232.~~

~~Hot-dip galvanize structural steel shapes, plates, bars and their products according to AASHTO M 111.~~

~~Repair damage to galvanized coatings per AASHTO M 36.~~

**~~n.k. Equipment List(s) and Drawings.~~** ~~Within 30 days after the Contract award, submit eight (8) collated copies of a portfolio of equipment and materials proposed for installation to the Department for review and approval. Include a table of contents in the portfolio(s) that includes each item's intended use(s) and the following:~~

**~~(1) Materials on the Qualified Products List.~~** ~~A description that includes product name, manufacturer, model or part number, and the conditions listed for approval.~~

~~(2)(1) **Materials Not on the Qualified Products List:** Catalog cuts that include the manufacturer's name, type of product, size, model number, conformance specifications, and other data as may be required, including manufacturer's maintenance and operations manuals, or sample articles.~~

~~(3)(2) **Materials Not Requiring Certification:** Incidental materials incorporated into the work (such as nuts, ties, bolts, washers, etc.) must meet all applicable Specifications and be installed per all manufacturer's recommendations. Certification is not needed unless required by the Special Provisions or requested by the Engineer.~~

## CONSTRUCTION METHODS

**160-3.1** Install load centers at the location and position shown on the Plans. Any deviation from the plan location must be coordinated with and approved by the serving utility and the Engineer.

Furnish conduit, conductors, contactors, breakers, ~~transformers~~, and all other necessary materials at all new and modified load centers to complete the installation.

~~Install a rigid metal conduit of the size shown in the Plans at a 30-inch depth from the load center and extend it to a location 2 feet from the power source. Install a pull rope in the conduit, cap the end, and mark the terminus with a 2-inch x 4-inch stake or 1-inch rebar, 3 feet long. Extend the end of the stake or bar 1 inch above the ground. When the servicing utility requires the complete conduit and weather head to be in place on the designated service pole, furnish and install all materials required by the utility. The additional work and materials are subsidiary to the load center bid item.~~

Where the service is to be installed on a utility-owned pole, coordinate the positioning of the riser and service equipment with the service utility.

House circuit breakers, switches, and contactors in a NEMA 3R type enclosure listed by an approved independent electrical testing laboratory as service equipment with a hinged and locking front cover. Indelibly label panel covers with the circuit number. Legend plates, labels, and signs must be engraved plastic or metal fastened with screws, non-cold-susceptible adhesive, or component mounting hardware.

~~Size and wire load center cabinets to serve all of the circuits shown in the Plans. Each cabinet must be a single enclosure subdivided to form compartments as required. Include hinged lockable door(s) or panel cover(s) with provision for a padlock with a 5/16-inch diameter shackle for each compartment. Circuit breaker ratings must be as shown in the load center summary for each location.~~

~~Wire and equip load centers with commonly metered thaw wire and lighting circuits with separate contactors, selector switches, and terminal blocks for lighting and thaw wire circuits. Control the thaw wires as described in D-760 Thaw Pipe and Thaw Wires.~~

Where a meter is required, furnish and install a meter socket that is acceptable to the serving utility, complete with sealing rings. Do not mount the meter socket on doors or removable panels.

~~Load centers containing contactors must have contactor control switches mounted in the load distribution section. Control switches for systems having automatic controls (for example, photo cell, thermostats, or time controls) must be 3-position types with the positions labeled "On", "Off" and "Auto". Control switches for manual control only must be a 2-position type with positions labeled "On" and "Off". Label each switch to identify function being controlled.~~

~~Mount transformer fuses in dead front fuse holders with lighted blown fuse indicators, where required. Label them to indicate function and fuse amp rating.~~

Install ~~a two~~ 3/4-inch x 10-foot copper clad ground rods ~~inside the base readily accessible through the removable cover, or adjacent to the supporting post. Install one or two rods as required by the serving utility or as shown on the Plans. Connect ground rod to ground bus with a soft-drawn copper grounding electrode conductor sized per NEC, #6 AWG minimum. Bond all non-current carrying metal parts of the load center to the ground bus. Install main bonding jumper between the ground and neutral bus.~~

~~Locate the photo cell for lighting control on the nearest light standard or top of the load center as shown on the load center summary. Orient it to the unobstructed northern sky. Submit for approval the method of attachment of the conduit to the load center. Use either a 3/C or a 5/C #14 AWG cable to connect the photo cell to the load center. When the photo cell is on a lighting standard with a slip base or frangible coupling style base, use an approved break-away disconnect in the base of the light standard. Restrain the cable in a similar manner as the illumination cable in the pole base.~~

Provide a typed circuit directory for each load panel inside of the ~~load center door, protected with a plastic cover, describing each circuit, with even and odd numbered circuit breaker positions shown on separate parts of the directory. Provide a power and control one-line diagram protected by a laminated plastic cover inside the load center. Include the following information on the directory and one-line diagram: Load center identification (A, B, etc.), Project Name, Project number (Federal/State) and Service Voltage.~~

Apply conspicuity tape to posts, alternating red/white, spacing on one foot centers for full length of post, 3" width, 3M Product 983-32 or equal.

**160-3.2 TESTING.** Provide operational test and insulation resistance test per L-108 Underground Power Cable for Airports. Repair systems that do not test satisfactorily at no additional cost to the Department and retest.

## METHOD OF MEASUREMENT

**160-4.1 LOAD CENTER.** The quantity to be paid will be the actual number of load centers, ~~modified load centers, and transformers~~ completed and accepted as shown on the Plans or as directed by the Engineer.

## BASIS OF PAYMENT

**160-5.1** Payment will be made according to GCP section 90 at the contract price for provision of the load center and the following. Payment is for a complete, operating unit. The price is full compensation for furnishing all supplies, material and labor required to prepare the site and to install all equipment and materials to complete this item, including all installation, connections, testing, and commissioning. Load circuits, consisting of conduits and conductors attached to the load centers and photoelectric controls, and terminations of field wiring, are subsidiary to other work.

### a. Subsidiary Work.

- (1) Portland Cement Concrete.** Portland cement concrete is subsidiary to L-160 pay items requiring its use. Refer to P-610 for requirements regarding all work and materials to place Portland cement concrete.
- (2) Underground Power Cables.** Underground power cables are subsidiary to L-160 pay items requiring their use. Refer to L-108 for requirements regarding all work and materials to install underground power cables.
- (3) Underground Electrical Duct Banks and Conduits.** Underground electrical duct banks and conduits are subsidiary to L-160 pay items requiring their use. Refer to L-110 for

requirements regarding all work and materials to install underground electrical duct banks and conduits.

**(4) Handholes and Junction Boxes.** Handholes and junction boxes are subsidiary to L-160 pay items requiring their use. Refer to L-125 for requirements regarding all work and materials to install handholes and junction boxes.

Payment will be made under:

Item L160.030.0000      Load Center, Type 2 – per each

## ITEM P-151 CLEARING AND GRUBBING

### DESCRIPTION

**151-1.1** This item shall consist of clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the Plans or as required by the Engineer.

Clearing shall consist of the cutting and removal of all trees, ~~grinding of stumps, brush, and logs, hedges, and~~ the removal of fences and other loose or projecting material from the designated areas. The grubbing of stumps and roots will not be required.

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 Engineer 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 by burning or otherwise.

Selective tree removal requires the hand cutting (topping) of all types of trees either by chain saw or by other approved conventional hand clearing methods. Dispose of the tree in the same manner as clearing and grubbing spoil materials.

### CONSTRUCTION METHODS

**151-2.1 GENERAL.** The areas to be cleared or cleared and grubbed shall be staked or otherwise marked on the ground at the direction of the Engineer. The Engineer will flag or mark each tree designated for selective tree removal. The clearing and grubbing shall be done far enough ahead of the earthwork operation to permit cross-sectioning prior to excavation or embankment. Mechanical brush cutting equipment may be used for clearing. Dozers or other mechanical equipment not specifically designed for brush cutting may not be used.

Vegetation clearing will follow the USFWS Recommended Time Periods for Avoiding Vegetation Clearing in Alaska in order to protect Migratory Birds unless the USFWS has been consulted to determine the most appropriate method to avoid impacts to nesting birds. Clearing and grubbing is not permitted within the migratory bird window of May to July 15: except as permitted by Federal, State, and local laws when approved by the Engineer.

~~Debris from mechanical brush cutting equipment less than 4 feet long by 4 inches in diameter may remain in place outside of Runway and Taxiway Safety Area surfaces except as specified in areas to be embanked. All other spoil materials generated by clearing or by clearing and grubbing shall be disposed of by burning, when permitted by local laws, or by removal to approved disposal areas, except that stumps may be ground in place.~~ When burning of material is permitted, it shall be burned under the constant care of competent watchmen so that the surrounding vegetation and other adjacent property will not be jeopardized. Burning shall be done according to all applicable laws, ordinances, and regulations. Before starting any burning operations, the Contractor shall notify the agency having jurisdiction.

~~As far as practicable, waste concrete and masonry shall be placed on slopes of embankments or channels. When embankments are constructed of such material, this material shall be placed according to requirements for formation of embankments.~~ Any broken concrete or masonry which 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 Engineer 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 Engineer, permission in writing from the property owner for the use of private property for this purpose.

If the Plans or the Specifications require the saving of merchantable timber, the Contractor shall trim the limbs and tops from designated trees, saw them into suitable lengths, and make the material available for removal by others.

Perform blasting in accordance with all Federal, state, and local safety regulations. Submit notice 15 days prior to starting work. Submit a Blasting Plan, prepared and sealed by a registered professional Engineer that includes calculations for overpressure and debris hazard. Obtain written approval prior to performing any blasting and notify the Engineer 24 hours prior to blasting. Include provisions for storing, handling and transporting explosives as well as for the blasting operations in the plan. The Contractor is responsible for damage caused by blasting operations.

The Contractor shall remove existing structure and utilities that are identified to be removed or demolished, except when another entity is identified in the Contract to accomplish the work.

**151-2.2 CLEARING.** The Contractor shall clear the staked or indicated area of all objectionable materials. Trees unavoidably falling outside the specified limits must be cut up, removed, and disposed of in a satisfactory manner. In order to minimize damage to trees that are to be left standing, trees shall be felled toward the center of 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. Stumps shall be ground in place.~~ The grubbing of stumps and roots will not be required. The final condition of the cleared area shall be easily maintainable by a commercial brush cutter mounted on a loader.

Fences shall be removed and disposed of when directed by the Engineer. 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 designated location if the fence is to remain the property of a local owner.

**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 shall be removed, ~~except where embankments exceeding 4 feet in depth are to be made in areas that are not subject to aircraft or vehicle traffic loadings and are unpaved. For embankments that are greater than 4 feet in depth, which are not subject to aircraft or vehicle traffic loadings and are unpaved, 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 1.5 inches in diameter shall be grubbed out to a depth of at least 18 inches below the finished subgrade or slope elevation.

Any buildings, tie-downs, and miscellaneous structures that are shown on the Plans to be removed shall be demolished or removed, and all materials therefrom shall be ~~disposed of either by burning or otherwise~~ removed from the site. The cost is incidental to this item. The remaining or existing foundations, wells, cesspools, and all 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 below the existing surrounding ground. Any broken concrete, blocks, or other objectionable material ~~which 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 remaining after the grubbing operation in embankment areas shall have the sides broken down to flatten out the slopes, and shall be filled with suitable material, moistened and properly compacted in layers to the density required in Item P-152. The same construction procedure shall be applied to all holes remaining after grubbing in excavation areas where the depth of holes exceeds the depth of the proposed excavation.

## METHOD OF MEASUREMENT

**151-4.1** Measure according to GCP Section 90 and the following:

- a. **Acre.** The area acceptably cleared, or cleared and grubbed, measured on the ground surface. Only areas shown on the Plans, or areas cleared at the Engineer's direction will be measured. Islands

of existing cleared areas, such as lakes, ponds, existing stream beds, and roads and trails within the clearing limits of more than 60 square yards will not be included as pay areas.

- b. **Each.** The number of designated trees acceptably removed, regardless of size.
- c. **Lump Sum.** Lump sum items will not be measured for payment.

**BASIS OF PAYMENT**

**151-5.1** At the contract lump sum or unit price, for each of the pay items listed below that are shown in the bid schedule. Clearing and Grubbing is subsidiary to Item P-152 pay items.

Payment will be made under:

Item P151.010.0000      Clearing – per acre





## ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

### DESCRIPTION

**152-1.1** This item consists of excavation, hauling, embankment (or waste disposal), placement, grading and compaction of all materials required to construct runway safety areas, taxiway safety areas, runways, taxiways, aprons, drainage, buildings, roadways, parking, and other work. Construct according to the specifications, and conform to the dimensions and typical sections shown on the Plans.

### MATERIALS

**152-2.1 MATERIAL DEFINITIONS.** The Contract will designate material to be removed from within the project lines and grades as classified excavation (common, rock or muck) or as unclassified excavation. Material obtained from outside the project lines and grades is borrow.

All material shall be described as defined below, but no quantity of material shall be defined or paid in more than one category:

- a. **Unclassified Excavation.** All material, regardless of its nature, which is not paid for under another contract item. May include common, rock or muck.
- b. **Common Excavation.** Suitable material such as silt, sand, gravel, and granular material that does not require blasting or ripping. Not rock or muck.
- c. **Rock Excavation.** Rock that cannot be excavated without blasting or ripping, and boulders containing a volume of more than 0.5 cubic yard.
- d. **Muck Excavation.** Soil, organic matter, and other material not suitable for embankment or foundation material, including material that will decay or produce subsidence in the embankment such as stumps, roots, logs, humus, or peat.
- e. **Drainage Excavation.** Excavation made for the primary purpose of controlling drainage including: intercepting, inlet or outlet ditches; temporary levee construction; or any other type as shown on the Plans.
- f. **Borrow.** Suitable material that is required for the construction of embankment or for other portions of the work. Borrow material shall be obtained ~~from sources within the limits of the airport property but outside the project lines and grades,~~ or from sources outside the airport property.
- g. **Foundation Soil.** In-situ soil or undisturbed ground.
- h. **Ditch Lining.** Use crushed or naturally occurring stones that are sound and durable, are not larger than 8 inches in greatest dimension, and containing not more than 50% by weight passing a 3-inch sieve and not more than 5% by weight passing the 1-inch sieve as determined by ATM 304, or as accepted by the Engineer.

**152-2.2 UNSUITABLE MATERIAL.** Material that does not meet the testing requirement for suitable material. Material containing vegetable or organic matter, such as muck, peat, organic silt, or sod is considered unsuitable for use in embankment construction. Material that is contaminated by hazardous substances, including fuel or oil, in greater quantity than state and federal standards allow is considered unsuitable for use.

**152-2.3 SUITABLE MATERIAL.** Suitable material may be obtained from classified excavation, unclassified excavation, or borrow. The Engineer will approve material as "suitable" for use in embankment when the material meets the following criteria:

- a. Sand, rock, gravel, silt, concrete, asphalt pavement, and other inorganic material;
- b. Gradation of 100% by weight passing 6 inch screen; and
- c. Meets definition of Non-Frost Susceptible in GCP Subsection 10-03, except delete "6%" and replace with "10%" (passing No. 200 screen).
- ~~c.~~ d. Material is well graded, with an even distribution of material sizes, and can be compacted with a minimal amount of voids.

The Engineer may, in their discretion, approve oversize material as "suitable" for use in embankment when the material meets the following criteria:

- a. Sand, rock, gravel, silt, concrete, asphalt pavement, and other inorganic material;
- b. Gradation of 100% by weight passing 24-inch screen;
- c. Meets definition of Non-Frost Susceptible in GCP Subsection 10-03, except delete "6%" and replace with "10%" (passing No. 200 screen); and
- d. ~~Rock~~ Material is well graded with an even distribution of ~~rock~~ material sizes, and can be compacted with a minimal amount of voids.

## CONSTRUCTION METHODS

**152-3.1 GENERAL.** Perform all necessary clearing and grubbing in accordance with Item P-151, and construction surveying in accordance with Item G-135, including staking of lines and grades, prior to beginning excavation, grading, and embankment operations in any area.

The suitability of material to be placed in embankments shall be subject to approval by the Engineer. Material with organics, when approved by the Engineer as suitable to support vegetation, may be used on top of the embankment slope.

Unsuitable material shall be disposed of in waste areas shown on the Plans or in locations acceptable to the Engineer. Material contaminated by hazardous substances shall require special handling and disposal off-site, performed according to ~~GCP Subsection 70-11.f.~~ CPSS Section 10.04 Article 4.10 and using methods acceptable to the Engineer.

- a. **Waste Areas.** All waste areas shall be graded to allow positive drainage of the area and of adjacent areas. Where storm water collection systems exist, grade areas to drain to inlets. The surface elevation of waste areas shall not extend above the surface elevation of adjacent usable areas of the airport, unless specified on the Plans or approved by the Engineer. Unsuitable material shall not be left in windrows or piles, and shall not extend into the Obstacle-Free Zone as shown on the plans.

All waste areas shall be protected from erosion according to the SWPPP. Areas where seeding is called for, in which the top layer of soil material has become compacted, by hauling or other activities of the Contractor shall be scarified and disked to a depth of 4 inches, in order to loosen and pulverize the soil.

The Contractor shall obtain all permits required for placing waste in areas they choose, and which are not covered by Department obtained permits. When the Contractor is required to locate a disposal area outside the airport property limits at his/her own expense, he shall obtain and file with the Engineer, permission in writing from the property owner for the use of private property for this purpose.

- b. **Utility Work.** Utility work shall be performed, and compensation claims for utility work made, according to ~~GCP Subsection 50-06~~ CPSS Section 10.04 Article 4.17. If it is necessary to work thorough or around existing utilities or associated structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve the utilities or provide temporary services. When utilities not shown on the Plans are encountered, the Contractor shall immediately notify the Engineer, and the Engineer will determine the disposition of the utility. The Contractor shall, at no additional cost to the Department, satisfactorily repair or pay the cost of all damage to utilities or associated structures which may result from any of the Contractor's operations.

**152-3.2 EXCAVATION.** No excavation shall be started until the Contractor has construction surveyed the work, including staking the lines and grades, and the Engineer has reviewed stakes, elevations and measurements of the ground surface. As required in ~~GCP Subsection 40-04~~ CPSS Section 10.04 Article 4.25, all Useable Excavation of suitable material shall be used in the formation of embankment or for other purposes shown on the Plans. All unsuitable material shall be disposed of in waste areas as shown on the Plans or as directed by the Engineer.

When the volume of the Useable Excavation exceeds that required to construct the embankments to the grades indicated, the excess material shall be used to grade the waste areas of ultimate development or then disposed of ~~as directed off-site~~. When the volume of Useable Excavation is not sufficient for constructing the fill to the grades indicated, borrow shall be used to make up the deficiency.

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. All temporary drains and drainage ditches shall be constructed and maintained according to the SWPPP.

In cuts, all loose or protruding rocks on the back slopes shall be scaled or otherwise removed to line of finished grade of slope. All cut-and-fill slopes shall be uniformly dressed to the slope, cross section, and alignment shown on the Plans or as directed by the Engineer.

Where geotextile fabric is encountered adjacent to new work requiring geotextile fabric, carefully excavate soil and provide a 3 foot overlap with new fabric. Where geotextile fabric is encountered under taxiways being removed, undisturbed fabric may remain in place; excavated fabric shall be disposed of off-site.

- a. **Selective Grading.** When selective grading is required, the more suitable material as designated by the Engineer shall be used in constructing the upper layers of the embankment or pavement structure. 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.
- b. **Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for runways, taxiways, safety areas, subgrades, roads, shoulders, or any areas intended for turfing shall be excavated to a minimum depth of 12 inches below the subgrade, or to the depth directed by the Engineer. Muck, peat, matted roots, or other yielding material that is unsatisfactory for foundation soil compaction, shall be removed to the depth specified. Unsuitable materials shall be disposed of at locations shown on the Plans. The excavated area shall be backfilled with suitable material, obtained from the grading operations or borrow areas and thoroughly compacted as specified. Where rock cuts are made and backfilled with suitable material. Any pockets created in the rock surface shall be drained according to the details shown on the Plans. The material removed will be paid as P152.010.0000 Unclassified Excavation.
- c. **Overbreak.** Overbreak, including slides, is that portion of any material displaced or loosened beyond the finished work, as planned or authorized by the Engineer. All overbreak shall be graded or removed by the Contractor and disposed of as directed by the Engineer. Payment will not be made for the removal and disposal of overbreak which the Engineer determines as avoidable. Unavoidable overbreak will be paid as P152.010.0000 Unclassified Excavation.
- d. **Removal of Structures and Utilities.** The Contractor shall accomplish the removal of existing structures and utilities that are specified to be removed or demolished, except when another entity

is identified in the Contract to accomplish the work. All existing structural foundations shall be excavated and removed to a depth at least 2 feet below the top of subgrade or as indicated on the Plans, and the material disposed of as directed. Holes left after removing foundations shall be backfilled with suitable material and compacted as specified. The material will be paid as P152.010.0000 Unclassified Excavation.

- e. **Foundation Soil Compaction Requirements.** In areas of excavation, the top 6 inches of foundation soil under areas serving aircraft or vehicle traffic loadings shall be compacted to a density of not less than 95% of the maximum density as determined by ATM 207, ATM 212, or ATM 309. The in-place field density and moisture content shall be determined according to ATM 213.

Compaction of the foundation soil is a subsidiary cost to excavation.

The Engineer may direct the Contractor to over excavate foundation soil that is soft or compresses excessively, and to backfill excavation with compacted suitable material. The material will be paid as P152.010.0000 Unclassified Excavation.

- f. **Blasting.** Blasting will be permitted only when proper precautions are taken for the safety of all persons, the work, and the property. The Contractor is responsible for blasting operations including the requirements of GCP Subsection 70-10. All damage done to the work or property shall be repaired at the Contractor's expense. All operations of the Contractor in connection with the transportation, storage, and use of explosives shall conform to all federal, state, local regulations, explosive manufacturers' instructions, and approved permits.

The Contractor shall submit a Safety Plan that includes descriptions of road and runway closures, warning signals; and plans for notification of affected local, state, and federal agencies, the airport manager, and other interested parties. Discuss in the Safety Plan methods for protection of life and health, public and private property, new work or existing work on the project, nearby structures, wetlands, waters and wildlife. When working within airport property include an emergency response contingency to clear runways of debris, to repair damaged navigational or visual aids; and get a NOTAMs before blasting. Hold a safety meeting prior to commencement of blasting operations to address safety issues.

In each distinct blasting area the Contractor shall submit a blasting plan, prepared by a qualified blaster, to the Engineer. This plan must consist of hole size, depth, spacing, burden, type of explosives, type of delay sequence, maximum amount of explosive on any one delay period, depth of rock, and depth of overburden if any. The maximum explosive charge weights per delay included in the plan shall not be increased without submitting a revised blasting plan to the Engineer.

When blasting, the Safety Plan and the Blasting Plan shall conform to FAA Order 7400.2 *Procedures for Handling Airspace Matters*, Chapter 27, and AC 150/5370-2 *Operational Safety on Airports During Construction*.

The Contractor shall keep a record of each blast fired, its date, time, and location; the amount of explosives used, maximum explosive charge weight per delay period, and, where necessary, seismograph records identified by instrument number and location. These records shall be made available daily to the Engineer.

The Engineer will keep the submitted plans and records, and has authority to review and reject plans.

**152-3.3 BORROW SOURCES.** Borrow sources within the airport property if available will be identified on the Plans. Excavation of borrow on airport property shall be made only at these identified locations and within the lines and grades staked.

~~Borrow sources outside of airport property may be identified in the Contract according to GCP Subsection 60-02. The Contractor shall furnish additional borrow sources if necessary.~~

Removal of overburden and waste material, permit costs, mineral royalties, and other costs of material source development are subsidiary and shall be included in the unit price for borrow.

**152-3.4 DRAINAGE EXCAVATION.** Drainage excavation for intercepting, inlet or outlet drains; for temporary levee construction; or for any other type as designed or as shown on the Plans. The work shall be performed in the proper sequence with the other construction and according to the SWPPP. All suitable material shall be placed in embankment fills; unsuitable material shall be placed in waste areas or as directed by the Engineer. Intercepting ditches shall be constructed prior to starting adjacent excavation operations. All necessary work shall be performed to secure a finish true to 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.

Place and spread ditch lining materials so that the finished face is uniform and conforms to the lines and slope shown on the Plans or as directed.

**152-3.5 PREPARATION OF EMBANKMENT AREA.** ~~In areas of Clearing and Grubbing, completely break up the subgrade by plowing or scarifying to a minimum depth of 6 inches. Where an embankment is to be constructed to a height of 4 feet or less, or where the embankment supports asphalt or concrete paving areas serving aircraft or vehicle traffic loadings, compact the subgrade as indicated in Subsection 152-3.2e. Where the height of fill is greater than 4 feet and the embankment does not support asphalt or concrete paving areas serving aircraft or vehicle traffic loadings, compact the subgrade to the density of the surrounding ground before construction of embankment.~~

When new embankment is placed on slopes steeper than 4:1, the existing ground shall be continuously benched over the areas as the work is brought up in layers. Benching shall be of sufficient width to permit placing of material and compacting operations. Each horizontal cut shall begin at the intersection of the original ground and the vertical side of the previous bench. Material thus cut out and deemed suitable shall be blended and incorporated into the new embankment.

Place geotextile fabric as shown on the Plans over compacted subgrade prior to the formation of new embankments.

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.

**152-3.6 FORMATION OF EMBANKMENTS.** Embankments shall be formed in successive horizontal layers of not more than 8 inches in loose depth for the full width of the cross section, unless otherwise approved by the Engineer.

The grading and compaction operations shall be conducted, and the various soil strata shall be placed, to produce an embankment as shown on the typical cross section or as directed by the Engineer. Materials such as brush, hedge, roots, stumps, grass and other unsuitable material, shall not be incorporated or buried in the embankment.

- a. **Suspension of Operations.** Operations on earthwork shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing, moisture content or other unsatisfactory conditions of 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 proper surface drainage.

- b. **Soft Foundations.** When embankments are to be constructed across wet or swampy ground, which will not support the weight of heavy hauling and spreading equipment, the Contractor shall use methods of embankment construction, and use hauling and spreading equipment, that will least disturb the soft foundation (defined as having a California Bearing Ratio less than 3). When soft foundations are encountered, and when approved by the Engineer, the lower part of the fill may be constructed by dumping and spreading successive vehicle loads in a uniformly distributed layer of a thickness not greater than that necessary to support the vehicle while placing subsequent layers, after which the remainder of the embankment shall be constructed in layers and compacted as specified. The Contractor shall not be required to compact the soft foundation, and at the Engineer's option, may not be required to clear and grub.
- c. **Moisture.** The material in the layer being placed shall be within  $\pm 2\%$  of optimum moisture content before rolling to obtain the prescribed compaction. In order to achieve a uniform moisture content throughout the layer, wetting or drying of the material and manipulation shall be performed when necessary. Should the material be too wet to permit proper compaction or rolling, all work on all of the affected portions of the embankment shall be delayed until the material has dried to the required moisture content. Watering of dry material to obtain the proper moisture content shall be done with approved equipment that will sufficiently distribute the water. Sufficient equipment to furnish the required water shall be available at all times.
- d. **Compaction.** Rolling operations shall be continued until the embankment is compacted to not less than 95% of maximum density as determined by ATM 207 or ATM 212. Under all areas serving aircraft or vehicle traffic loadings, the embankment shall be compacted to a density of not less than 98% of the maximum density as determined by ATM 207 or ATM 212. The in-place field density and moisture content shall be determined according ATM 213.

Keep dumping and rolling areas separate. Do not cover any layer by another until the proper density is obtained.

During construction of the embankment, the Contractor shall route their equipment at all times, both when loaded and when empty, over the layers as they are placed and shall distribute the travel evenly over the entire width of the embankment. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay, or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

In the construction of embankments, layer placement shall begin in the deepest portion of the fill and progress in layers approximately parallel to the finished pavement grade line. Stones or fragmentary rock larger than 3 inches in their greatest dimensions will not be allowed in the top 6 inches of the embankment.

- e. **Oversize Material.** At the Engineer's discretion and direction, the Contractor may use oversize material or rockfill, as defined in Subsection 152-2.3, in the embankment. Place material in layers up to 2 feet thick. Fill voids with finer material. Level and smooth each layer with suitable leveling equipment. Use compaction equipment and construction methods that can form a dense, well-compacted embankment. Do not use oversize material within 4 feet of the top of finished subgrade.

Rock or boulders larger than 2 feet in thickness shall both be disposed of outside the excavation or embankment areas, in places and in the manner designated by the Engineer; or they may be crushed to less than 2 feet thickness and used in the embankment.

- f. **Subsidiary Costs.** Excavation and embankment is a single pay item; there will be no separate measurement or payment. The costs for material source development, blasting, excavation, hauling, placing in layers, compacting, diskings, watering, mixing, sloping, grading, grubbing, and other necessary operations for construction of embankments, are subsidiary and shall be included in the contract unit prices for excavation, borrow, or other pay items.

- g. Frozen Material.** Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material, unless this construction method is identified in the special provisions, or is part of a Contractor's Progress Schedule that the Engineer has approved.

**152-3.7 FINISHING AND PROTECTION OF SUBGRADE.** After the subgrade has been substantially completed, the full width shall be conditioned by removing any soft or other unstable material that will not compact properly. The resulting areas and all other low areas, holes or depressions shall be brought to finish subgrade elevation with suitable material. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade, whose top is shaped to the lines and grades shown on the Plans.

Grading of the top of subgrade shall be performed so that it will drain readily. The Contractor shall take all precautions necessary to protect the subgrade from damage. The Contractor shall limit hauling over the finished subgrade to that which is essential for construction purposes.

All ruts, ponds or rough places that develop in a completed subgrade shall be repaired, smoothed and recompacted before another layer is placed on top of the subgrade.

No subbase, or surface course shall be placed on the subgrade until the subgrade has been approved by the Engineer. Erosion and sediment control shall be done according to the SWPPP. Work described in this subsection is subsidiary and shall be included in the contract unit prices.

**152-3.8 TOLERANCES.** In those areas upon which a subbase or base course is to be placed, the top of the subgrade shall be of such smoothness that, when tested with a 12-foot straightedge applied parallel and at right angles to the centerline, it shall not show any deviation in excess of 1/2-inch, or shall not be more than 0.05-foot from true grade as established by grade hubs or pins. Any deviation in excess of these amounts shall be corrected by loosening, adding, or removing materials; reshaping; and recompacting by watering and rolling.

On Runway Safety Areas, intermediate and other designated areas, the surface shall be of such smoothness that it will not vary more than 0.10-foot from true grade as established by grade hubs. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

**152-3.9 TOPSOIL.** When topsoil is specified or required as shown on the plans or under Item T-905, it may be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. The material may be stockpiled at approved locations in conformance with the CSPP.

Upon completion of grading operations, topsoil shall be handled and placed as directed, or as required in Item T-905. No direct payment will be made for topsoil under Item P-152.

## **METHOD OF MEASUREMENT**

**152-4.1** The quantity of unclassified excavation, common excavation, rock excavation, and muck excavation, will be measured in cubic yards of excavated material, measured in its original position. Pay quantities will be computed to the neat lines staked, by the method of average end areas of materials acceptably excavated. Measurement will not include the quantity of materials excavated without authorization beyond project lines and grades, or the quantity of material used for purposes other than those directed or approved by the Engineer.

With the Engineer's written approval, excavation may be measured by any method described in Subsection 152-4.2.

**152-4.2** The quantity of Borrow material to be paid will be by calculated by one of the following methods of measurement, as described in the Bid Schedule.

If Borrow is paid by source volume, the quantity will be measured in cubic yards of material, measured in its original position at the borrow source, after stripping of overburden and waste. Pay quantities will be computed by the method of average end areas from cross sections taken before and after borrow excavation. No shrink or swell factor will be used.

If Borrow is paid by design volume, the quantity will be measured in cubic yards of material, measured in its final compacted position. Pay quantities will be computed by the method of average end areas, as determined from original ground cross sections before placement (after clearing and grubbing) and to the neat lines staked and verified by the Engineer after placement. No allowance will be made for subsidence of the subgrade or for material placed outside the staked neat line limits. The quantity to be paid for will be the cubic yards of material placed and accepted in the completed embankment. No shrink or swell factor will be used.

If Borrow is paid by weight, the quantity will be measured in tons, by weighing system or by barge displacement method.

Ditch Lining will be paid by the ton in accordance with subsection GCP Subsection 90-02. Excavation required below normal ditch grade is subsidiary.

Grading of waste areas and taxiway removal areas after excavation of suitable material, will not be measured for payment.

### BASIS OF PAYMENT

**152-5.1** Excavation and embankment (or waste disposal) is a single pay item. The costs for material source development, blasting, excavation, hauling, placing in layers, compacting, disking, watering, mixing, sloping, grading, and other necessary operations for construction of embankments, or waste disposal including final grading, are subsidiary and shall be included in the contract unit prices.

- a. **Pay Item P152.010.0000 Unclassified Excavation.** For “Unclassified Excavation”, payment will be made at the contract unit price per cubic yard, or by lump sum.
- b. **Pay Item P152.190.0000 Borrow.** For “Borrow”, payment will be made at the contract unit price per cubic yard. If by weight, payment will be made at the contract unit price per ton.

Payment will be made under:

Item P152.010.0000	Unclassified Excavation – per cubic yard
Item P152.190.0000	Borrow – per ton

### TESTING REQUIREMENTS

ATM 212	Determining the Standard Density of Coarse Granular Materials using the Vibratory Compactor
ATM 207	WAQTC FOP for AASHTO T 99/ T 180 Moisture-Density Relations of Soils*
ATM 202	WAQTC FOP for AASHTO T 255/T 265 Moisture Content of Aggregate and Soils
ATM 213	WAQTC FOP for AASHTO T 310 In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)*.
ATM 304	WAQTC FOP for AASHTO T 27/T 11 Sieve Analysis of Fine and Coarse Aggregates *



## ITEM P-154 SUBBASE COURSE

### DESCRIPTION

**154-1.1** This item shall consist of a subbase course composed of granular materials constructed on a prepared subgrade or underlying course according to these Specifications, and in conformity with the dimensions and typical cross section shown on the Plans.

### MATERIALS

**154-2.1 MATERIALS.** The subbase material shall consist of hard durable particles or fragments of granular aggregates. This material will be mixed or blended with fine sand, clay, stone dust, or other similar binding or filler materials produced from approved sources. This mixture must be uniform and shall comply with the requirements of these Specifications as to gradation, soil constants, and shall be capable of being compacted into a dense and stable subbase. The material shall be free from vegetable matter, lumps or excessive amounts of clay, and other objectionable or foreign substances. Pit-run material may be used, provided the material meets the requirements specified.

Aggregate gradation shall meet the requirements of Table 154-1, determined according to ATM 304.

**TABLE 154-1. AGGREGATE GRADATION REQUIREMENTS**

Sieve designation (Square opening)	Percentage by weight passing sieves
3 inch	90-100
No. 4	20-55
No. 200	0-6

The percent passing the No. 200 sieve will be determined on minus 3-inch material.

The portion of the material passing the No. 40 sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than 6 when tested according to ATM 204 and ATM 205.

The gradations shall 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 sieves, or vice versa.

### CONSTRUCTION METHODS

**154-3.1 GENERAL.** The subbase course shall be placed where designated on the Plans or as directed by the Engineer. The material shall be shaped and thoroughly compacted within the tolerances specified.

Granular subbases which, due to grain sizes or shapes, are not sufficiently stable to support the movement of construction equipment, shall be mechanically stabilized to the depth necessary to provide such stability as directed by the Engineer. The mechanical stabilization shall principally include the addition of a fine-grained medium to bind the particles of the subbase material sufficiently to furnish a bearing strength, so that the course will not deform under the traffic of the construction equipment. The addition of the binding medium to the subbase material shall not increase the soil constants of that material above the limits specified.

**154-3.2 PREPARING UNDERLYING COURSE.** Before any subbase material is placed, the underlying course shall be prepared and conditioned as specified. The course shall be checked and accepted by the Engineer before placing and spreading operations are started.

To protect the subgrade and to ensure proper drainage, the spreading of the subbase shall begin along the centerline of the pavement on a crowned section or on the high side of pavements with a one-way slope.

**154-3.3 MATERIALS ACCEPTANCE IN EXISTING CONDITION.** When the entire subbase material is secured in a uniform and satisfactory condition, such approved material may be moved directly to the spreading equipment for placing. The material may be obtained from gravel pits, stockpiles, or may be produced from a crushing and screening plant with the proper blending. The materials from these sources shall meet the requirements for gradation, quality, and consistency. The moisture content of the material shall be approximately that required to obtain maximum density. The final operation shall be blading or dragging, if necessary, to obtain a smooth uniform surface true to line and grade.

**154-3.4 GENERAL METHODS FOR PLACING.** When materials from several sources are to be blended and mixed, the subbase material, together with any blended material, shall be thoroughly mixed prior to placing on grade.

The subbase course shall be constructed in layers. Any layer shall be not less than 3 inches nor more than 8 inches of compacted thickness. The material, as spread, shall be of uniform gradation with no pockets of fine or coarse materials. No material shall be placed in snow or on a soft, muddy, or frozen course.

When more than one layer is required, the construction procedure described herein shall apply similarly to each layer.

During the placing and spreading, sufficient caution shall be exercised to prevent the incorporation of subgrade, shoulder, or foreign material in the subbase course mixture.

**154-3.5 FINISHING AND COMPACTING.** After spreading or mixing, the subbase material shall be thoroughly compacted. Sufficient compactors shall be furnished to adequately handle the rate of placing and spreading of the subbase course. The moisture content of the material shall be approximately that required to obtain maximum density.

The field density of the compacted material shall be not less than 98% of the maximum density, as determined according to ATM 207 or ATM 212. The in-place field density and moisture content shall be determined according to ATM 213.

The course shall not be rolled when the underlying course is soft or yielding or when the rolling causes undulation in the subbase. When the rolling develops irregularities that exceed 1/2 inch when tested with a 12-foot straightedge, the irregular surface shall be loosened and then refilled with the same kind of material as that used in constructing the course and again rolled as required above.

Along places inaccessible to rollers, the subbase material shall be tamped thoroughly with mechanical or hand tampers.

Watering during rolling, if necessary, shall be in the amount and by equipment approved by the Engineer. Water shall not be added in such a manner or quantity that free water will reach the underlying layer and cause it to become soft.

**154-3.6 SURFACE TEST.** After the course is completely compacted, the surface shall be tested for smoothness and accuracy of grade and crown; any portion found to lack the required smoothness or to fail in accuracy of grade or crown shall be scarified, reshaped, recompacted, and otherwise manipulated as the Engineer may direct until the required smoothness and accuracy is obtained. The finished surface shall not vary more than 1/2-inch when tested with a 12-foot straightedge applied parallel with, and at right angles to, the centerline.

**154-3.7 PROTECTION.** Work on subbase course shall not be conducted during freezing temperature nor when the subgrade is wet. When the subbase material contains frozen material or when the underlying course is frozen, the construction shall be stopped.

**154-3.8 MAINTENANCE.** Following the final shaping of the material, the subbase shall be maintained throughout its entire length by the use of standard motor graders and rollers until, in the judgment of the Engineer, the subbase meets all requirements and is acceptable for the construction of the next course.

#### METHOD OF MEASUREMENT

**154-4.1 Pay Item P154.010.0000 Subbase Course.** Subbase Course will be weighed by the ton or measured by the cubic yard in final position according to GCP Subsection 90-02.

Subbase materials will not be included in any other excavation quantities.

#### BASIS OF PAYMENT

**154-5.1** Subbase Course will be paid for at the contract price, per unit of measurement, accepted in place.

Hauling and placing of these materials is subsidiary.

Payment will be made under:

Item P154.020.0000      Subbase Course – per ton

#### TESTING REQUIREMENTS

ATM 212	Determining the Standard Density of Coarse Granular Materials using the Vibratory Compactor
ATM 304	WAQTC FOP for AASHTO T 27/T 11 Sieve Analysis of Fine and Coarse Aggregates *
ATM 204	WAQTC FOP for AASHTO T 89 Determining the Liquid Limit of Soils
ATM 205	WAQTC FOP for AASHTO T 90 Determining the Plastic Limit and Plasticity Index of Soils
ATM 207	WAQTC FOP for AASHTO T 99/ T 180 Moisture-Density Relations of Soils*
ATM 213	WAQTC FOP for AASHTO T 310 In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)*



# ITEM P-161 RECYCLED ASPHALT PAVEMENT

## DESCRIPTION

**161-1.1** Excavate and process existing asphalt cement concrete (AC) pavement for use as Recycled Asphalt Pavement (RAP). Haul and place RAP on a prepared foundation, to the lines, grades, and depths shown on the Plans or as directed by the Engineer.

## MATERIAL AND CONSTRUCTION REQUIREMENTS

**161-2.1 PROCESSING.** Crush or pulverize existing pavement to meet the requirements of Table 161-1 for use as Recycled Asphalt Pavement (RAP). Process RAP to provide an asphalt content of 2.5 – 5.5 percent by weight.

Saw cut and process the full depth of existing pavement in areas shown on the Plans or as directed by the Engineer. Excavate to the minimum depth necessary for removal of all existing pavement. Up to one inch of underlying base course material may be excavated along with the AC pavement.

**TABLE 161-1. RAP GRADATION REQUIREMENTS**

Sieve Size	Percent Passing
2 in.	100
1 in.	90-100

**161-2.2 PLACEMENT AND SPREADING.** Place RAP in 4-inch thick maximum lifts on the approved surface as required to achieve the depth shown on the Plans after compaction.

Excess RAP is the property of the State Department. Place excess RAP in stockpiles located and shaped as shown on the Plans, or as directed by the Engineer.

**161-2.3 COMPACTION.** Thoroughly compact the RAP layer by rolling. Density acceptance will be based on the use of a control strip in accordance with ATM 412 to determine a density standard. Compact to a density not less than 98% of the density standard. After rolling and with the RAP thoroughly set, reduce interstitial spaces to a minimum. Blade and roll alternately as required or directed to obtain a smooth, even and uniformly compacted surface. Do not roll the RAP course when the underlying course is soft or yielding or when the rolling causes undulation of the surface. In areas inaccessible to rollers, tamp RAP material thoroughly with hand held mechanical tampers.

**161-2.4 RAP PROTECTION.** Do not perform work on the RAP course during freezing temperatures, when the subgrade is wet, or when rain is expected. Hauling equipment may be routed over the finished RAP course, provided no damage results and provided that equipment is routed over the full width of the RAP surface to avoid rutting or uneven compaction. The Engineer has authority to stop all hauling over completed or partially completed RAP when, in his opinion, such hauling is causing damage. Repair at your expense, any damage to the RAP course resulting from the routing of equipment over RAP surfaces.

**161-2.5 PROTECTION OF EXISTING STRUCTURES.** Take all precautions necessary to ensure that existing structures within pavement removal areas are not damaged. If damage to any structure occurs, repair the damage at no cost to the Department.

**161-2.6 DRAINAGE.** Maintain drainage at all times. Install temporary drains and drainage ditches, when directed, to intercept or divert surface water that may affect the prosecution or condition of the work.

### **METHOD OF MEASUREMENT**

**161-4.1** Measure according to GCP Section 90. If RAP by unit area appears in the bid schedule, the item will be measured in original position before excavation. If RAP by unit volume appears in the bid schedule, the item will be measured in final position after processing and placement. Underlying base course material excavated along with the AC pavement will not be included in the measurement for payment of RAP measured by unit volume.

### **BASIS OF PAYMENT**

**161-5.1** At the contract unit price for recycled asphalt pavement accepted in place.

Payment will be made under:

Item P161.010.0000	Recycled Asphalt Pavement – per square yard
Item P161.040.0000	Recycled Asphalt Pavement Placement – per square yard

### **TESTING REQUIREMENTS**

ATM 412          Relative Standard Density of Treated Mixes by the Control Strip Method

## ITEM P-165 REMOVAL OF STRUCTURES

### DESCRIPTION

**165-1.1** Remove and dispose of or salvage existing structures as specified. Backfill the resulting holes and pits.

### CONSTRUCTION REQUIREMENTS

**165-2.1 GENERAL.** Obtain utility locates in the vicinity of the designated items. Coordinate with utility companies for removal of electrical and natural gas utilities. Decommission the water well following the Alaska Department of Environmental Conservation (ADEC) and Alaska Department of Natural Resources (ADNR) *Maintaining or Decommissioning Water Wells and Boreholes – Best Management Practices*. Provide the Engineer a Decommissioning Work Plan and submit a Well Record of Decommissioning to ADEC and ADNR. Provide record of submission to the Engineer. Work around and preserve any facilities to remain within the work limits. Remove all foundations completely. Backfill all excavations with approved embankment or excavated materials and compact in accordance with Item P-152.

**a. Removed Structures Designated for Disposal.** Removed structures designated for disposal become your property. Excavate, load, and haul structures, foundations, and other debris to an approved disposal site off of airport property in accordance with applicable Federal and State regulations.

**(1) Old Woods Air Hangar** located on the proposed Apron E. This building will be vacated no later than April 15, 2023.

**b. Removed Structures Designated for Salvage.** Removed structures designated for salvage remain the property of the State.

### METHOD OF MEASUREMENT

**165-3.1** This item will not be measured for payment. The Engineer's acceptance constitutes measurement.

### BASIS OF PAYMENT

**165-4.1** Payment will be made at the contract price for work acceptably completed. No separate payment will be made for hauling or transportation. All work associated with removal of specified items, including but not limited to labor, equipment, tools, hauling, transportation, and incidentals will be included in the contract price for removal of structures.

Payment will be made under:

Item P165.010.0000      Removal of Structures – per lump sum





## ITEM P-209 CRUSHED AGGREGATE BASE COURSE

### DESCRIPTION

**209-1.1** This item consists of a base course composed of crushed aggregate constructed on a prepared course in accordance with these Specifications and to the dimensions and typical cross-sections shown on the Plans.

### MATERIALS

**209-2.1 CRUSHED AGGREGATE BASE.** Crushed aggregate shall consist of clean, sound, durable particles of crushed stone or crushed gravel and shall be free from excess coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials. 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 passing the No. 4 sieve shall consist of fines from the coarse aggregate crushing operation. If necessary, fine aggregate may be added to produce the correct gradation. The fine aggregate shall be produced by crushing stone and gravel that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in Table 209-1.

**TABLE 209-1, CRUSHED AGGREGATE BASE MATERIAL REQUIREMENTS**

Material Test	Requirement	Standard
<b>Coarse Aggregate</b>		
Resistance to Degradation	Loss: 45% maximum	AASHTO T 96
Soundness of Aggregates by Use of Sodium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate	AASHTO T 104
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 100% with at least one fractured face <sup>1</sup>	ATM 305
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles <sup>2</sup>	ATM 306
Degradation Value	45%, minimum	ATM 313
<b>Fine Aggregate</b>		
Liquid limit	Less than or equal to 25	ATM 204
Plasticity Index	Not more than six (6)	ATM 205

<sup>1</sup> The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

<sup>2</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

**209-2.2 GRADATION REQUIREMENTS.** The gradation of the final aggregate base material shall meet the requirements of the gradation given in Table 209-2 when tested per ATM 304. 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. Use Gradation D-1 unless specified otherwise.

**TABLE 209-2. REQUIREMENTS FOR GRADATION OF AGGREGATE**

Sieve Size	Design Range Percentage by Weight passing		Contractor's Final Gradation	Job Control Grading Band Tolerances <sup>1</sup> (Percent)
	C-1	D-1		
1-1/2 inch	100			0
1 inch	70-100	100		±5
3/4 inch	60-90	70-100		±8
3/8 inch	45-75	50-80		±8
No. 4	30-60	35-65		±8
No. 8	22-52	20-50		±8
No. 50 <sup>2</sup>	6-30	6-30		±5
No. 200 <sup>2</sup>	0-5	0-5		±3

<sup>1</sup> The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

<sup>2</sup> The fraction of material passing the No. 200 sieve shall not exceed two-thirds the fraction passing the No. 50 sieve.

**209-2.3 SAMPLING AND TESTING.**

- a. **Aggregate base materials.** The Contractor shall take samples of the aggregate base in accordance with ATM 301 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in subsection 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.
- b. **Gradation requirements.** The Contractor shall take at least two aggregate base samples per day in the presence of the Engineer to check the final gradation. Sampling shall be per ATM 301. Material shall meet the requirements in subsection 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the Engineer.

**209-2.4 SEPARATION GEOTEXTILE.** 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 Engineer, that the materials, equipment, and construction processes meet the requirements of the Specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined.

Control strips that do not meet Specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the Engineer. The Contractor shall use the same equipment, materials, construction methods, and sequence and manner of rolling for the remainder of base course construction, unless adjustments made by the Contractor are approved by the Engineer.

**209-3.2 PREPARING UNDERLYING COURSE.** The underlying subgrade and/or subbase shall be checked and accepted, in writing, by the Engineer before base course placing and spreading operations begin. Any ruts or soft, yielding areas shall be corrected and compacted to the required density 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, or as directed by the Engineer.

**209-3.3 PRODUCTION.** The aggregate shall be uniformly blended and, when at a satisfactory moisture content according to subsection 209-3.5, the approved material may be transported directly to the spreading equipment. The plant shall blend and mix the materials to meet the Specifications.

**209-3.4 PLACEMENT.**

The crushed aggregate base material shall be placed on the approved subgrade in uniform, equal-depth layers, each not exceeding 6 inches of compacted depth. The aggregate shall meet gradation and moisture requirements prior to compaction. . Crushed aggregate base course shall not be placed on frozen material.

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, and within the same day that the aggregate is placed, compact each layer of the base course to the required density.

The field density of each compacted lift of material shall be at least 98% of the maximum density of laboratory specimens prepared from samples of the crushed aggregate base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ATM 207 or ATM 212. The moisture content of the material during placing operations shall be within  $\pm 2$  percentage points of the optimum moisture content as determined by ATM 207 or ATM 212. 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 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 until the work is accepted. 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 to avoid rutting or uneven compaction. 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 will be tested by the Engineer for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and re-compact to grade until the required smoothness and accuracy are obtained and approved by the Engineer. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

- a. **Smoothness.** The finished surface shall not vary more than 3/8-inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.
- b. **Grade.** The grade and crown shall be measured on a 50-foot grid and shall be within +0 and -1/2 -inch of the specified grade.

**209-3.9 ACCEPTANCE SAMPLING AND TESTING.** Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yards. Sampling locations will be determined on a random basis according to ATM SP 4.

- a. **Density.** The Engineer will perform all density tests. Base course will be accepted for density when the field density is not less than 98% of the maximum density, as determined according to ATM 207 or ATM 212. The in-place field density and moisture content will be determined according to ATM 213. If the specified density is not attained, the material shall be reworked and/or recompacted until the specified density is reached.
- b. **Thickness.** The thickness of the finished base course will be determined by the Engineer by taking before and after elevation measurements, or by depth tests, at random locations. The completed

thickness of the base course shall be within 1/2-inch of the design thickness. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material of proper gradation, and the material shall be blended and recompact to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

#### METHOD OF MEASUREMENT

**209-4.1** The quantity of crushed aggregate base course will be determined by the ton or measured by the cubic yard of material in final position according to GCP subsection 90-02.

#### BASIS OF PAYMENT

**209-5.1** Payment shall be made at the contract unit price per unit of measurement, accepted in place.

Payment will be made under:

Item P209.020.0000      Crushed Aggregate 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.

AASHTO T 96	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
AASHTO T 104	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
ATM 204	WAQTC FOP for AASHTO T 89 Determining the Liquid Limit of Soils
ATM 205	WAQTC FOP for AASHTO T 90 Determining the Plastic Limit and Plasticity Index of Soils
ATM 207	WAQTC FOP for AASHTO T 99/ T 180 Moisture-Density Relations of Soils
ATM 212	Determining the Standard Density of Coarse Granular Materials Using the Vibratory Compactor
ATM 213	WAQTC FOP for AASHTO T 310 In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)*
ATM 301	WAQTC FOP for AASHTO T 2 Sampling of Aggregates
ATM 304	WAQTC FOP for AASHTO T 27/T 11 Sieve Analysis of Fine and Coarse Aggregates *
ATM 305	WAQTC FOP for AASHTO T 335 Determining the Percentage of Fracture in Coarse Aggregate*
ATM 306	Determining the Percentage of Flat and Elongated Particles in Coarse Aggregate
ATM 313	Degradation Value of Aggregates
ATM SP 4	Random Sampling

## ITEM P-401 ASPHALT MIX PAVEMENT

### DESCRIPTION

**401-1.1 ASPHALT MIX PAVEMENT.** Hot Mix Asphalt (HMA) shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these Specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the Plans. Each course shall be constructed to the depth, typical section, and elevation required by the Plans and shall be rolled, finished, and approved before the placement of the next course.

### MATERIALS

**401-2.1 AGGREGATE.** Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 sieve. Fine aggregate is the material passing the No. 4 sieve.

Use a minimum of three stockpiles of crushed aggregate of different gradations. Place blend material, if any, in a fourth pile.

- 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 bituminous material and be free from organic matter and other deleterious substances. Coarse aggregate material shall conform to Table 401-1 Coarse Aggregate Material Requirements.

**TABLE 401-1. COARSE AGGREGATE MATERIAL REQUIREMENTS**

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	AASHTO T 96
Soundness of Aggregates by Use of Sodium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate	AASHTO T 104
Clay lumps and friable particles	1.0% maximum	AASHTO T 112
Degradation Value of Aggregates	30 minimum	ATM 313
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds or more: Minimum 90% by weight of particles with at least two fractured faces, except Type V shall have a minimum of 98% by weight with at least two fractured faces	ATM 305
	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 <sup>1</sup>	
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 <sup>2</sup>	ATM 306

<sup>1</sup>. The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

<sup>2</sup>. A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

- 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, and conform to Table 401-2 Fine Aggregate Material Requirements.

Natural (non-manufactured) sand may be used to obtain the gradation of the fine aggregate blend or to improve the workability of the mix. The amount of sand to be added will be adjusted to produce mixtures conforming to requirements of these Specifications.

**TABLE 401-2. FINE AGGREGATE MATERIAL REQUIREMENTS**

Material Test	Requirement	Standard
Liquid limit	25 maximum	ATM 204
Plasticity Index	4 maximum	ATM 205
Soundness of Aggregates by Use of Sodium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate	AASHTO T 104
Clay Lumps and Friable Particles	1.0% maximum	AASHTO T 112
Sand Equivalent	45 minimum	ATM 307
Natural Sand	15% maximum by weight of total aggregate	ASTM D1073
Uncompacted Void Content <sup>1</sup>	45% minimum	AASHTO T 304, Method A

<sup>1</sup>. Applies to Type V mix designs.

- c. Sampling.** The Engineer will sample according to ATM 301 for coarse and fine aggregate and according to ASTM D242 for mineral filler.

**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 AASHTO M 17 and Table 401-3.

**TABLE 401-3. MINERAL FILLER REQUIREMENTS**

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ATM 205

**401-2.3 ASPHALT BINDER.** Provide the asphalt binder performance grade as indicated on the Plans. Asphalt binder shall conform to AASHTO M 320 or M 332 for the specified Performance Grade, except as indicated in Table 401-4 Exceptions to Performance-Graded Asphalt Binder Specification.

**TABLE 401-4. EXCEPTIONS TO PERFORMANCE-GRADED ASPHALT BINDER SPECIFICATION**

Performance Grade	AASHTO Spec.	Viscosity AASHTO T 316	MSCR, AASHTO T 350			PAV, Dynamic Shear AASHTO T 315	Direct Tension AASHTO T 314
			J <sub>NR3.2</sub> kPa <sup>-1</sup>	J <sub>NR</sub> Diff	% Rec <sub>3.2</sub>		
PG 52-28	M320	None	---	---	---	None	Delete
PG 52-40	M320	None	---	---	---	None	Delete
PG 52-40V	M332	None	0.50 max.	Delete	75 min.	None	Delete
PG 58-34E	M332	None	0.25 max.	Delete	85 min.	None	Delete
PG 64-40E	M332	1.0 PaS max.	0.10 max.	Delete	95 min.	5000 max @ 4°C	Delete

The Contractor shall furnish vendor's certificate of compliance and certified test reports for each lot of asphalt binder shipped to the project. The vendor's certified test report for the asphalt binder can be used for acceptance or tested independently by the Engineer.

The following documents shall be furnished at delivery:

- a. Manufacturer's certificate of compliance
- b. Certified test reports for the lot.
- c. Lot number, storage tanks, and shipping containers (if applicable) used.
- d. Date and time of load out for delivery.
- e. Type, grade, temperature, and quality of asphalt binder loaded.
- f. Type and percent of anti-stripping agent added.

All excess asphalt binder shall remain the property of the Contractor. Removal of excess asphalt binder from the project area shall be incidental to the contract and no separate payment will be made.

**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 approved by the Engineer.

**401-2.5 PRELIMINARY MATERIAL ACCEPTANCE.** Prior to delivery of materials to the job site, the Contractor shall submit certified test reports to the Engineer for the following materials:

- a. **Coarse Aggregate.**
  - (1) Percent of wear
  - (2) Soundness
  - (3) Degradation
  - (4) Percent of fracture
  - (5) Percent of flat and elongated particles
  - (6) Clay lumps and friable particles
- b. **Fine Aggregate.**
  - (1) Liquid limit.
  - (2) Plasticity index
  - (3) Sand equivalent
  - (4) Un-compacted void content for HMA Type V
  - (5) Clay lumps and friable particles
  - (6) Soundness
  - (7) Percent Natural Sand
- c. **Mineral Filler.**
  - (1) Gradation
  - (2) Plasticity Index

(3) Organic content

- d. **Asphalt Binder.** The certification(s) shall show the appropriate test(s) for each material, the test results, and a statement that the material meets the specification requirement. Include temperature/viscosity charts and note recommended mixing and compaction temperatures.

**401-2.6 JOINT ADHESIVE.** The joint adhesive shall conform to Table 401-5 Joint Adhesive Material Requirements.

**TABLE 401-5. JOINT ADHESIVE MATERIAL REQUIREMENTS**

PROPERTY	SPECIFICATION	TEST METHOD
Brookfield Viscosity, 400°F	4,000 – 11,000 cP	ASTM D2669
Core Penetration, 77°F	60 – 100	ASTM D5329
Flow, 140°F	0.2-inch, max.	
Resilience, 77°F	30%, min.	
Tensile Adhesion, 77°F	500%, min.	
Asphalt Compatibility	Pass	
Ductility, 77°F	1-foot, min.	ASTM D113
Ductility, 39.2°F	1-foot, min.	
Softening Point	170°F	AASHTO T 53

**401-2.7 JOINT SEALANT.** The joint shall be sealed with GSB 88 (manufactured by Asphalt Systems Inc.), Optipave (manufactured by SealMaster), or meet the following:

- a. Emulsion concentrate, in the undiluted state, shall have the following properties:

- (1) Saybolt furol viscosity at 77°F, ASTM D244, seconds.....20-100
- (2) Residue by distillation or evaporation, ASTM D244, % .....57 min
- (3) Sieve test, ASTM D244, % .....0.2 max
- (4) 5 day Settlement test, ASTM D244, %.....5.0 max
- (5) Particle charge (refer to 401-2.7d), ASTM D244 .....Positive

- b. Ready to Apply:

- (1) Emulsion concentrate diluted in the proportion of one part emulsion to one part hot water by volume, shall have the following properties:
  - (a) Saybolt furol viscosity at 77°F, ASTM D244, seconds.....10-50
  - (b) Residue by distillation or evaporation, ASTM D244, % .....28.5 min
  - (c) Pumping stability test, (refer to 401-2.7e) .....Pass
- (2) Emulsion concentrate diluted in the proportion of two parts emulsion to one part hot water by volume, shall have the following properties:
  - (a) Saybolt furol viscosity at 77°F, ASTM D244, seconds.....10-50
  - (b) Residue by distillation or evaporation, ASTM D244, % .....37.5 min
  - (c) Pumping stability test, (refer to 401-2.7e) .....Pass



- c. Tests on residue from distillation or evaporation shall have the following properties:
  - (1) Viscosity at 275°F, ASTM D4402, cubic feet per second (cts).....1,750 max
  - (2) Solubility in 1,1,1 Trichloroethylene, ASTM D2042, %.....97.5 min
  - (3) Penetration ASTM D5, dmm.....50 max
  - (4) Asphaltenes, ASTM D2007,%.....15 min
  - (5) Saturates, ASTM D2007, %.....15 max
  - (6) Polar Compounds, ASTM D2007, %.....25 min
  - (7) Aromatics, ASTM D2007, %.....15 min
- d. pH may be used in lieu of the particle charge test, which is sometimes inconclusive in slow setting, bituminous emulsions.
- e. Pumping stability test is tested by pumping one pint of sealer material diluted one part concentrate to one part water, at 77°F, through a 1/4-inch gear pump operating 1,750 revolutions per minute (rpm) for 10 minutes with no significant separation or coagulation.

The bituminous base residue shall contain not less than 20% gilsonite, and shall not contain any tall oil pitch. Curing time, under recommended application conditions, shall not exceed four hours. The Contractor shall furnish and submit to the Engineer, manufacturer’s certification that the material is the type, grade, and quality specified for each load of bituminous material delivered. The certification shall show the shipment number, refinery, consignee, destination, contract number, and date of shipment. The Contractor shall submit to the Engineer, two 1-quart samples of ready-to-apply bituminous material for each batch applied and two 1-quart samples of concentrate for each load delivered. The Contractor shall submit any additional samples requested by the Engineer.

The Engineer may request samples for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable Specifications.

**COMPOSITION**

**401-3.1 COMPOSITION OF MIXTURE(S).** The HMA shall be composed of a mixture of well-graded aggregates, filler, 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 design (JMD).

**401-3.2 JOB MIX DESIGN (JMD) LABORATORY.** The laboratory used to develop the JMD shall possess a current certificate of accreditation, listing ASTM D3666 from a national accrediting authority, and all test methods required for developing the JMD; 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 Department prior to start of construction.

**401-3.3 JOB MIX DESIGN (JMD).** No HMA for payment shall be placed until an acceptable JMD has been approved by the Engineer. The Class A and B HMA shall be designed using procedures contained in ATM 417, and shall meet the requirements of Tables 401-6 and 401-8.

The HMA, Type V, Class S will be designed using procedures contained in AASHTO R 35 and shall meet the requirements of Table 401-7 and Table 401-8. Upon completion of the JMD, determine the Marshall

stability and Marshall air voids at the design asphalt binder content using a 75-Blow Marshall from procedures contained in ATM 417. The Department will furnish all JMDs for HMA, Type V.

The JMD and subsequent production targets should be based on a stability greater than shown in Table 401-6 and 401-7, and the flow and air voids should be targeted close to the mid-range of the criteria in order to meet the acceptance requirements.

Anti-stripping agent shall be added to the asphalt binder in the amount determined by ATM 414. A minimum of 0.30% anti-stripping agent by weight of asphalt binder is required.

At the discretion of the Engineer, the JMD may be designed by the Department. The Department designed JMDs will be based on the Contractor's submitted target gradation. The Contractor shall submit material samples to the Engineer, upon request, for JMD. The Department will bear the cost of the initial JMD evaluation for each Type and Class of HMA specified. If subsequent evaluations are required, the Engineer will assess a fee of \$5,000.00 under Hot Mix Asphalt Price Adjustment, for each additional evaluation.

**a. Department Furnished JMD.** Submit the following, or as directed, in writing to the Engineer at least 30 calendar days prior to the start of paving operations and shall include as a minimum:

- (1) Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMD according to subsection 401-2.3. Certificate of asphalt Performance Grade must include added modifier, if used, and also indicate compliance of asphalt binder with AASHTO M 320 or AASHTO M 332. Furnish five (5) separate 1-gallon samples of the asphalt binder proposed for use in the HMA, and Safety Data Sheet.
- (2) Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMD according to subsection 401-2.4.
- (3) Certified material test reports for the course and fine aggregate and mineral filler according to subsection 401-2.1.
- (4) Percent natural sand.
- (5) Percent fractured faces.
- (6) Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- (7) Laboratory mixing and compaction temperatures.
- (8) Supplier-recommended field mixing and compaction temperatures.
- (9) Plot of the combined gradation on a 0.45 power gradation curve. Provide curve and testing results for each aggregate type proposed for use.
- (10) Type and amount of anti-strip agent when used. Furnish a minimum of 1/2-pint of the proposed anti-strip additive, if anti-strip is not incorporated into asphalt binder by the manufacturer.
- (11) Temperature-viscosity relationship of the asphalt binder.
- (12) Uncompacted void content for HMA Type V.
- (13) Percentage and properties (asphalt content, asphalt binder properties, and aggregate properties) of RAP in accordance with subsection 401-3.4. Furnish 200-pound, minimum, sample of proposed RAP.

- b. Contractor Furnished JMD.** When the Contractor is directed to prepare the JMD for approval, the Contractor must submit the JMD sealed by the responsible Professional Engineer of the laboratory.

In addition to the items listed in subsection 401-3.3a, submit the following, or as directed, in writing to the Engineer at least 15 calendar days prior to the start of paving operations:

- (1) Date the JMD was developed. Mix designs that are not dated or which are from a prior construction season will not be accepted.
- (2) 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 JMD. Furnish representative samples totaling 500 pounds of aggregate material in proportional amounts to the proposed JMD.
- (3) A letter stating the location, size, and type of mixing plant. The letter shall include gradations for individual stockpiles, and the blend ratio of each aggregate stockpile.
- (4) Specific Gravity and absorption of each coarse and fine aggregate.
- (5) Percent of asphalt.
- (6) Number of blows or gyrations.
- (7) Asphalt Pavement Analyzer (APA), or Hamburg test results; or stability and flow test results, as appropriate for the mix design method.
- (8) Sand Equivalent value for fine aggregate.
- (9) Theoretical Maximum Specific Gravity at the optimum asphalt binder content.

All Contractor furnished JMDs must be sealed by a professional Engineer registered in the State of Alaska. The Professional Engineer must certify that the JMD was performed according to the specified procedures, and meets these Specifications.

The Engineer has authority to review and reject submitted JMDs that do not meet these Specifications. The Contractor shall submit samples to the Engineer, upon request, for JMD verification testing.

The JMD for each mixture shall be in effect until modified in writing by the Engineer. Should a change in sources of materials be made, a new JMD must be approved by the Engineer before the new material is used.

**TABLE 401-6. MARSHALL MIX DESIGN REQUIREMENTS**

Test Property	Class A: Pavements Designed for Aircraft Gross Weights of 60,000 lbs or More or Tire Pressures of 100 psi or More	Class B: Pavements Designed for Aircraft Gross Weight Less Than 60,000 lbs or Tire Pressure Less Than 100 psi
Number of blows	75	50
Stability, pounds	2150	1350
Flow, 0.01 inch <sup>1</sup>	10-16	10-18
Air voids % (design target 3.5%)	2.8 – 4.2	2.8 – 4.2

Test Property	Class A: Pavements Designed for Aircraft Gross Weights of 60,000 lbs or More or Tire Pressures of 100 psi or More	Class B: Pavements Designed for Aircraft Gross Weight Less Than 60,000 lbs or Tire Pressure Less Than 100 psi
Voids in mineral aggregate, %, min.	See Table 401-8	See Table 401-8
Asphalt Binder Content, %, min.	5.0	5.0
Antistrip Requirement, % coverage, min <sup>2</sup>	70	70
Asphalt Pavement Analyzer (APA) <sup>3</sup>	Less than 10mm @ 4,000 passes	N/A

<sup>1</sup>. The flow requirement is not applicable for Polymer Modified Asphalts.

<sup>2</sup>. ATM 414 <sup>3</sup>. ATM 419 at 250 psi hose pressure at 64°C test temperature

**TABLE 401-7. GYRATORY HOT MIX ASPHALT TYPE V MIX DESIGN REQUIREMENTS**

<b>Mix Design Class S</b>	
Pavements for gross aircraft weights of 60,000 lbs or more.	
Test Property	Design Criteria ¾" Nominal Maximum Aggregate Size
Initial Number of Gyration (N <sub>ini</sub> )	7
Design Number of Gyration (N <sub>des</sub> )	75
Maximum Number of Gyration (N <sub>max</sub> )	115
Air voids @ N <sub>des</sub> (Design Target 3.5), %	2.8-4.2
Voids in Mineral Aggregate @ N <sub>des</sub> , %	Table 401-8
Voids filled with Asphalt @ N <sub>des</sub> , %	65-78
Dust to effective asphalt ratio	0.6 -1.2
Uncompacted Void Content	45 min.
% G <sub>mm</sub> @ N <sub>ini</sub>	≤ 90.50
% G <sub>mm</sub> @ N <sub>max</sub>	≤ 98.00
Asphalt Binder Content, %, min.	5.0
Antistrip Requirement, %, min. <sup>1</sup>	70
Marshall Stability 75 blow (average of 3 specimens)	Report
Marshall Air Voids – 75 blow (average of 3 specimens)	Report
Rut Index, Max., mm, ATM 419 <sup>2</sup>	Less than 10 mm @ 4,000 passes

<sup>1</sup>. ATM 414

<sup>2</sup>. ATM 419 at 250 psi hose pressure at 64°C test temperature

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 401-8 Aggregate-Asphalt Pavements when tested according to ATM 304. The maximum size aggregate used shall not be more than one-fourth of the thickness of the course being constructed.

The gradations in Table 401-8 represent the limits that shall determine the suitability of aggregate for use from the sources of supply. The aggregate, as selected (and used in the JMD), shall have a gradation within the limits designated in Table 401-8 and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa, but shall be well graded from coarse to fine when tested according to ATM 304.

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, 7<sup>th</sup> Edition.

**TABLE 401-8. AGGREGATE – ASPHALT PAVEMENTS**

Sieve Size	Percentage by Weight Passing Sieves			Type V
	Type I	Type II	Type III <sup>1</sup>	
1 inch	100	--	--	--
3/4 inch	90-100	100	--	100
1/2 inch	68-88	90-100	100	65-90
3/8 inch	60-82	72-88	90-100	55-80
No. 4	45-67	53-73	58-78	40-60
No. 8	32-54	38-60	40-60	≤ 45
No. 16	22-44	26-48	28-48	≤ 35
No. 30	15-35	18-38	18-38	≤ 25
No. 50	9-25	11-27	11-27	≤ 20
No. 100	6-18	6-18	6-18	≤ 12
No. 200	3-6	3-6	3-6	4-7
<b>Minimum Voids in Mineral Aggregate (VMA)</b>	13	14	15	14
<b>Asphalt percent by total weight of mixture:</b>				
<b>Stone or gravel</b>	4.5-7.0	5.0-7.5	5.5-8.0	5.0 – 7.5
<b>Recommended Minimum Construction Lift Thickness</b>	3 inches	2 inches	1-1/2 inches	2 inches

<sup>1</sup>. Type III gradation is intended for leveling courses.

**401-3.4 RECYCLED HOT MIX ASPHALT PAVEMENT** Recycled HMA shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, asphalt binder, and recycling agent, if necessary. 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. The recycled HMA shall be designed using procedures contained in the Asphalt Institute MS-2 Mix Design Manual, 7<sup>th</sup> Edition, in conjunction with ATM 417. The percentage of asphalt in the RAP shall be established for the mix design according to ASTM D2172 using the appropriate dust correction procedure. The JMD shall meet the requirements subsection 401-3.3. Recycled HMA shall only be used for shoulder surface course mixes and for any intermediate courses. The amount of RAP shall be limited to 20 percent. In addition to the requirements of subsection 401-3.3, the JMD shall indicate the percent of RAP, the percent and grade of new asphalt binder, the percent and grade of hot mix recycling agent (if used), and the properties (including viscosity and penetration) of the asphalt blend. The resulting composite mixture of RAP and virgin components shall meet all requirements specified for mixes without RAP. No RAP shall be used in Type V, Class S HMA.

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.

All new aggregates used in the recycled mix shall meet the requirements of subsection 401-2.1. New asphalt binder shall meet the requirements of subsection 401-2.3. Recycling agents shall meet the requirements of ASTM D4552. The Contractor shall submit documentation to the Engineer, indicating that the mixing equipment proposed for use is adequate to mix the percent of RAP shown in the JMD.

**401-3.5 CONTROL STRIP.** Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the Engineer. The Contractor shall prepare and place a quantity of asphalt according to the JMD. 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 subsection 401-5.1, has been accepted, in writing, by the Engineer.

The control strip will consist of at least 250 tons. 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 subsection 401-4.14 using the same procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F. The equipment used in construction of the control strip shall be the same type, configuration, and weight, to be used on the project.

The control strip shall be evaluated for acceptance as a single lot in accordance with the acceptance criteria in subsection 401-6.1 for aggregate gradation and asphalt binder content. The control strip shall be divided into three separate equal sub-lots. If the Composite Pay Factor is less than 1.000, the control strip is unacceptable.

Three 6-inch diameter core samples shall be cut from the finished hot mix asphalt by the Contractor, at the locations marked by the Engineer. The core samples will be tested by the Department for density according to subsection 401-5.1. The Target Value for mat density is 94.0% of the theoretical maximum specific gravity (MSG) of the JMD. The three samples will be evaluated according to subsection 401-8.1.a. If the Density Pay Factor is less than 1.000, the control strip is unacceptable.

Three longitudinal joint cores centered on the longitudinal joint shall be cut by the Contractor, at the locations marked by the Engineer. The core samples will be tested by the Department according to subsection 401-5.1. The Target Value for joint density is 92.0% of the JMD MSG. If the average density of the three joint cores is below 91.0%, the control strip is unacceptable.

After completion of control strip compaction, the Department will accept or reject the control strip within 48 hours.

If the control strip is unacceptable, necessary adjustments to the JMD, 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. For small projects, less than 3,000 tons, a control strip is not required.

**401-3.6 PRE-PAVING CONFERENCE.** Meet with the Engineer for a pre-paving meeting in the presence of project superintendent and paving foreman at least five working days before beginning paving operations. Submit a paving plan and pavement inspection plan per 401-3.7, 24 hours before the pre-paving conference.

Include the following elements in the paving plan and address these elements at the meeting:

- a. Safety Plan procedures to be implemented prior to and during paving.
- b. Sequence of operations and Laydown Plan per subsection 401-4.11.
- c. List of equipment that will be used for production, transport, pick-up (if applicable), laydown, and compaction.
- d. Summary of plant modifications (if applicable) for production of HMA.
- e. Procedures to produce consistent HMA.
- f. Procedures to minimize material and thermal segregation.

- g. Procedures to minimize premature cooling.
- h. Procedures to achieve HMA density.
- i. Procedures for joint construction including corrective action for joints that do not meet surface tolerance requirements.
- j. Quality control sampling and testing methods, frequencies and sample locations for gradation, asphalt binder content, and density.
- k. Any other information or procedures necessary to provide completed HMA construction that meets the contract requirements.

Include the following elements in the pavement inspection plan and address these elements at the meeting:

- l. Process for daily inspections
- m. Means and methods to remove and dispose of project materials

**401-3.7 PROJECT MAINTENANCE.** Inspect daily according to pavement inspection plan. Remove, and dispose of project materials incorrectly deposited on existing and new pavement surfaces(s) inside and outside the project area including haul routes.

The Contractor is responsible for damage caused by not removing these materials and any damage to the roadway from the removal method(s).

Repair damage to the existing paved surfaces that results from fugitive materials or their removal.

### CONSTRUCTION METHODS

**401-4.1 WEATHER LIMITATIONS.** The HMA shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 401-9. The temperature requirements may be waived by the Engineer, if requested; however, all other requirements including compaction shall be met.

**TABLE 401-9. SURFACE TEMPERATURE LIMITATIONS OF UNDERLYING COURSE**

Mat Thickness	Base Temperature (°F Minimum)
3 inches or greater	40
Greater than 2 inches but less than 3 inches	45

**401-4.2 ASPHALT MIXING PLANT.** Meet American Association of State Highway and Transportation Officials (AASHTO) M 156. Use an HMA plant capable of producing at least 250 tons of HMA per hour noted on posted DEC air quality permit, designed to dry aggregates, maintain consistent and accurate temperature control, and accurately proportion asphalt binder and aggregates. HMA plant capacity to support echelon paving shall be a minimum of 400 tons per hour produced by a maximum of 2 plants. Both plants shall produce the same mix design. Calibrate the HMA plant and furnish copies of the calibration data to the Engineer at least 24 hours before HMA production.

Provide a scalping screen at the asphalt plant to prevent oversize material or debris from being incorporated into the HMA.

Provide a tap on the asphalt binder supply line just before it enters the plant (after the 3-way valve) for sampling asphalt binder. Provide aggregate and asphalt binder sampling locations meeting OSHA safety requirements.

Plants may not be placed on Airport property unless a specific location is noted on the Plans. Requirements for all plants include:

- a. **Inspection of Plant.** The Engineer, or Engineer's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.
- b. **Storage Bins and Surge Bins.** Use of surge bins or storage bins for temporary storage of HMA will be permitted as follows:
  - (1) The HMA may be stored in surge bins for not longer than 3 hours.
  - (2) The HMA may be stored in insulated storage bins for not longer than 8 hours.

The bins shall be such that mix drawn from them meets the same requirements as mix loaded directly into trucks.

If the Engineer determines that there is an excessive amount of heat loss, segregation or oxidation of the mixture due to temporary storage, no temporary storage will 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 HMA shall have tight, clean, and smooth metal beds. To prevent the mixture 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).** MTVs used to transfer the material from the hauling equipment to the paver shall be self-propelled, 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 MTV will have remixing and storage capability of at least 15 tons to prevent physical and thermal segregation.

**401-4.5 ASPHALT PAVERS.** HMA pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of bituminous plant mix material 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 subsection 401-4.12. Place auger extensions within 20 inches of the screed extensions or per written manufacturer's recommendations.

**401-4.6 ROLLERS.** The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

**401-4.7 DENSITY DEVICE.** The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the Engineer upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

**401-4.8 PREPARATION OF ASPHALT BINDER.** The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F when added to the aggregate.

**401-4.9 PREPARATION OF MINERAL AGGREGATE.** The aggregate for the HMA shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

**401-4.10 PREPARATION OF HMA.** The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMD.

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 AASHTO T 195, 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 HMA upon discharge shall not exceed 0.5% of the total weight of mix, as determined by ATM 407.

**401-4.11 APPLICATION OF PRIME AND TACK COAT.** Immediately before placing the HMA, the underlying course shall be cleaned of all dust and debris.

If required, a prime coat in accordance with Item P-602 Emulsified Asphalt Prime Coat shall be applied to aggregate base prior to placing HMA.

A tack coat shall be applied in accordance with Item P-603 Emulsified Asphalt Tack Coat to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of HMA.

**401-4.12 LAYDOWN PLAN, TRANSPORTING, PLACING, AND FINISHING.** Prior to the placement of the HMA, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the Engineer.

The Contractor shall use an MTV conforming to the requirements of subsection 401-4.4.1 to deliver mix to the paver for taxiway paving.

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 HMA surface course and certify to the Engineer that every lot of each lift meets the grade tolerances of subsection 401-6.2f 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 HMA shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the Engineer. The HMA shall be placed in consecutive adjacent lanes having a minimum width of 20 feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the HMA uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot; however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet .On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The Engineer may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated HMA. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the Engineer, and if it can be demonstrated in the Department's laboratory, in the presence of the Engineer, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the Engineer, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet long.

~~Echelon paving shall be used for the final lift of HMA pavement. Pave the final lift of HMA with two pavers operating in echelon in adjacent lanes with a breakdown roller behind each paver operating with intelligent compaction equipment. The pavers shall be spaced no more than 50 feet apart. The distance between the pavers shall be reduced as required to ensure the HMA placed by the lead paver is greater than 230°F when the second paver places material against it. Two paving crews are required.~~

**401-4.13 COMPACTION OF HMA.** After placing, the HMA 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 power tampers approved by the Engineer.

Any mixture 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 pavement. 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. Any longitudinal joint should also have the use of a bulkhead for any traffic that may also cause a rolled edge. In both methods, all contact surfaces shall have a tack coat or joint adhesive applied, dependent on top/bottom asphalt lift, before placing any fresh mix against the joint.

Longitudinal joints shall be formed in such a manner that the joint meets density requirements of subsection 401-6.2c. Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F; or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a minimum of 3 inches and a maximum of 6 inches to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

For all joints below the top lift, uniformly coat joint surfaces with tack coat material meeting P-603.

When joint adhesive is required, follow joint adhesive manufacturer's recommendations for temperatures and application method. Otherwise, use tack coat material meeting Item P-603. Remove joint adhesive applied to the top of pavement surface. When forming a longitudinal joint in the final lift, apply a 1/8 inch thick band joint adhesive to the full height of the joint surface prior to placing any fresh hot mix asphalt against the joint. Joint edge preparation, and joint adhesive application temperature, thickness, and method shall be per the manufacturer's recommendations. Joint adhesive is not required between mats placed while echelon paving.

Joint sealant shall be applied in a 12-inch wide strip centered over joints in the final lift layer of HMA while the asphalt is still clean, free of moisture, and before striping. Joint sealant shall be applied over joints in the final lift formed by two panels of HMA composed of different type or class of mix; or of new against

existing HMA pavement. Joint surface preparation, and joint sealant application temperature, thickness, and method shall be per the manufacturer's recommendations.

Joints between existing and new HMA shall be saw cut. Cut a neat, straight line along the existing HMA to expose the full depth of the layer where new HMA is to be placed against existing asphalt. Use a power saw or other method approved by the Engineer.

Cut back of all cold joints is required as specified above.

The Contractor may provide additional joint density quality control by use of joint heaters at the Contractor's expense. The heaters shall be operated so they do not produce excessive heat when the units pass over new or previously paved material. When used, heaters will be required to be in operation at all times.

Electrically powered infrared heating equipment should consist of one or more low-level radiant energy heaters to uniformly heat and soften the pavement joints. The heaters should be configured to uniformly heat an area up to 18 inches in width and 3 inches in depth. Infrared equipment shall be thermostatically controlled to provide a uniform, consistent temperature increase throughout the layer being heated up to a maximum temperature range of 200°F to 300°F.

Propane powered infrared heating equipment shall be attached to the paving machine and the output of infrared energy shall be in the one to six-micron range. Converters shall be arranged end to end directly over the joint to be heated in sufficient numbers to continuously produce, when in operation, a minimum of 240,000 BTU per hour. The joint heater shall be positioned not more than one inch above the pavement to be heated and in front of the paver screed and shall be fully adjustable.

**401-4.15 SAW-CUT GROOVING.** If shown on the Plans, saw-cut grooves shall be provided as specified in Item P-621 Saw Cut Grooves. Do not perform saw-cut grooving until smoothness testing has been performed, as described in subsection 401-5.3.

**401-4.16 DIAMOND GRINDING.** . Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet wide. The saw blades shall be 1/8-inch wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches wide; and peaks and ridges approximately 1/32-inch higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate.

Equipment or grinding procedures that cause ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. The Contractor shall demonstrate to the Engineer that the grinding equipment will produce satisfactory results prior to making corrections to surfaces. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per ~~Item P-608 Emulsified Asphalt Seal Coat~~ Item P-608-R Rapid Cure Seal Coat to all areas that have been subject to grinding.

**401-4.17 NIGHTTIME PAVING REQUIREMENTS.** Paving during nighttime construction shall require the following:

- a. All paving machines, rollers, distribution trucks and other vehicles required by the Contractor for his operations shall be equipped with artificial illumination sufficient to safely complete the work.
- b. Minimum illumination level shall be twenty horizontal foot-candles and maintained in the following areas:
  - (1) An area of 30 feet wide by 30 feet long immediately behind the paving machines during the operations of the machines.

- (2) An area 15 feet wide by 30 feet long immediately in front and back of all rolling equipment, during operation of the equipment.
- (3) An area 15 feet wide by 15 feet long at any point where an area is being tack coated prior to the placement of pavement.
- c. As partial fulfillment of the above requirements, the Contractor shall furnish and use, complete artificial lighting units with a minimum capacity of 3,000 watt electric beam lights, affixed to all equipment in such a way to direct illumination on the area under construction.
- d. A lighting plan must be submitted by the Contractor and approved by the Engineer prior to the start of any nighttime work.

Lighting for nighttime construction is required for work occurring between end civil twilight and begin civil twilight as posted the United States Naval Observatory on all days except the “No Lighting Required” period shown in Table 401-10.

**TABLE 401-10. NIGHTTIME ILLUMINATION EXCLUSIONS**

Latitude (degrees)	No Lighting Required		Nearby
	Start	End	Cities
South of 61	Lighting Required All Year		Everything South of Hope
61	June 11	July 1	Anchorage, Valdez, Girdwood
62	June 2	July 13	Wasilla, Palmer, Glennallen, Talkeetna
63	May 27	July 17	Cantwell, Paxson, McGrath
64	May 22	July 21	Tok, Delta, Nome
65	May 18	July 25	Fairbanks
66	May 14	July 29	Circle City
67	May 10	August 2	Coldfoot, Kotzebue
68	May 7	August 6	Galbraith Lake
69	May 3	August 9	Happy Valley
70	April 30	August 12	Deadhorse
71	April 27	August 15	Utqiagvik (Barrow)
72	April 24	August 19	

**CONTRACTOR QUALITY CONTROL (CQC)**

**401-5.1 GENERAL.** The Contractor shall develop a CQC Program (CQCP) according to the GCP Section 100. No partial payment will be made for materials that are subject to specific QC requirements without an approved CQCP.

**401-5.2 CONTRACTOR QUALITY CONTROL (QC) FACILITIES.** The Contractor shall provide or contract for testing facilities in accordance with GCP Section 100. The Engineer shall be permitted unrestricted access to inspect the Contractor’s QC facilities and witness QC activities. The Engineer will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

**401-5.3 QUALITY CONTROL (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 ATM 405 or ATM 406, by total weight of mix for determination of asphalt content. When using ATM 406, 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 lot from mechanical analysis of extracted aggregate in accordance with ATM 304 and ATM 408.
- 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 ATM 202.
- d. **Moisture Content of Asphalt.** The moisture content shall be determined once per day in accordance with ATM 407.
- 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 ATM 411.
- g. **Smoothness for Contractor Quality Control.** The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than 1/4-inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues.

The Contractor may use a 12-foot straightedge, a rolling inclinometer meeting the requirements of ASTM E2133, or rolling external reference device that can simulate a 12-foot straightedge approved by the Engineer. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement.

Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using the FAA profile program, ProFAA, or FHWA ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the Plans.

- (1) **Transverse Measurements.** Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement

centerline each 50 feet or more often as determined by the Engineer. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

**(2) Longitudinal Measurements.** Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet; and at the third points of paving lanes when widths of paving lanes are 20 feet or greater. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4-inch shall be corrected with diamond grinding per subsection 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 subsection 401-6.2d. 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 grade line elevations and cross-sections shown on the Plans by more than 1/2-inch vertically and 0.1 feet laterally. The documentation will be provided by the Contractor to the Engineer within 24 hours.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2-inch less than the thickness specified on the Plans. Grinding shall be in accordance with subsection 401-4.16.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus 1/2-inch and replacing with new material. Skin patching is not allowed.

**401-5.4 SAMPLING.** When directed by the Engineer, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

**401-5.5 CONTROL CHARTS.** The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt binder content, and density.

Control charts shall be posted in a location satisfactory to the Engineer and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the Engineer may suspend production or acceptance of the material.

- a. **Individual Measurements.** Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt binder content, and density. The control charts shall use the JMD target values as indicators of central tendency for the test parameters with associated Action and Suspension Limits in Table 401-11.

**Table 401-11. CONTROL CHART LIMITS FOR INDIVIDUAL MEASUREMENTS**

Sieve	Action Limit	Suspension Limit
3/4-inch	±6%	±9%
1/2-inch	±6%	±9%
3/8-inch	±6%	±9%
No. 4	±6%	±9%
No. 16	±5%	±7.5%
No. 50	±3%	±4.5%
No. 200	±2%	±3%
<b>Asphalt Binder Content</b>	±0.45%	±0.70%
<b>Minimum VMA</b>	-0.5%	-1.0%

- b. **Range.** Control charts for range shall be established to control process variability for the test parameters and Suspension Limits listed in Table 401-12. The range shall be computed for each lot 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  $n = 4$ .

**Table 401-12. CONTROL CHART LIMITS BASED ON RANGE (n = 2)**

Sieve	Suspension Limit
1/2-inch	11%
3/8-inch	11%
No. 4	11%
No. 16	9%
No. 50	6%
No. 200	3.5%
<b>Asphalt Content</b>	0.8%

- c. **Corrective Action.** The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:



- (1) One point falls outside the Suspension Limit line for individual measurements or range; or
- (2) Two points in a row fall outside the Action Limit line for individual measurements.

**401-5.6 QUALITY CONTROL (QC) REPORTS.** The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with the CQCP described in GCP Section 100.

## **MATERIAL ACCEPTANCE**

**401-6.1 ACCEPTANCE SAMPLING AND TESTING.** All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Engineer at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor. Selection of sampling and testing methods used for Acceptance are at the discretion of the Engineer.

**a. Lot size.**

- (1) **Hot Mix Asphalt Lots.** The bid quantity of each type of HMA produced and placed for each bid schedule will be divided into lots and the lots evaluated individually for acceptance. The Department has the exclusive right and responsibility for determining the acceptability of all materials incorporated into the project. The results of the acceptance testing performed by the Engineer will be made available to the Contractor.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant

- (2) **5,000 Ton Lot Size.** A lot will normally be 5,000 tons. The lot will be divided into sub-lots of 500 tons, each randomly sampled and tested for asphalt binder content, density and gradation according to this subsection. The lot is evaluated for price adjustment according to subsection 401-6.2. Seasonal startup or a new JMD requires starting a new lot.

If the project has more than one lot and if less than eight sub-lots have been sampled at the time a lot is terminated, the material in the shortened lot will be included as part of the prior lot and the price adjustment computed for the prior lot will include the samples from the shortened lot. Density test results from material in the shortened lot will be based on the MSG of the shortened lot. If there is no prior lot, and there are at least three sub-lots, the material in the shortened lot will be considered as a lot and the price adjustment will be based on the actual number of test results in the shortened lot. If there are less than three sub-lots, the HMA will be accepted for payment based on the Engineer's approval of the JMD, and placement and compaction of the HMA to the specified depth, finished surface requirements and tolerances. The Engineer reserves the right to perform any testing required in order to determine acceptance.

If eight or nine sub-lots have been placed at the time a lot is terminated, they will be considered as a lot and the price adjustment will be based on the actual number of test results in the shortened lot.

- (3) **1,500 to 4,999 Ton Lot Size.** If the total ~~contract~~ bid schedule bid quantity is between 1,500 tons and 4,999 tons, the total ~~project~~ bid schedule quantity will be considered one lot. The lot will be divided into sub-lots of 500 tons and randomly sampled for asphalt binder content, density and gradation according to this subsection. The lot will be evaluated for price adjustment according to subsection 401-6.2 except as noted.

- (4) **Under 1,500 Ton Lot Size.** If the total ~~contract~~ bid schedule bid quantity is less than 1,500 tons, asphalt concrete pavement will be accepted for payment based on the Engineer's approval of a Job Mix design and the placement and compaction of the HMA to the specified

depth and finished surface requirements and tolerances, and material testing. The Engineer reserves the right to perform any testing required in order to determine acceptance.

Any area of finished surfacing that is segregated, fails to meet surface tolerance requirements, cools to below 175°F prior to completing compaction, or is any other way defective shall be removed and replaced with new asphalt concrete pavement. Removal and replacement of defective pavement shall be at no additional cost to the Department.

**(5) Joint Density Lot Size.** Longitudinal joints include joints internal to a lot and joints created when paving adjacent to previously placed lots. Joints constructed by echelon paving will not be evaluated for density, unless required by the Engineer.

**(6) Asphalt Binder Grade Lot Size.** The lot size for asphalt binder is 200 tons of the same grade asphalt binder. If a ~~project-bid schedule~~ has more than one lot and the remaining asphalt binder quantity of the same grade is less than 150 tons, it is added to the previous lot and that total quantity will be evaluated as one lot. If the remaining asphalt binder quantity is 150 tons or greater, it is sampled, tested and evaluated as a separate lot.

If the bid schedule bid quantity of asphalt binder is between 85 and 200 tons, the ~~contract-bid schedule~~ quantity is considered as one lot and sampled, tested, and evaluated according to this subsection. Quantities of asphalt binder less than 85 tons will be accepted based on manufacturer's certified test reports and certification of compliance.

#### b. Sampling.

**(1) Asphalt Binder Content.** Samples taken for the determination of asphalt binder content will be taken from behind the screed prior to initial compaction, or from the windrow, according to ATM 402 and ATM 403.

If sampling is from behind the screed prior to initial compaction, then provide a WAQTC certified technician and equipment to take plate samples. Sample in locations determined by the Engineer. Sample in the presence of the Engineer and immediately transfer possession of the sample to the Engineer.

Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable.

**(2) Gradation.** Samples taken for the determination of aggregate gradation will be from the same location as specified for the determination of asphalt binder content. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable.

**(3) Mat Density.** The location(s) for taking core samples is determined using a set of random numbers (independent of asphalt binder and aggregate sampling set of random numbers) and the Engineer's judgment. The Contractor shall cut full depth core samples with a diameter of 6 inches from each sub-lot, within 24 hours of final rolling for density acceptance testing. The samples shall be neatly cut by a core drill at the randomly selected location designated by the Engineer according to the procedures contained in ATM 413.

All voids left by sampling shall be backfilled with new asphalt concrete material and compacted within 24 hours of sampling. All core holes on final lift will be sealed with GSB-88, after being backfilled and compacted, or have Crafcro Joint Adhesive applied prior to backfill and compaction.

Cores for mat density shall not be taken closer than one foot from a transverse or longitudinal joint.

- (4) **Joint Density.** Longitudinal joint density cores shall be taken directly on the joint, at locations adjacent to cores taken from the mat completing the joint. Cores shall be taken by the Contractor in the presence of the Engineer. The Engineer will take immediate possession of the samples.
- (5) **Asphalt Binder Grade.** Sample asphalt binder at the plant from the supply line in the presence of the Engineer according to ATM 401. The Engineer will take immediate possession of the samples. Take three samples from each lot, one for acceptance testing, one for Contractor requested retesting, and one held in reserve for referee testing if requested.

**c. Testing.**

- (1) **Asphalt Binder Content.** Asphalt binder content will be determined by ATM 405 or ATM 406, by total weight of mix.
- (2) **Gradation.** Cold feed or dry batched aggregate gradations will be tested according to ATM 304 and evaluated for acceptance according to subsection 401-6.2. Asphalt concrete mix and core sample gradations will be determined according to ATM 408 from extracted aggregate, or aggregate remaining after the ignition oven ATM 406 has burned off the asphalt binder.
- (3) **Density.** Mat density will be based on theoretical maximum specific gravity (MSG) as determined by ATM 409. For the first lot of HMA, the MSG will be determined by the JMD. For additional lots, the MSG will be determined from the randomly selected sample from the first sub-lot.

For the top lift longitudinal joint density, use the MSG of the panel completing the joint. No adjustment will be made to the MSG or any other material property, due to application of joint adhesive, in evaluating joint density.

Core samples will be tested according to ATM 410, and evaluated for acceptance according to subsection 401-6.2.

- (4) **Asphalt Binder Grade.** Asphalt binder will be tested for conformance to the requirements specified in subsection 401-2.3 and evaluated for acceptance according to subsection 401-6.2.

**401-6.2 ACCEPTANCE CRITERIA.**

- a. **General.** Acceptance will be based on the following characteristics of the HMA and completed pavement as well as the implementation of the Contractor's Quality Control Plan (CQCP) and test results:

- (1) Aggregate Gradation
- (2) Asphalt Binder Content
- (3) Mat Density
- (4) Joint Density
- (5) Thickness
- (6) Smoothness
- (7) Grade
- (8) Asphalt Binder Quality

The Engineer may at any time reject and require the Contractor to dispose of any batch of HMA which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or improper mix temperature. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the Engineer, and, if it can be demonstrated in a certified laboratory, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

**b. Mat Density, Aggregate Gradation, and Asphalt Binder Content.** Evaluation for acceptance of each lot of plant-produced material for mat density, aggregate gradation, and asphalt binder content will be based on percentage of material within specification limits (PWL). Acceptance and payment for the lot will be according to subsection 401-8.1.

**(1) Percentage of Material within Specification Limits (PWL).** Acceptance of test results for HMA asphalt binder content, gradation and mat density are used in HMA price adjustment. These test results for a lot are analyzed collectively and statistically by the Quality Level Analysis (QLA) method as specified in GCP Section 110 to determine the total estimated percentage of the lot that is within specification limits.

HMA pay factors are computed as follows:

**(a)** All statistical Quality Level Analysis (QLA) is computed using the Engineer's Price Adjustment programs.

**(b)** The USL and LSL are equal to the Target Value (TV) plus and minus the allowable tolerances. The specification tolerance limits (L) and (U) are contained in Table 401-13. The values for percent passing the No. 200 sieve, asphalt binder content and density test results are reported to the nearest 0.1%. All other sieves used in QLA are reported to the nearest whole number. The TV is the specification value shown on the approved JMD.

**TABLE 401-13. LOWER SPECIFICATION TOLERANCE LIMIT (L)  
AND UPPER SPECIFICATION TOLERANCE LIMIT (U)**

Measured Characteristics	L	U
3/4 in.	99	100
1/2 in.	TV -6	TV +6
3/8 in.	TV -6	TV +6
No. 4	TV -6	TV +6
No. 8	TV -6	TV +6
No. 16	TV -5	TV +5
No. 30	TV -4	TV +4
No. 50	TV -4	TV +4
No. 100	TV -3	TV +3
No. 200 *	TV -2.0 *	TV +2.0
Asphalt %	TV -0.4	TV +0.4
Mat Density	93.0%	100.0%

TV (Target Value) = Job Mix Design value for gradation and asphalt binder content

\* L for the No. 200 sieve is restricted by the broadband limits Table 401-8.

**c. Longitudinal Joint Density.** The minimum density for top lift longitudinal joint density is 92.0% of the MSG of the panel completing the joint. MSG will be determined according to ATM 409. Top lift longitudinal joints will be evaluated for acceptance according to 401-8.1b.

For a joint core that is less than 92.0% of the MSG perform corrective action on the sublot containing the joint core. Perform Corrective Action by heating the longitudinal joint to compaction temperatures with an infrared heater and compact to at least 92.0% of the MSG. Do not exceed mixing temperatures as indicated on the mix design. Material may be added to the joint to meet surface tolerances, but do not skin patch. Perform corrective action prior to grooving or striping. After corrective action is performed and joint is acceptable, seal the joints in the sub-lot per 401-4.14.

**d. Thickness.** Thickness of each lift will be evaluated by the Engineer to the requirements shown on the Plans. Measurements of thickness will be made by the Engineer using the cores extracted from the mat for each sub-lot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4-inch less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or sub-lot shall be corrected by the Contractor at his expense by removing the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the Engineer to circumscribe the deficient area.

**e. Smoothness.**

**(1) Non-runway HMA.** The finished surfaces of the HMA shall not vary more than 1/4 inch for the surface layer when tested with a 12-foot straightedge. Straightedge testing will be performed in accordance with subsection 401-6.2e(2)(a).

**(2) Runway HMA.** The final surface shall be free from roller marks and will be subject to the following smoothness testing.

**(a) Straight Edge Testing.** After the final rolling, the surface of each lot shall be tested in both transverse and longitudinal directions for smoothness. The finished surface course of the pavement shall not vary more than 1/4-inch when evaluated with a 12-foot straightedge. Measurements will include joints.

**(i) Transverse Measurements.** Transverse measurements will be taken for each lot placed. Transverse measurements will be taken perpendicular to the pavement centerline every 50 feet or more often as determined by the Engineer.

**(ii) Longitudinal Measurements.** Longitudinal measurements will be taken for each lot placed. Longitudinal tests will be parallel to the centerline of paving; at the center.

**(b) Profilograph Smoothness for QA Acceptance.** The final profilograph shall be the full length of the project to facilitate testing of roughness between lots. The Engineer will perform a profilograph roughness test on the completed project with a profilograph meeting the requirements of ASTM E1274 or a Class I inertial profiler meeting ASTM E950. Data and results shall be provided within 48 hours of profilograph roughness tests.

The pavement shall have an average profile index less than 15 inches per mile per 1/10-mile. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate "must grind" bumps and the Profile Index for the pavement using a 0.2-inch blanking band. The bump template must span one inch with an offset of 0.4 inches. The profilograph must be calibrated prior to use and operated by a factory or Department approved, trained operator.

Profilograms shall be recorded on a longitudinal scale of one inch equals 25 feet and a vertical scale of one inch equals one inch. Profilograph shall be performed one foot right and left of project centerline and 15 feet right and left of project centerline.

- (c) Corrective Action.** Areas of unacceptable smoothness on final surface course shall be corrected with diamond grinding per subsection 401-4.16 or by removing and replacing full depth of surface course.

Where corrections are necessary, a second profilograph run shall be performed to verify that the corrections produced an average profile index of 15 inches per mile per 1/10-mile or less.

- f. Grade.** Grade shall be evaluated after the first day of placement and then as a minimum, prior to the placement of the surface lift and after the placement of the surface lift to allow adjustments to paving operations if measurements do not meet specification requirements. The Contractor shall provide the survey data/results to the Engineer by the following day after the measurements have been taken. Measurements shall be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and 50-foot longitudinal spacing on cross sections verifying that the surface is in conformance with project Plans and cross sections. Data shall include the difference between the measured surface and plan grades.

The finished surface of the pavement shall not vary from the gradeline elevations and cross sections shown on the Plans by more than 0.05-foot. The finished grade of each lot will be determined by running levels at intervals of 50 feet or less longitudinally and transversely to determine the elevation of the completed pavement. The lot size will be 2,000 square yards. When more than 15% of all the measurements within a lot are outside the specified tolerance, the Contractor shall remove the deficient area and replace with new material. Removal depth shall be a minimum of 2 inches. Skin patching for correcting low areas will not be permitted. High points may be ground off.

- g. Asphalt Binder Quality.** Acceptance and payment for the lot shall be determined according to subsection 401-8.1c. If three consecutive samples are out of specification, stop HMA production immediately and submit a corrective action plan to the Engineer for approval.

#### **401-6.3 RETESTS.**

- a. General.** When test results have failed to meet specification tolerance limits, retest of acceptance test results for asphalt binder content, gradation, and density may be requested provided the quality control requirements of subsection 401-6.3 are met. Deliver this request in writing to the Engineer within seven days of receipt of the final test of the lot.

The Engineer will mark the sample location for the density retest within a 2-foot radius of the original core. The original test results are discarded and the retest result is used in the price adjustment calculation regardless of whether the retest result gives a higher or lower pay factor.

Only one retest per sample is allowed. Except for the first lot, when gradation and asphalt binder content are determined from the same sample, retesting for gradation or asphalt binder from the first sub-lot of a lot will include retesting for the MSG; when separate samples are used, retesting for asphalt binder content will include retesting for MSG.

When gradation and asphalt binder content are determined from the same sample, a request for a retest of either gradation or asphalt binder content results in a retest of both. Both gradation and asphalt binder content retest results are used in the price adjustment calculation. Retesting will be performed by a department laboratory.

- (1)** A redefined PWL will be calculated for the lot.
- (2)** The cost for resampling shall be borne by the Contractor.

- (3) Asphalt Binder Grade Retest.** Retest of acceptance test results may be requested provided the quality control requirements of subsection 401-6.3 are met.

The assigned test value (ATV) will be determined using ASTM D3244. Testing will be by AASHTO accredited independent laboratories. Each test will be completed by a different laboratory.

Submit a written request, for a retest, no more than seven days from receiving notice of the failed acceptance test. In the request, identify the retest laboratory. The Engineer will send the second sample (retest sample) to the laboratory. Provide the retest results to the Engineer. Contractor pays for the retest costs.

If the average of the combined test results  $([\text{acceptance} + \text{retest}]/2)$  passes the specification requirement, the average value becomes the ATV. If this ATV fails the specification requirement, the Engineer or Contractor may request the third sample (referee sample) be tested.

The Engineer will send the third sample (referee sample) to an agreed upon laboratory. The average of the combined test results  $([\text{acceptance} + \text{retest} + \text{referee}]/3)$  equals the ATV. If the ATV fails to meet Specifications, the Contractor pays for the referee test.

- b. Payment for Resampled Lots.** The redefined PWL for a resampled lot will be used to calculate the payment for that lot according to GCP Section 110.

#### **401-6.4 RESAMPLING PAVEMENT FOR MAT DENSITY.** (Subsection Not Used)

**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 401-8, subsection 401-3.3. The leveling course shall meet the requirements of subsection 401-3.3 and 401-6.2, but shall not be subject to the mat density or joint density requirements. The leveling course shall be compacted with the same effort used to achieve density of the control strip. The leveling course shall not exceed the lift thickness associated with each gradation in Table 401-8, subsection 401-3.3.

### **METHOD OF MEASUREMENT**

**401-7.1 MEASUREMENT.** HMA will be measured by the number of tons used in the accepted work, based on recorded truck scale weights. No deduction will be made for the weight of asphalt binder in the mixture.

Asphalt binder will be measured by the number of tons of asphalt binder used in the accepted pavement determined as follows:

The method of measurement to be used will be based on one of the following procedures listed in subsections a, b, and c.

- a.** Supplier's invoices minus waste, diversion and excess left over. This method may be used on projects where deliveries are made in sealed tankers and the plant is producing material for one project only. Method b. will be used to compute left over. Waste and diversion will be computed in a manner to be determined by the Engineer.
- b.** Volume measure (tank stickings) of actual daily uses. It is the Contractor's responsibility to notify the Engineer whenever material is to be added to the calibrated volume measure or whenever material from the volume measure is to be used for work other than that specified in this contract.
- c.** Percent of asphalt binder content for each sub-lot as determined by ATM 405 or ATM 406 multiplied by the weight represented by that sub-lot.

Method c. will be used for determining asphalt binder quantity unless otherwise directed in writing by the Engineer. Whichever method is used must be used for the duration of the project. Another method may be used and computed as a check, but only one method will be used for payment computation.

- d. Longitudinal Joint Density Price Adjustment. By the linear foot of top lift longitudinal joint under subsection 401-8.1(b).
- e. Joint Adhesive. By the linear foot of longitudinal and transverse joint.

**401-7.2 ASPHALT MATERIAL PRICE ADJUSTMENT. Not used.**

**BASIS OF PAYMENT**

**401-8.1 Payment.** Payment for an accepted lot of HMA will be made at the contract unit price per ton for HMA and asphalt binder adjusted according to subsection 401-8.1a. 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.

- a. **HMA Price Adjustment.** The HMA price adjustment will be the sum of the HMA price adjustments for each lot. Acceptance test results for HMA asphalt binder content, gradation, and mat density are used in the HMA price adjustment. These tests results for a lot are analyzed collectively and statistically by the Quality Level Analysis (QLA) method as specified in GCP subsection 110-01 to determine the total estimated percentage of the lot that is within specification limits.

The price adjustment will be based on the Composite Pay Factor (CPF) for asphalt binder content and aggregate gradation or the Density Pay Factor (DPF) whichever is the lowest value. Table 401-14 is used to determine the weight factor (f) for each sieve size and asphalt binder content. The HMA Composite Pay Factor (CPF) is computed for asphalt binder content and all sieves using the following formula:

$$CPF = \frac{[f_{3/4in} (PF_{3/4in}) + f_{1/2in} (PF_{1/2in}) + \dots + f_{ac} (PF_{ac})]}{\sum f}$$

**TABLE 401-14. WEIGHT FACTORS**

	<b>Type I Factor “f”</b>	<b>Type II and V Factor “f”</b>	<b>Type III Factor “f”</b>
1 in	4	-	-
3/4 in.	4	4	-
1/2 in.	4	5	4
3/8 in.	4	5	5
No. 4	4	4	5
No. 8	4	4	5
No. 16	4	4	5
No. 30	4	5	6
No. 50	4	5	6
No. 100	4	4	4
No. 200	20	20	20
Asphalt %	40	40	40

The Density Pay Factor (DPF) is computed using HMA mat core compaction acceptance test results.



The CPF and DPF are rounded to the nearest 0.001. The price adjustment for each individual lot is calculated as follows:

$$\text{HMA Price Adjustment} = [(\text{CPF or DPF})^{-1}] \times (\text{tons in lot}) \times (\text{PAB})$$

PAB = Price Adjustment Base per ton (for mix including asphalt binder)

\* Composite Pay Factor (CPF) or Density Pay Factor (DPF) whichever is lower value.

Price Adjustment Base shall be:

(1) Dollars per ton as follows:

(a) PAB = [ \$ 115 ] per ton Hot Mix Asphalt [ Type I ], [ Class A ];

(b) PAB = [ \$ 110 ] per ton Hot Mix Asphalt [ Type II ], [ Class B ];

A lot containing material with less than a 1.000 pay factor is accepted at an adjusted price, provided that pay factor is at least 0.800 and there are no isolated defects identified by the Engineer. A lot containing material that fails to obtain the minimum pay factor is considered unacceptable and rejected under GCP Section 110.

Hot Mix Asphalt Price Adjustment also includes fees assessed for additional JMDs as identified in 401-3.2.

**b. Longitudinal Joint Density Price Adjustment.** The longitudinal joint density price adjustment will be based on top lift cold joint densities greater than 93.0%. Add \$1.50 per lineal foot for one-half the distance to each prior and subsequent passing joint density greater than 93.0%.

**c. Asphalt Binder Price Adjustment.** A lot quantity of asphalt binder, with a quality pay factor less than 1.000 is accepted or rejected according to Table 401-15, Asphalt Binder Quality Pay Factors.

**Table 401-15. ASPHALT BINDER QUALITY PAY FACTORS**

Pay Factor			1.01	1.00	0.95	0.90	0.75	Reject
<b>RTFO (Rolling Thin Film Oven)</b>								
<b>DSR<sup>(1)</sup></b>	All Grades	$G^*/\text{Sin}\delta, \text{kPa}^{-1}$	$\geq 2.69$	2.68- 2.20	2.19- 1.96	1.95- 1.43	1.42- 1.10	$< 1.10$
	PG 52-40V	$J_{NR-3.2}$	$\leq 0.39$	0.40- 0.50	0.51- 0.59	0.60- 0.69	0.70- 1.00	$> 1.00$
$\% \text{ Rec}_{3.2}$		$\geq 86$	85- 75	74- 68	67- 60	59- 55	$< 55$	
<b>MSCR<sup>(2)</sup></b>	PG 58-34E	$J_{NR-3.2}$	$\leq 0.19$	0.20- 0.25	0.26- 0.29	0.30- 0.39	0.40- 0.50	$> 0.50$
		$\% \text{ Rec}_{3.2}$	$\geq 90$	89-85	84-80	79-75	74-70	$< 70$
	PG 64-40E	$J_{NR-3.2}$	$\leq 0.05$	0.05- 0.10	0.11- 0.15	0.16- 0.20	0.21- 0.25	$> 0.25$
		$\% \text{ Rec}_{3.2}$	$\geq 97$	96- 95	94- 91	90- 85	84- 80	$< 80$
<b>PAV (Pressure Aging Vessel)</b>								
<b>DSR<sup>(3)</sup></b>	PG 64-40E And all other Grades	$G^*\text{Sin}\delta, \text{kPa}$	$\leq 4711$	4712- 5000	5001- 5289	5290- 5578	5579- 5867	$> 5867$
	PG 52-40V, PG 58-34E	$G^*\text{Sin}\delta, \text{kPa}$	$\leq 5700$	5701- 6000	6001- 6300	6301- 6600	6601- 7000	$> 7000$
<b>CS<sup>(4,5)</sup></b>	All Grades <sup>(4)</sup>	BBR, "S" MPa	$\leq 247$	248- 300	301- 338	339- 388	389- 449	$\geq 450$

Pay Factor		1.01	1.00	0.95	0.90	0.75	Reject
	All Grades <sup>(5)</sup>	BBR, "M"	$\geq 0.320$	<del>0.319</del> 0.300	<del>0.299</del> 0.294	<del>0.293</del> 0.278	<del>0.277</del> 0.261

Creep Stiffness (CS) ————— Dynamic Shear Rheometer (DSR) ————— Multiple Stress Creep Recovery (MSCR)

Asphalt Binder Price Adjustment = (Lowest Pay Factor — 1.00) x (Binder Quantity) x PAB x 5

Select the lowest pay factor from:

**RTFO** (test at Performance Grade Temperature)

(1) DSR, All Grades,  $G^*/\sin\delta$ , kPa<sup>-1</sup>

(2) MSCR: PG, Select the highest pay factor, either  $J_{NR,3.2}$  or % Rec3.2

**PAV**

(3) Intermediate DSR, PG,  $G^*\sin\delta$ , kPa

(4) CS, All Grades, BBR, S MPa

(5) CS, All Grades, BBR, M

If Pay Item P401.130.0000 HMA Combined Price Adjustment is in the Bid Schedule, the Price Adjustment Pay Items (P401.080.0000 Hot Mix Asphalt Price Adjustment, Method 1, P401.110.0000 Longitudinal Joint Density Price Adjustment, and P401.120.0000 Asphalt Binder Quality Price Adjustment) will be paid under P401.130.0000 HMA Combined Price Adjustment.

Payment will be made under:

Item P401.010.0030	Hot Mix Asphalt Type II, Class A – per ton
Item P401.010.0040	Hot Mix Asphalt Type II, Class B – per ton
Item P401.020.5828	Asphalt Binder (PG 58-28) – per ton
Item P401.130.0000	HMA Combined Price Adjustment – per contingent 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.

Alaska Test Methods (ATM) Manual

ATM 202	Moisture Content of Aggregate and Soils
ATM 204	Liquid Limit of Soils
ATM 205	Plastic Limit and Plasticity Index of Soils
ATM 301	Sampling Aggregates
ATM 304	Sieve Analysis of Aggregate and Soils
ATM 305	Determining the Percentage of Fracture in Coarse Aggregate.
ATM 306	Flat and Elongated
ATM 307	Sand Equivalent
ATM 313	Degradation Value of Aggregate
ATM 401	Sampling Bituminous Materials

ATM 402	Sampling Bituminous Mixes
ATM 403	Sampling Hot Mix Asphalt
ATM 405	Asphalt Binder Content of Asphalt Concrete Mixtures by the Nuclear Method
ATM 406	Asphalt Binder Content of Bituminous Mixes by Ignition Method
ATM 407	Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method
ATM 408	Mechanical Analysis of Extracted Aggregate
ATM 409	Maximum Specific Gravity of Bituminous Mixes
ATM 410	Bulk Specific Gravity and Percent Compaction of Bituminous Mixes
ATM 411	In-Place Density of Asphalt Mixtures by Nuclear Method
ATM 413	Sampling Hot Mix Asphalt (HMA) after Compaction (Obtaining Cores)
ATM 414	Anti-Strip Requirements of Hot Mix Asphalt
ATM 417	Hot Mix Asphalt Design by the Marshall Method
ATM 419	Rutting Susceptibility using an Asphalt Pavement Analyzer

ASTM International (ASTM)

ASTM D5	Penetration of Bituminous Materials
ASTM D113	Ductility of Asphalt Materials
ASTM D242	Mineral Filler for Bituminous Paving Mixtures
ASTM D244	Practices for Emulsified Asphalts
ASTM D1073	Fine Aggregate for Asphalt Paving Mixtures
ASTM D2007	Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
ASTM D2042	Solubility of Asphalt Materials in Trichloroethylene
ASTM D2172	Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D2669	Apparent Viscosity of Petroleum Waxes Compounded with Additives (Hot Melts)
ASTM D3244	Utilization of Test Data to Determine Conformance with Specifications
ASTM D3666	Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

ASTM D4402	Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D4552	Classifying Hot-Mix Recycling Agents
ASTM D5329	Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Concrete Pavements
ASTM E1274	Measuring Pavement Roughness Using a Profilograph
ASTM E950	Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
ASTM E2133	Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M 17	Mineral Filler for Bituminous Paving Mixtures
AASHTO M 156	Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
AASHTO M 320	Performance-Graded Asphalt Binder
AASHTO M 332	Performance-Graded Asphalt Binder Using Multiple Stress Creep Recovery (MSCR) Test
AASHTO R 35	Superpave Volumetric Design for Asphalt Mixtures
AASHTO T 96	Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
AASHTO T 104	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
AASHTO T 195	Determining Degree of Particle Coating of Bituminous-Aggregate Mixtures
AASHTO T 304	Uncompacted Void Content of Fine Aggregate
AASHTO T 314	Determining the Fracture Properties of Asphalt Binder in Direct Tension (DT)
AASHTO T 315	Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)
AASHTO T 316	Viscosity Determination of Asphalt Binder Using Rotational Viscometer
AASHTO T 350	Multiple Stress Creep Recovery (MSCR) Test of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)

Asphalt Institute (AI)

Asphalt Institute MS-2 Mix Design Manual, 7th Edition

## ITEM P-602 EMULSIFIED ASPHALT PRIME COAT

### DESCRIPTION

**602-1.1** This item shall consist of an application of liquid asphalt material on the prepared base course or Recycled Asphalt Pavement according to these Specifications and in reasonably close conformity to the lines shown on the Plans.

### MATERIALS

**602-2.1 LIQUID ASPHALT MATERIAL.** The types, grades, controlling specifications, and application temperatures for the prime coat are given in Table 602-1. Provide the specific prime coat material designated in the Plans.

**TABLE 602-1. MATERIALS**

Type and Grade	Specification	Application Temperatures \\ °F	Application Rate gal/yd <sup>2</sup>
<b>Emulsified Asphalt</b>			
SS-1, SS-1h	AASHTO M 140	70-160	0.27 to 0.53
MS-2, HFMS-1	AASHTO M 140	70-160	0.27 to 0.53
CSS-1, CSS-1h	AASHTO M 208	70-160	0.27 to 0.53
CMS-2	AASHTO M 208	70-160	0.27 to 0.53
CMS-2s	\\2\\	70-160	0.22 to 0.44
<b>Cutback Asphalt</b>			
RC-30	ASTM D2028	80+	0.27 to 0.53
RC-70	ASTM D2028	120+	0.27 to 0.53
RC-250	ASTM D2028	165+	0.27 to 0.53
MC-30	ASTM D2027	80+	0.11 to 0.33

\\1\\ The maximum temperature for cutback asphalt shall be that at which fogging occurs.

\\2\\ CMS-2s shall meet the following specifications: Viscosity, Saybolt Furol, of 50 to 450 at 122 °F when tested under AASHTO T 59. Particle charge test of Positive when tested under AASHTO T 59. Sieve test maximum of 0.10% when tested under AASHTO T 59. Oil distillate, by volume of emulsion, of 20% maximum when tested under AASHTO T 59. Residue of 65% minimum when tested under AASHTO T 59. Penetration of 100 to 250 at 77 °F, 100 g, 5 s when tested under ASTM D5. Ductility of 40 cm minimum at 77 °F when tested under ASTM D113. Solubility in trichloroethylene of 97.5% minimum.

The Contractor shall provide samples of the prime coat material and a copy of the manufacturer's Certificate of Analysis (COA) for each carload or equivalent of the liquid asphalt material to the Engineer for review and acceptance before the liquid asphalt material is applied. The furnishing of the COA for the liquid 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 prime coat shall be applied only when the existing surface is dry or contains sufficient moisture to get uniform distribution, when the surface temperature is above 45 °F, and when the weather is not foggy or rainy. The temperature requirements may be waived, but only when so directed by the Engineer.

**602-3.2 EQUIPMENT.** The equipment used by the Contractor shall include a self-powered pressure distributor and equipment for heating the prime coat.

The distributor shall be designed, equipped, maintained, calibrated within the past year to ASTM D2995, and operated so that prime coat at even heat may be applied uniformly on variable widths of surface at the specified rate. The allowable variation from the specified rate shall not exceed 5%. Distributor equipment shall include a tachometer, pressure gages, volume-measuring devices or a calibrated tank, and a thermometer for measuring temperatures of tank contents. The distributor shall be self-powered and shall be equipped with a power unit for the pump and full circulation spray bars adjustable laterally and vertically.

A power broom and/or blower shall be provided for any required cleaning of the surface to be treated.

**602-3.3 APPLICATION OF PRIME COAT.** ~~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 prime coat including solvent shall be uniformly applied with an asphalt distributor at the rate specified in Table 602-1, depending on the base course surface texture. The type of liquid asphalt material and application rate shall be approved by the Engineer prior to application.

Following the application, the primed surface shall be allowed to cure not less than 48 hours without being disturbed or for such additional time as may be necessary to permit the drying out of the prime until it will not be picked up by traffic or equipment. This period shall be determined by the Engineer. The surface shall then be maintained by the Contractor until the surfacing, if any, has been placed. Suitable precautions shall be taken by the Contractor to protect the primed surface against damage during this interval, including supplying, spreading, and removing any sand necessary to blot up excess prime coat.

**602-3.4 TRIAL APPLICATION RATES.** The Contractor shall conduct a trial application in the presence of the Engineer to demonstrate the liquid asphalt material can be satisfactorily applied within the application range specified in Table 602-1 for the specified material.

**602-3.5 FREIGHT AND WAYBILLS.** Before the final estimate is allowed, the Contractor shall file with the Engineer receipted bills when railroad shipments are made, and certified waybills when materials are received in any other manner, of the prime coat actually used in the construction covered by the contract. The Contractor shall not remove prime coat from the tank car or storage tank until the initial outage and temperature measurements have been taken by the Engineer, nor shall the car or tank be released until the final outage has been taken by the Engineer.

Copies of freight bills and waybills shall be furnished to the Engineer during the progress of the work.

## METHOD OF MEASUREMENT

**602-4.1** Prime coat will be measured by the ton, according to Subsection GCP-90-02. Removing any sand necessary to blot up excess prime coat is subsidiary to the work. Water added to emulsified asphalt will not be measured for payment.

## BASIS OF PAYMENT

**602-5.1** Payment will be made at the contract unit price per ton for accepted prime coat.

Payment will be made under:

Item P602.010.0010 Prime Coat, CSS-1 – per ton

### **TESTING REQUIREMENTS**

AASHTO T59	Test for Emulsified Asphalts
ASTM D5	Penetration of Bituminous Materials
ASTM D113	Ductility of Asphalt Materials
ASTM D2995	Estimating Application Rate and Residual Application Rate of Bituminous Distributors

### **MATERIAL REQUIREMENTS**

AASHTO M140	Emulsified Asphalt
AASHTO M208	Cationic Emulsified Asphalt
ASTM D2027	Cutback Asphalt (Medium-Curing Type)
ASTM D2028	Cutback Asphalt (Rapid Curing Type)





## ITEM P-603 EMULSIFIED ASPHALT TACK COAT

### DESCRIPTION

**603-1.1** This item shall consist of preparing and treating an asphalt or concrete surface with liquid 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 or cutback asphalt as specified in Table 603-1 as an asphalt application for tack coat appropriate to local conditions. Provide the specific tack coat material designated on the Plans.

The tack coat material shall not be diluted. The Contractor shall provide samples of the tack coat material and a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Engineer for review and acceptance before the asphalt material is applied. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

**TABLE 603-1. MATERIALS**

Type and Grade	Specification	Application Temperature °F
<b>Emulsified Asphalt</b>		
SS-1, SS-1h	AASHTO M 140	75-130
CSS-1, CSS-1h	AASHTO M 208	75-130
STE-1	\1\	68-140
<b>Cutback Asphalt</b>		
RC-70	AASHTO M 81	120-160

Note /1/ Special Tack Emulsion, STE-1. Meet the following, when tested using AASHTO T 59:

#### TESTS ON EMULSION

Viscosity @ 77 °F, SSF	30, max.
Storage Stability, 1 day, %	1, max.
Demulsibility, 35 mL 0.8% SDS, %	25, min.
Particle Charge	Positive*
Sieve Test, % Retained	0.10, max.
Distillation Oil by Vol. of Emulsion, %	5, max.
Distillation Residue by Wt. of Emulsion, %	45, min.

#### TESTS ON RESIDUE

Penetration @ 77 °F	100-250 (when tested under ASTM D5)
Ductility @ 77 °F, 5 cm/min., cm	40, min (when tested under ASTM D113)
Solubility in TCE, %	97.5, min.

\* If Particle Charge test is inconclusive, material having a max. pH value of 6.7 is acceptable.

## 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 or above; the temperature has not been below 35°F for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the Engineer.

**603-3.2 EQUIPMENT.** The Contractor shall provide equipment for heating and applying the tack coat material. The tack coat 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 or seven hundred (700) feet per minute.

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the Engineer.

A power broom and/or power blower shall be provided suitable for cleaning the surfaces to which the asphalt tack coat is to be applied.

**603-3.3 APPLICATION OF TACK COAT MATERIAL.** The tack coat material shall not be diluted. Immediately before applying the 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 tack coat material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in Table 603-2 below. The type of liquid asphalt material and application rate shall be approved by the Engineer prior to application.

**TABLE 603-2. APPLICATION RATE**

Surface Type	Residual Rate, gal/SY	Application Bar Rate, gal/SY
New asphalt	0.02-0.05	0.03-0.07
Existing asphalt	0.04-0.07	0.06-0.11
Milled Surface	0.04-0.08	0.06-0.12
Concrete	0.03-0.05	0.05-0.08

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the Engineer. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

**603-3.4 FREIGHT AND WAYBILLS.** The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the Engineer certified waybills and certified delivery tickets for all tack coat materials used in the construction of the pavement covered by the contract. Do not remove tack coat material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

#### **METHOD OF MEASUREMENT**

**603-4.1** The liquid asphalt material for tack coat shall be measured by the ton according to GCP Subsection 90-02. The liquid 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 liquid 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 ton of accepted tack coat material.

Payment will be made under:

Item P603.010.0010 Tack Coat, STE-1 – per ton

#### **REFERENCES**

AASHTO M 81	Cutback Asphalt (Rapid-Curing Type)
AASHTO M 140	Emulsified Asphalt
AASHTO M 208	Cationic Emulsified Asphalt
AASHTO T 59	Test for Emulsified Asphalts
ASTM D5	Penetration of Bituminous Materials
ASTM D113	Ductility of Asphalt Materials
ASTM D2995	Estimating Application Rate and Residual Application Rate of Bituminous Distributors



## ITEM P-608-R RAPID CURE SEAL COAT

### DESCRIPTION

**608-R-1.1** This item shall consist of the application of an asphalt surface treatment composed of natural and refined asphalt materials, additives, and light oils, for taxiways and runways with the application of a suitable aggregate to maintain adequate surface friction; and airfield secondary and tertiary pavements including aprons, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied as designated on the Plans.

The terms seal coat, asphalt sealer, and asphalt material are interchangeable throughout this specification. The term asphalt means natural and refined asphalt materials in this specification.

### MATERIALS

**608-R-2.1 AGGREGATE.** The fine-aggregate material shall be a dry, clean, sound, durable, angular shaped, with highly textured surfaces, manufactured specialty abrasive aggregate. It shall have 100% fractured faces, SiO<sub>2</sub> content of 55% minimum, CaO of 3% max, with a sand equivalent greater than 85 and a Mohs hardness of 7 or greater. Additional characteristics as outlined in Table 608-R-1. The Contractor shall submit specialty aggregate manufacturer's technical data and the specialty aggregate manufacturer's certification indicating that the specialty aggregate meets the requirements of the specification to the Engineer prior to start of construction. The aggregate must be approved for use by the Engineer and shall meet the gradation limits in Table 608-R-2 when tested in accordance with ASTM C136:

**TABLE 608-R-1. AGGREGATE CHARACTERISTICS**

Test	Standard	Range
Micro-Deval	ASTM D7428	15% max
Magnesium Sulfate Soundness	ASTM C88	2% max
Aggregate Angularity	ASTM C1252 – Test Method A	45% min
Moisture Content (%)	ASTM C566	2% max
Bulk Dry Specific Gravity	ASTM C128	2.6 – 3.0
Absorption (%)	ASTM D2216	3% max
Mohs Hardness	Mohs Scale	7 min

**TABLE 608-R-2. AGGREGATE GRADATION REQUIREMENTS**

Sieve	Percent Passing by Weight
No. 8	100
No. 14	98 - 100
No. 16	85 - 100
No. 30	15- 45
No. 50	0 – 8
No. 70	0 - 2

The Contractor shall provide a certification of analysis (COA) showing analysis and properties of the material delivered for use on the project. The Contractor's certification may be subject to verification by testing the material delivered for use on the project.

**608-R-2.2 ASPHALT MATERIAL.** The asphalt material base residue shall contain not less than 40% gilsonite, or uintaite, and shall not contain any tall oil pitch or coal tar material. The material shall be compatible with asphalt pavement, and have a 5-year minimum proven aviation performance record at airports with similar climatic conditions.

The solvent-based rapid cure material shall meet the following properties:

Kinematic Viscosity at 140°F, ASTM D4402, cSt.	10-30
Percent Residue by Distillation, ASTM D402, or Evaporation	30-45%

The residue from distillation shall have the following properties:

Penetration at 77°F, ASTM D5, dmm	2-12
Softening Point, ASTM D36	180-200
Solubility in 1,1,1 Trichloroethylene, ASTM D2042	99% min.

The Contractor shall provide a copy of the manufacturer’s Certificate of Analysis (COA) for the asphalt sealer delivered to the project. If the asphalt sealer is diluted at other than the manufacturer’s facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt sealer properties. The COA shall be provided to and approved by the Engineer before the asphalt material is applied. The furnishing of the vendor's certified test report for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

The asphalt sealing material must be applied in an undiluted form. The material may be stored at ambient temperature for long periods of time if necessary. Storage will follow industry standard recommendations due to the flammability of the material; avoid sparks and open flames to come into contact with the material or any gasses that might be escaping the storage vessel.

Contractor shall provide a list of airport pavement projects, exposed to similar climate conditions, where this product has been successfully applied within at least 5 years of the project.

**608-R-2.3 SEAL COAT WITH AGGREGATE.** The Contractor shall submit friction test data from at least two (2) airport projects identified under subsection 608-R-2.2. The test data must be from the same project and include technical details on application rates, aggregate rates, and point of contact at the airport to confirm use and success of sealer with aggregate.

Friction test data in accordance with the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5320-12, *Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces*, at 40 or 60 miles per hour (mph) wet, must include as a minimum; the friction value prior to sealant application; two values, between 24 and 96 hours after application, with a minimum of 24 hours between tests; and one value between 180 days and 360 days after the application. The results of the tests between 24 and 96 hours shall indicate friction is increasing at a rate to obtain similar friction value of the pavement surface prior to application, and the long-term test shall indicate no apparent adverse effect with time relative to friction values and existing pavement surface.

Seal coat material submittal without required friction performance will not be approved. Friction tests performed on this project cannot be used as a substitute of this requirement.

**COMPOSITION AND APPLICATION RATE**

**608-R-3.1 APPLICATION RATE.** The approximate amounts of materials per square yard (square meter) for the asphalt surface treatment shall be as provided in the table for the treatment area(s) at the specified rate(s) as noted on the plans. The actual application rates will vary within the range specified to suit field conditions and will be recommended by the manufacturer’s representative for control strip evaluations, and approved by the Engineer from the test area/sections evaluation.

**TABLE 608-R-3. APPLICATION RATE**

Dilution Rate	Quantity of Sealer gal/yd <sup>2</sup>	Quantity of Aggregate lb/yd <sup>2</sup>
N/A	0.08-0.15	0.40-0.50

**608-R-3.2 CONTROL AREAS AND CONTROL STRIPS.** A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips to determine the appropriate application rate of both sealer and aggregate to be evaluated and approved by the Engineer.

A test area and/or section shall be applied for each differing asphalt pavement surface identified in the project. The control area(s) and/or control strip(s) shall be used to determine the material application rate(s) of both sealer and aggregate prior to full production. The same equipment and method of operation shall be utilized on the control area(s) and/or control strip(s) as will be utilized on the remainder of the work.

~~a. For Taxiway, Taxiway and Apron Surfaces.~~ Prior to full application, the Contractor shall place test areas at varying application rates as recommended by the Contractor's manufacturer's representative to determine appropriate application rate(s). The test areas will be located on representative section(s) of the pavement to receive the asphalt surface treatment designated by the Engineer.

~~b. For Runway and High-Speed Exit Taxiway Surfaces.~~ Prior to full application, the Contractor shall place a series of control strips a minimum of 300 feet long by 12 feet wide, or width of anticipated application, whichever is greater, at varying application rates as recommended by the manufacturer's representative and acceptable to the Engineer to determine appropriate application rate(s). The control strips should be separated by a minimum of 200 feet between control strips. The area to be tested will be located on a representative section of the pavement to receive the asphalt surface treatment designated by the Engineer. The control strips should be placed under similar field conditions as anticipated for the actual application. Before beginning the control strip(s), the skid resistance of the existing pavement shall be determined for each control strip with a continuous friction measuring equipment (CFME). The skid resistance of existing pavement can be immediately adjacent to the control strip or at the same location as the control strip if testing prior to application.

The Contractor may begin testing the skid resistance of runway and high-speed exit taxiway control strips after application of the asphalt surface treatment has fully cured. If seal coat is to be applied when atmospheric and pavement surface temperatures are below 55°F and rising, consult with the manufacturer's representative regarding time for seal coat to fully cure. Aircraft shall not be permitted on the runway or high-speed exit taxiway control strips until such time as the Contractor validates that its surface friction meets the maintenance planning friction levels in AC 150/5320-12, Table 3-2 when tested at speeds of 40 and 60 mph wet with approved CFME.

Prior to full application on runway and high speed exit taxiway surfaces, submit to the Engineer written documentation of skid resistance of the control area/control strip measured according to AC 150/5320-12.

~~c. Control Strip.~~ If the control strip should prove to be unsatisfactory, necessary adjustments to the application rate, placement operations, and equipment shall be made. Additional control strips shall be placed and additional skid resistance tests performed and evaluated. Full production shall not begin without the Engineer's approval of an appropriate application rate(s). Acceptable control strips shall be paid for in accordance with subsection 608-R-8.1.

## CONSTRUCTION METHODS

**608-R-4.1 WORKER SAFETY.** The Contractor shall obtain a Safety Data Sheet (SDS) for both the asphalt sealer product and aggregate and require workmen to follow the manufacturer's recommended safety precautions. All additional industry standard safety precautions regarding the storage and applications of solvent based asphalts should be understood and followed by the Contractor.

**608-R-4.2 WEATHER LIMITATIONS.** The asphalt sealer shall be applied only when the existing pavement surface is dry and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. No material shall be applied when dust or aggregate is blowing or when rain is anticipated within 4 hours of application completion. The atmospheric temperature and the pavement surface

temperature shall both be at, or above 40°F and rising. If seal coat is to be applied when atmospheric and pavement surface temperatures are below 55°F and rising, consult with the manufacturer's representative regarding time for seal coat to fully cure. The sealer shall not be applied when pavement temperatures are expected to exceed 160°F within the subsequent 72 hours, if traffic will be opened on pavement within those 72 hours. During application, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the sealer. Should sealer get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the Engineer, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Department.

Contractor shall submit an overspray shielding plan to the Engineer for approval prior to beginning surface treatment. Shielding shall be used when working near parked aircraft, in windy conditions, or as directed by the Engineer.

**608-R-4.3 EQUIPMENT AND TOOLS.** The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

- a. **Pressure Distributor.** The sealer 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 sealer. 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 8 mph or 700 feet per minute (fpm).

The Contractor will provide verification of truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application per nozzle manufacturer, spray-bar height and pressure and pump speed appropriate for the viscosity and temperature of sealer material, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use. The distributor truck shall be equipped with a 12-foot, minimum, spray bar with individual nozzle control. The distributor truck shall be capable of specific application rates in the range of 0.05 to 0.25 gallons per square yard.

These rates shall be computer-controlled rather than mechanical. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the sealer, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy.

The distributor truck shall effectively mix the material prior to application.

The distributor shall be equipped with a hand sprayer to spray the sealer in areas not accessible to the distributor truck.

- b. **Aggregate Spreader.** The asphalt distributor truck will be equipped with an aggregate spreader mounted to the distributor truck that can apply aggregate to the sealer in a single pass operation without driving through wet sealer. The aggregate spreader shall be equipped with a variable control system capable of uniformly distributing the aggregate at the specified rate at varying application widths and speeds.

The aggregate spreader must be adjusted to produce an even and accurate application of specified aggregate. Prior to any seal coat application, the aggregate spreader will be calibrated onsite to ensure acceptable uniformity of spread. The Engineer will observe the calibration and verify the results. The aggregate spreader will be re-calibrated each time the aggregate rate is changed either during the application of test strips or production. The Contractor may consult the seal coat manufacturer representative for procedure and guidance. The aggregate spreader shall have a minimum hopper capacity of 3,000 pounds of aggregate. Push-type hand spreaders will be allowed for use around lights, signs and other obstructions, if necessary.



- c. **Power Broom/Blower.** A power broom and/or blower shall be provided for removing loose material from the surface to be treated.
- d. **Equipment Calibration.** Asphalt distributors must be calibrated within the same construction season in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the Engineer.

**608-R-4.4 PREPARATION OF ASPHALT PAVEMENT SURFACES.** Clean pavement surface immediately prior to placing the seal coat so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease from the asphalt pavement by scrubbing with a detergent, washing thoroughly with clean water, and treating these areas with the oil spot primer. Patch or prepare asphalt pavement surfaces, and remove markings for seal coat as follows:

- a. **Patching and Repair.** Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement. Materials and methods of construction shall comply with the applicable sections of these Specifications.
- b. **Crack Sealing and Preparation.** Remove all vegetation and debris from cracks to a minimum depth of 1-inch. If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the Engineer. Fill all cracks wider than 1/4-inch with a crack sealant meeting ASTM D6690, Type IV. 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, not to exceed 1/4-inch. Any excess joint or crack sealant shall be removed from the pavement surface.
- c. **Painted Marking Removal.** All painted stripes or markings identified on the Plans for removal from the surface to be treated shall be removed according to subsection P-620-3.3.
- d. **New Asphalt Pavement Surfaces.** Allow new asphalt pavement surfaces to cure so that there is no concentration of oils on the surface. A period of at least 30 days at 70°F daytime temperatures should elapse between the placement of a hot mixed asphalt concrete surface course and the application of the surface treatment.

Perform a water-break-free test to confirm that the surface oils have degraded and dissipated. Cast approximately one gallon of clean water out over the surface. The water should sheet out and wet the surface uniformly without crawling or showing oil rings. If signs of crawling or oil rings are apparent on the pavement surface, additional time must be allowed for additional curing and retesting of the pavement surface prior to treatment.

Existing construction or transverse joints shall receive an initial application of seal coat 18 inches wide, centered on the joint.

**608-R-4.5 APPLICATION OF ASPHALT SEALER.** The asphalt sealer shall be applied using a pressure distributor upon the properly prepared, clean and dry surface at the application rate recommended by the manufacturer's representative and approved by the Engineer from the test area/sections evaluation for each designated treatment area. Recommended material temperature for application is 70°F to 90°F, but depending on the application equipment used, good material dispersion and pavement coverage may be achieved at lower material temperatures. The material should not be heated above 100°F.

Pavement surfaces which have excessive runoff of seal coat due to excessive amount of material being applied or excessive surface grade shall be treated in two or more applications, if feasible, to the specified application rate at no additional cost to the Owner. Each additional application shall be performed after the prior application of material has penetrated into the pavement.

If low spots and depressions greater than 1/2-inch in depth in the pavement surface cause ponding or puddling of the applied materials, the pavement surface shall be lightly broomed with a broom or brush type squeegee. Brooming shall continue until the pavement surface is free of any pools of excess material. Ponding and/or puddling shall not cause excessive pavement tackiness and/or additional distress.

During all applications, the surfaces of adjacent structures shall be protected to prevent their being spattered or marred. Asphalt materials shall not be discharged into borrow pits or gutters or on the airport area.

**608-R-4.6 APPLICATION OF AGGREGATE MATERIAL.** Immediately following the application of the asphalt sealer, aggregate at the rate recommended by the manufacturer's representative and approved by the Engineer from the test area/sections evaluation for each designated application area, shall be spread uniformly over the asphalt sealer in a single-pass operation simultaneous with the sealer application. The sealer material and aggregate shall be applied simultaneously in a single pass operation, so as to not drive through the applied fresh sealer. The aggregate shall be spread to the same width of application as the asphalt material and shall not be applied in such thickness as to cause blanketing.

Sprinkling of additional aggregate material, and spraying additional asphalt material over areas that show up having insufficient cover or bitumen, shall be done by hand whenever necessary. In areas where hand work is necessitated, the aggregate shall be applied before the sealant begins to break.

Minimize aggregate from being broadcast and accumulating on the untreated pavement adjacent to an application pass. Prior to the next application pass, the Contractor shall clean areas of excess or loose aggregate and remove from project site.

#### QUALITY CONTROL (QC)

**608-R-5.1 MANUFACTURER'S REPRESENTATION.** The manufacturer's representative knowledgeable of the material, procedures, and equipment described in the specification is responsible to assist the Contractor and Engineer in determining the appropriate application rates of the emulsion and aggregate, as well as recommendations for proper preparation and start-up of seal coat application. Documentation of the manufacturer representative's experience and knowledge for applying the seal coat product shall be furnished to the Engineer a minimum of 10 work days prior to placement of the control strips. The cost of the manufacturer's representative shall be included in the Contractor's bid price.

**608-R-5.2 CONTRACTOR'S QUALIFICATIONS.** The Contractor shall provide the Engineer with the seal coat Contractor's qualifications for applicators, personnel and equipment. The Contractor shall also provide documentation that the seal coat Contractor is qualified to apply the seal coat and has made at least 3 applications similar to this project in the past 2 years.

#### MATERIAL ACCEPTANCE

**608-R-6.1 APPLICATION RATE.** The rate of application of the asphalt emulsion shall be verified at least twice per day.

~~**608-R-6.2 FRICTION TESTS.** Friction tests in accordance with AC 150/5320-12 shall be accomplished on all runway and high-speed taxiways that have received a seal coat. Friction testing shall not be performed until seal coat is fully cured. Each test includes performing friction tests at 40 mph and 60 mph both wet, 15 feet to each side of runway centerline. The Contractor shall coordinate testing with the Engineer and provide the Engineer a written report of friction test results. The Engineer shall be present for testing.~~

#### METHOD OF MEASUREMENT

**608-R-7.1** The quantity of asphalt surface treatment shall be measured according to GCP Section 90, and by the square yards of material applied in accordance with the Plans and specifications and accepted by the Engineer.

The Contractor must furnish the Engineer with the certified weigh bills when materials are received for the asphalt material used under this contract. The Contractor must not remove material from the tank car or storage tank until initial amounts and temperature measurements have been verified.

Initial application of seal coat to longitudinal and transverse joints shall be subsidiary to Pay Item P608.210.0000 Asphalt Surface Treatment, Rapid Cure.

**BASIS OF PAYMENT**

**608-R-8.1** Payment shall be made at the contract unit price per square yard for the asphalt surface treatment applied and accepted by the Engineer. This price shall be full compensation for all surface preparation, furnishing all materials, delivery and application of these materials, for all labor, equipment, tools, and incidentals necessary to complete the item, including ~~the friction testing and all work required to meet AC 150/5320-12,~~ initial joint application, and any costs associated with furnishing a qualified manufacturer’s representative to assist with control ~~strips~~areas.

Payment will be made under:

Item P608.210.0000 Asphalt Surface Treatment, Rapid Cure – per square yard

**TESTING REQUIREMENTS**

- ASTM C88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
- ASTM C128 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate
- ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- ASTM C566 Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
- ASTM C1252 Standard Test Methods for Uncompacted Void Content of Fine Aggregate
- ASTM D5 Standard Test Method for Penetration of Asphalt Materials
- ASTM D36 Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
- ASTM D402 Standard Test Method for Distillation of Cutback Asphalt
- ASTM D2042 Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D2995 Standard Practice for Estimating Application Rate of Bituminous Distributors
- ASTM D4402 Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
- ASTM D6690 Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
- ASTM D7428 Standard Test Method for Resistance of Fine Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus



## ITEM P-610 CONCRETE FOR MISCELLANEOUS STRUCTURES

### DESCRIPTION

**610-1.1** This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these Specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

### MATERIALS

**610-2.1 GENERAL.** Only approved materials, conforming to the requirements of these Specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Engineer before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

- a. **Reactivity.** Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the Engineer. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

**610-2.2 COARSE AGGREGATE.** The coarse aggregate for concrete shall meet the requirements of AASHTO M 80, Class A.

Coarse aggregate shall be well graded from coarse to fine, and shall meet AASHTO M 43, Number 57 or 67, when tested according to ATM 304.

**610-2.2.1 COARSE AGGREGATE SUSCEPTIBILITY TO DURABILITY (D) CRACKING.** Not Used.

**610-2.3 FINE AGGREGATE.** The fine aggregate for concrete shall meet all fine aggregate requirements of AASHTO M 6, Class A.

**610-2.4 CEMENT.** Cement shall conform to the requirements of AASHTO M 85.

**610-2.5 CEMENTITIOUS MATERIALS.**

- a. **Fly ash.** Fly ash shall meet the requirements of AASHTO M 295, 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 AASHTO M 295. 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 AASHTO M 295 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the Engineer.

- b. **Slag cement (ground granulated blast furnace (GGBF)).** Slag cement shall conform to AASHTO M 302, 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. Water from 'Community' or 'Non-Transient Non-Community' sources regulated by the Alaska Department of Environmental Conservation Division of Environmental Health Drinking Water Program, or equivalent in other states, do not require testing under ASTM C1602. Other sources shall be tested in accordance with ASTM C1602 prior to use.

**610-2.7 ADMIXTURES.** The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the Engineer may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the Engineer from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

- a. **Air-entraining admixtures.** Air-entraining admixtures shall meet the requirements of AASHTO M 154 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 AASHTO M 194, Type A, B, or D. AASHTO M 194, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used. Water-reducing admixtures shall be added at the mixer separately from air-entraining admixtures according to the manufacturer's printed instructions.
- c. **Other chemical admixtures.** The use of set retarding, and set-accelerating admixtures shall be approved by the Engineer. Retarding shall meet the requirements of AASHTO M 194, Type A, B, or D and set-accelerating shall meet the requirements of AASHTO M 194, 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 AASHTO M 213.

**610-2.9 JOINT FILLER.** The filler for joints shall meet the requirements of ASTM D6690 for sealing joints or cracks in Asphalt or Portland Cement Concrete Pavements ~~Item P-605~~.

**610-2.10 STEEL REINFORCEMENT.** Reinforcing shall consist of Deformed and Plain Carbon-Steel Bars conforming to the requirements of ASTM A615, Welded Steel Wire Fabric conforming to the requirements of ASTM A1064, Welded Deformed Steel Fabric conforming to the requirements of ASTM A1064, or Bar Mats conforming to the requirements of ASTM A184, as shown on the Plans.

**610-2.11 MATERIALS FOR CURING CONCRETE.** Curing materials shall conform to Table 610-1:

**TABLE 610-1. MATERIALS FOR CURING CONCRETE**

<b>CURING MATERIAL</b>	<b>SPECIFICATION</b>
Burlap Cloth made from Jute or Kenaf and Cotton Mats	AASHTO M 182, Class 4
Sheet Materials for Curing Concrete	ASTM C171
Liquid Membrane – Forming Compounds for Curing Concrete	ASTM C309, Type 1-D Class B, except do not use compounds containing linseed oil.

### **CONSTRUCTION METHODS**

**610-3.1 GENERAL.** The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the Engineer.

**610-3.2 CONCRETE MIXTURE.** The concrete shall develop a minimum compressive strength of 4,000 psi in 28 days as determined by test cylinders made according to ATM 506 and tested according to AASHTO T 22. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard. The concrete shall contain 5.0% of entrained air, plus or minus 1.2%, as determined by ATM 505. Slump, as determined by ATM 503, shall match the mix design target value plus or minus 1 inch.

**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 AASHTO M 157.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F without the Engineer's approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F nor more than 100°F. The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

**610-3.4 FORMS.** Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the Engineer. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown on the Plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so that 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.

Reinforcing bars shall be bent cold and shall conform accurately to the shape and dimensions shown on the diagram. In no case shall the radius of any bend be less than 4 times the diameter of the bar.

Place reinforcement as indicated on the Plans or as hereinafter specified. Rigidly block and wire in place, using metal or plastic supports or concrete blocks and securely tie at each intersection with annealed iron wire of at least 1/8 inch.

Do not splice bars at points not indicated on the Plans except with the consent of the Engineer. Such splices shall be at the points of minimum tensile stress and the lap shall be not less than 36 bar diameters.

Verify the quantity, size, and shape of the reinforcement against the structure drawings and make necessary corrections to the bar lists and bending schedules before ordering. Errors in the bar lists and/or bending schedules shall not be cause for adjustment of the contract prices.

If reinforcing bars are to be welded, follow AWS D12.1.

**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 ATM 503.

**610-3.8 PLACING CONCRETE.** All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the Engineer. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet. Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

**610-3.9 VIBRATION.** Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

**610-3.10 JOINTS.** Joints shall be constructed as indicated on the plans.

**610-3.11 FINISHING.** All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

**610-3.12 CURING AND PROTECTION.** All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

**610-3.13 COLD WEATHER PLACING.** When concrete is placed at temperatures below 40°F, follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

**610-3.14 HOT WEATHER PLACING.** When concrete is placed at temperatures greater than 85°F, follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.



## ACCEPTANCE TESTING

**610-4.1 ACCEPTANCE SAMPLING AND TESTING.** Concrete for each day's placement will be accepted on the basis of the compressive strength specified in Subsection 610-3.2. The Engineer will sample the concrete in accordance with ATM 501; test the slump in accordance with ATM 503; test air content in accordance with ATM 505; make and cure compressive strength specimens in accordance with ATM 506; and test in accordance with AASHTO T 22. The Acceptance Testing laboratory will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

**610-4.2 DEFECTIVE WORK.** Any defective work that cannot be satisfactorily repaired as determined by the Engineer, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

## METHOD OF MEASUREMENT

**610-5.1** Concrete will be measured by the number of cubic yards based on the dimensions shown on the plans of concrete complete in place and accepted, and according to GCP Section 90. When the pay items shown below are absent from the bid schedule, no measurement for payment will be made.

**610-5.2** Reinforcing steel will be measured by the calculated theoretical number of pounds placed, as shown on the Plans, complete in place and accepted. The unit weight used for deformed bars will be the weight of plain square or round bars of equal nominal size. If so indicated on the Plans, the weight to be paid for will include the weight of metal pipes and drains, metal conduits and ducts, or similar materials indicated and included. When the pay items shown below are absent from the bid schedule, no measurement for payment will be made.

## BASIS OF PAYMENT

**610-6.1** Payment will be made at the contract unit price per cubic yard for structural portland cement concrete and per pound for reinforcing steel. If the following pay items are absent from the bid schedule, no payment will be made.

## REFERENCES

ATM 304	WAQTC FOP for AASHTO T 27/T 11 Sieve Analysis of Fine and Coarse Aggregates
ATM 501	FOP for WAQTC TM 2 Sampling Freshly Mixed Concrete
ATM 503	WAQTC FOP for AASHTO T 119 Slump of Hydraulic-Cement Concrete
ATM 505	WAQTC FOP for AASHTO T 152 Air Content of Freshly Mixed Concrete by the Pressure Method
ATM 506	WAQTC FOP for AASHTO T 23 Making and Curing Concrete Test Specimens in the Field
AASHTO M 6	Fine Aggregate for Portland Cement Concrete
AASHTO M 43	Sizes of Aggregate for Road and Bridge Construction
AASHTO M 80	Coarse Aggregate for Portland Cement Concrete

AASHTO M 85	Portland Cement
AASHTO M 154	Air-Entraining Admixtures for Concrete
AASHTO M 157	Ready-Mixed Concrete
AASHTO M 182	Burlap Cloth made from Jute or Kenaf and Cotton Mats
AASHTO M 194	Chemical Admixture for Concrete
AASHTO M 213	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
AASHTO M 295	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
AASHTO M 302	Slag Cement for Use in Concrete and Mortars
AASHTO T 22	Compressive Strength of Cylindrical Concrete Specimens
ASTM A184	Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A1064	Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C171	Sheet Materials for Curing Concrete
ASTM C309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C1017	Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1260	Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1602	Mixing Water Used in the Production of Hydraulic Cement Concrete
AWS D12.1	Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction
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

## ITEM P-620 RUNWAY AND TAXIWAY MARKING

### DESCRIPTION

**620-1.1** This item consists of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Engineer. The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification. This item includes removal of existing painted markings from pavement surfaces as shown on the plans or as designated by the Engineer. Complete this work within the limitations of the project Construction Safety and Phasing Plan.

### MATERIALS

**620-2.1 MATERIALS ACCEPTANCE.** The Contractor shall furnish manufacturer's certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer's surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive, and application requirements must be submitted and approved by the Engineer prior to the initial application of markings. The reports can be used for material acceptance or the Engineer may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the Engineer upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the Engineer. Provide manufacturer certification (Material Safety Data Sheet) showing that each product does not contain mercury, lead, hexavalent chromium, halogenated solvents, nor any carcinogen as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.

**620-2.2 MARKING MATERIALS.** Paint shall be waterborne or solvent-base. Paint colors shall comply with Federal Standard No. 595, and Table 620-1. Use black paint to outline a border at least 6 inch wide around markings on all light colored pavements.

**TABLE 620-1. MARKING MATERIALS**

Paint <sup>1</sup>				Glass Beads <sup>2</sup>	
Type	Color	Fed Std. 595 Number	Application Rate Maximum	Type	Application Rate Minimum
II	White	37925	115 ft <sup>2</sup> /gal	Type I, Gradation A	7 lb/gal)
II	Red	31136	115 ft <sup>2</sup> /gal	Type I, Gradation A	5 lb/gal
II	Yellow	33538 or 33655	115 ft <sup>2</sup> /gal	Type I, Gradation A	7 lb/gal
II	Black	37038	115 ft <sup>2</sup> /gal	Not used	Not Used
II	Pink	1 part 31136 to 2 parts 37925	115 ft <sup>2</sup> /gal	Type I, Gradation A	5 lb/gal
II	Green	34108	115 ft <sup>2</sup> /gal	Not Used	Not Used

<sup>1</sup> See subsection 620-2.2a

<sup>2</sup> See subsection 620-2.2b

**a. Paint.**

**(1) Waterborne.** Paint shall meet the requirements of Federal Specification TT-P-1952F, Type II. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis. Use waterborne paint only for temporary markings.

**(2) Solvent-Base.** Paint shall meet the requirements of Commercial Item Description A-A-2886B Type II. Use solvent-based paint only for permanent markings.

**b. Reflective Media.** Glass beads shall meet the requirements for Federal Specification TT-B-1325D Type I, Gradation A.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black and green paint.

Glass beads shall comply with Table 620-1.

## 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 subsection 620-2.1. Discontinue painting when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Do not apply markings when weather conditions are forecasted 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. Marking equipment for both paint and glass beads shall be calibrated daily.

**620-3.3 PREPARATION OF SURFACES.** Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminants that would reduce the bond between the paint and the pavement.

**a. Preparation of New Pavement Surfaces.** The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the Engineer to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface. Areas which cannot be satisfactorily cleaned by brooming and blowing shall be scrubbed as directed with a 10% solution of tri-sodium phosphate or an equally suitable solution. After scrubbing, the solution shall be rinsed off and the surface dried prior to painting.

**b. Preparation of Pavement to Remove Existing Markings.** Where indicated on the plans, use high pressure water to remove all visible indications of existing painted markings from pavement surfaces. Do not paint over existing markings. Remove pavement markings to the fullest extent possible without materially damaging the pavement surface, color, or texture. Group adjacent markings together into a larger rectangular removal area in conformance with FAA AC 150/5340-1, paragraph 1.3.f. and Figure 1-1, Figure 1-2, Figure 1-3 and Figure 1-4. Collect and dispose of all

loose or waste material as needed to prevent interference with drainage or to prevent dusty conditions under traffic, wind, or propellers. After removal of markings on asphalt pavements, apply a fog seal or seal coat Asphalt Surface Treatment to 'block out' the removal area to eliminate 'ghost' markings.

- c. **Preparation of Pavement Markings Prior to Remarkings.** Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the Engineer. After removal, the surface shall be cleaned of all residue or debris according to 620-3.3.a.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufacturer's application and surface preparation requirements must be submitted to the Engineer prior to the initial application of markings.

**620-3.4 LAYOUT OF MARKINGS.** The proposed markings shall be laid out in advance of the paint application. Layout markings and glass beads in advance of paint application at the locations shown on the Plans according to the tolerances in section 620-3.5 and according to the requirements of G-135. Space control points at such intervals to ensure accurate location of all markings. Provide an experienced technician to supervise the location, alignment, layout dimensions, and application of the paint.

**620-3.5 APPLICATION.** A period of 7 days minimum shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the Plans. Paint shall not be applied until the layout and condition of the surface has been approved by the Engineer.

The edges of the markings shall not vary from a straight line more than 1/2 inch in 50 feet, and marking dimensions and spacing shall be within the tolerances shown in Table 620-2:

**TABLE 620-2. MARKING DIMENSIONS AND SPACING TOLERANCE**

Dimension and Spacing	Tolerance
36 inch or less	±1/2 inch
greater than 36 inch to 6 feet	±1 inch
greater than 6 feet to 60 feet	±2 inch
greater than 60 feet	±3 inch

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 620-1. The addition of thinner will not be permitted.

Pressure apply glass beads upon ~~the all marked areas at the locations shown on the Plans to receive glass beads~~ immediately after application of the paint, except do not apply glass beads to aircraft tie-down marks. 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 620-1. 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.

Apply temporary markings, if required, as directed by the Engineer. If pavement is opened to traffic before the pavement curing period is complete, apply paint in two coats. Apply the first coat at least 12 hours after paving is completed at 30 to 50 percent of the total application rate. Apply an additional coat at 100 percent of the total application rate following pavement curing time and after pavement grooving operations in

affected areas. The direction of the second application shall be 180 degrees from the first to ensure complete coverage. Apply glass beads, if required, in the second coat only.

Return all emptied containers to the paint storage area for checking by the Engineer. The containers shall not be removed from the airport or destroyed until authorized by the Engineer.

**620-3.6 NOT USED.**

**620-3.7 CONTROL STRIP.** Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the Engineer. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads, according to Table 620-1, 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 TESTING (PART 139 CERTIFICATED AIRPORTS ONLY).** Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 readings shall be taken over a 6 square foot area with 3 readings taken from each direction. The average of all readings which are within 30% of each other shall be equal to or above the minimum levels shown in Table 620-3.

**TABLE 620-3. MINIMUM RETRO-REFLECTANCE VALUES**

Material	Retro-reflectance mcd/m <sup>2</sup> /lux		
	White	Yellow	Red
Initial Type I	300	175	35
All materials, remark when less than <sup>1</sup>	100	75	10

<sup>1</sup> 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 discoloration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the Engineer. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

**METHOD OF MEASUREMENT**

**620-4.1 RUNWAY AND TAXIWAY PAINTING BY UNIT AREA.** If runway and taxiway painting by unit area appears in the bid schedule, then new painted markings will be so measured.

**620-4.2 REFLECTIVE MEDIA.** If reflective media by unit weight appears in the bid schedule, then this material will be so measured. If reflective media appears by lump sum in the bid schedule, or does not appear at all, it will not be measured.

**620-4.3 RUNWAY AND TAXIWAY PAINTING BY LUMP SUM.** If Runway and Taxiway painting by a lump-sum item appears in the bid schedule, new painted markings will not be measured for payment. Reflective media is subsidiary to the work.

**620-4.4 PAINTED MARKING REMOVAL.** If painted marking removal by unit area, it will be measured by area. If painted marking removal by lump sum appears in the bid schedule or is absent from the bid schedule, no measurement will be made and this item will be subsidiary to painting.

**620-4.5 TEMPORARY RUNWAY AND TAXIWAY PAINTING.** Lump Sum. Includes all necessary maintenance or reapplication of paint necessary during the time the numbers, markings, and stripes are required.

### **BASIS OF PAYMENT**

**620-5.1** Payment will be made at the respective contract unit or lump sum price for the pay items listed below that appear in the bid schedule.

Payment will be made under:

Item P620.020.0000 Runway and Taxiway Painting – per lump sum

### **TESTING REQUIREMENTS**

ASTM C371	Wire-Cloth Sieve Analysis of Nonplastic Ceramic Powders
ASTM D92	Flash and Fire Points by Cleveland Open Cup
ASTM D711	No-Pick-Up Time of Traffic Paint
ASTM D968	Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Epoxy Content of Epoxy Resins
ASTM D2074	Total Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Rubber Products-Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM G53	Operating Light and Water-Exposure Apparatus (Florescent UV-Condensation Type) for Exposure of Nonmetallic Materials.
Federal Test Method Standard No. 141	Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing

### **MATERIAL REQUIREMENTS**

ASTM D476	Titanium Dioxide Pigments
Code of Federal Regulations	40 CFR Part 60, Appendix A-7, Method 24. Determination volatile matter content, water content, density, volume solids, and weight solids of surface coatings
Code of Federal Regulations	29 CFR Part 1910.1200 – Hazard Communications

Fed. Spec. TT-B-1325D	Beads (Glass Spheres) Retroreflective
Fed. Spec. TT-P1952F	Paint, traffic and Airfield Marking, Waterborne
Federal Standard 595	Colors used in Government Procurement
Commercial Item Description	A-A-2886B      Paint, Traffic, Solvent Based
Advisory Circular 150/5340-1	Standard for Airport Markings
Advisory Circular 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces



## ITEM P-641 EROSION, SEDIMENT, AND POLLUTION CONTROL

**641-1.1 DESCRIPTION.** Provide project administration and Work relating to control of erosion, sedimentation, and discharge of pollutants, according to this section and applicable local, state, and federal requirements, including the Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit (CGP). The state APDES program is administered by the Alaska Department of Environmental Conservation (ADEC). Section 301(a) of the Clean Water Act (CWA) and 18 AAC 83.015 provide that the discharge of pollutants to the waters of the United States (U.S.) is unlawful except as allowed by the CGP.

Temporary erosion control measures shall be in accordance with the Erosion and Sediment Control Plan (ESCP); 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.

All references to Forms (i.e. Form 25D-111) shall mean a form substantially similar to the referenced ADO&PF form, as modified and provided by the Owner for use in this project.

Temporary erosion and sediment control measures may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites, when such areas are included in the Project Zone.

Temporary control measures shall be designed, installed and maintained:

- a. outside of safety areas of active runways and taxiways, and
- b. to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near airports.

### DEFINITIONS AND TERMS

**641-1.2** These definitions apply only to Item P-641.

**ACTIVE TREATMENT SYSTEM (ATS) OPERATOR.** The Contractor's qualified representative who is responsible for maintaining and operating an active treatment system (as defined in the CGP) for storm water runoff.

**ALASKA CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (AK-CESCL).** A person who has completed training, testing, and other requirements of, and is currently certified as, an AK-CESCL from an AK-CESCL Training Program (a program developed under a Memorandum of Understanding between the Department and others). The Department recognizes AK-CESCLs as "qualified personnel" required by the CGP. An AK-CESCL must be recertified every three years. See subsection 641-1.2. QUALIFIED PERSON for the definition.

**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION (ADEC).** The state agency authorized by the Environmental Protection Agency (EPA) to administer the APDES.

**ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM (APDES).** A system administered by ADEC that issues and tracks permits for storm water discharges.

**BEST MANAGEMENT PRACTICES (BMPs).** Temporary or permanent structural and non-structural devices, schedules of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or minimize the discharge of pollutants to waters of the United States. BMPs also include, but are not limited to, treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from material storage.

**CLEAN WATER ACT (CWA).** Federal Water Pollution Control Amendments of 1972, as amended (33 U.S.C. 1251 et seq.).

**CONSTRUCTION ACTIVITY.** Physical activity by the Contractor, Subcontractor or utility company; that may result in erosion, sedimentation, or a discharge of pollutants into storm water. Construction Activity includes soil disturbing activities (e.g. clearing, grubbing, grading, excavating); and establishment of construction materials or equipment storage or maintenance areas (e.g. material piles, borrow area, concrete truck chute washdown, fueling); and industrial activities that may discharge storm water and are directly related to the construction process (e.g. concrete or asphalt batch plants).

**CONSTRUCTION GENERAL PERMIT (CGP).** The permit authorizing storm water discharges from Construction Activities, issued and enforced by ADEC. It authorizes storm water discharges provided permit conditions and water quality standards are met.

**ELECTRONIC NOTICE OF INTENT (ENOI).** The electronic Notice of Intent submitted to ADEC, to obtain coverage under the CGP.

**ELECTRONIC NOTICE OF TERMINATION (ENOT).** The electronic Notice of Termination submitted to ADEC, to end coverage under the CGP.

**ENVIRONMENTAL PROTECTION AGENCY (EPA).** A federal agency charged to protect human health and the environment.

**ERODIBLE STOCKPILE.** Any material storage area or stockpile consisting of mineral aggregate, organic material, or a combination thereof, with greater than 5% passing the No. 200 sieve, and any material storage where wind or water transports sediments or other pollutants from the stockpile. Erodible Stockpile also includes any material storage area or stockpile, where the Engineer determines there is potential for wind or water transport, of sediments or other pollutants away from the stockpile.

**EROSION AND SEDIMENT CONTROL PLAN (ESCP).** The Department's project specific document that illustrates measures to control erosion and sediment on the project. The ESCP provides bidders with the basis for cost estimating and guidance for developing an acceptable Storm Water Pollutant Prevention Plan (SWPPP).

**FINAL STABILIZATION.** Is defined in this item as it is defined in Appendix C of the CGP.

**HAZARDOUS MATERIAL CONTROL PLAN (HMCP).** The Contractor's detailed project specific plan for prevention of pollution from storage, use, transfer, containment, cleanup, and disposal of hazardous material (including, but are not limited to, petroleum products related to construction activities and equipment). The HMCP is included as an appendix to the SWPPP.

**INSPECTION.** An inspection required by the CGP or the SWPPP, usually performed together by the Contractor's SWPPP Manager and Department's Storm Water Inspector.

**MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT.** An ADEC storm water discharge permit issued to certain local governments and other public bodies, for operation of storm water conveyances and drainage systems. See CGP for further definition.

**MULTI-SECTOR GENERAL PERMIT (MSGP).** The APDES General Permit for storm water discharges associated with industrial activity.

**OPERATOR(S).** The party or co-parties associated with a regulated activity that has responsibility to obtain permit coverage under the CGP. "Operator" for the purpose of the CGP and in the context of storm water associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

- a. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or

- b. The party has day to day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g. they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

**POLLUTANT.** Any substance or item meeting the definition of pollutant contained in 40 CFR § 122.2. A partial listing from this definition includes: dredged spoil, solid waste, sediment, sewage, garbage, sewage sludge, chemical wastes, biological materials, wrecked or discarded equipment, rock, sand, cellar dirt and industrial or municipal waste.

**PROJECT ZONE.** The physical area provided by the Department for construction. The Project Zone includes the area of highway or facility under construction, project staging and equipment areas, and material and disposal sites; when those areas, routes and sites, are provided by the Contract.

Material sites, material processing sites, disposal sites, haul routes, staging and equipment storage areas; that are furnished by the Contractor or a commercial operator, are not included in the Project Zone.

**QUALIFIED PERSON.** A person knowledgeable in the principles and practice of erosion and sediment controls. A Qualified Person must be certified either under the AK-CESCL training program. One of the following training and certification programs may substitute for AK-CESCL certification: ENVIROCERT's Certified Professional in Erosion & Sediment Control (CPESC), Certified Erosion, Sediment, and Stormwater Inspector (CESSWI), The Certified Professional in Stormwater Quality (CPSWQ), or CISEC's Certified Inspector of Sediment and Erosion Control (CISEC). For additional information, see Appendix C of the CGP.

**RECORDS.** Any record, report, information, document or photograph required to be created or maintained pursuant to the requirements of the CGP, the CGP storm water requirements of the Clean Water Act; and applicable local, state, and federal laws and regulations regarding document preservation.

**SPILL PREVENTION, CONTROL AND COUNTERMEASURE PLAN (SPCC PLAN).** The Contractor's detailed plan for petroleum spill prevention and control measures that meet the requirements of 40 CFR 112.

**SPILL RESPONSE FIELD REPRESENTATIVE.** The Contractor's representative with authority and responsibility for managing, implementing, and executing the HMCP and SPCC Plan.

**STORM EVENT.** A rainfall event that produces more than 0.5-inch of precipitation in 24 hours and that is separated from the previous storm event by at least 3 days of less than 0.1-inch of rain per day.

**STORM WATER POLLUTION PREVENTION PLAN (SWPPP).** The Contractor's detailed project specific plan to minimize erosion and contain sediment within the Project Zone, and to prevent discharge of pollutants that exceed applicable water quality standards. The SWPPP includes, but is not limited to, amendments, records of activities, inspection schedules and reports, qualifications of key personnel, and all other documentation, required by the CGP and this specification, and other applicable local, state, and federal laws and regulations.

**STORM WATER POLLUTION PREVENTION PLAN TWO (SWPPP2).** The Contractor's detailed project specific plan to comply with CGP or MSGP requirements, for Contractor construction-related activities outside the Project Zone.

**SUBCONTRACTOR SPILL RESPONSE COORDINATOR.** The subcontractor's representative with authority and responsibility for coordinating the subcontractor's activities in compliance with the HMCP and SPCC Plan.

**SUBCONTRACTOR SWPPP COORDINATOR.** The subcontractor's representative with authority to direct the subcontractor's work, and who is responsible for coordination with the Superintendent and SWPPP Manager, and for the subcontractor's compliance with the SWPPP.

**SUPERINTENDENT.** The Contractor's duly authorized representative in responsible charge of the work. The Superintendent has responsibility and authority for the overall operation of the Project and for Contractor furnished sites and facilities directly related to the Project.

**SWPPP AMENDMENT.** A revision or document that adds to, deletes from, or modifies the SWPPP.

**SWPPP MANAGER.** The Contractor's qualified representative who conducts Inspections, updates SWPPP records, and has authority to suspend work and to implement corrective actions required for CGP compliance.

**SWPPP PREPARER.** The Contractor's qualified representative who is responsible for developing the initial SWPPP.

**TEMPORARY STABILIZATION.** Protecting soils from erosion and sediment loss by rainfall, snow melt, runoff, or wind with a temporary vegetative and/or non-vegetative protection cover. Temporary stabilization may include a combination of seeding, geotextiles, mulches, surface tackifiers, rolled erosion control products, low erodible gravel or paving, or the mentioned BMP's combined together with trackwalking.

**U.S. ARMY CORPS OF ENGINEERS PERMIT (USACE PERMIT).** A USACE Permit for construction in the waters of the U.S. Such permit may be issued under Section 10 of the Rivers and Harbors Act of 1899, or Section 404 of the Clean Water Act.

**UTILITY SPILL RESPONSE COORDINATOR.** The Utility's representative with authority and responsibility for coordinating the Utility's activities in compliance with the HMCP and SPCC Plan.

**UTILITY SWPPP COORDINATOR.** The Utility's representative with authority to direct the Utility's work, and who is responsible for coordination with the Superintendent and SWPPP Manager, and for the Utility's compliance with the SWPPP.

#### **641-1.3 PLAN AND PERMIT SUBMITTALS.**

For plans listed in ~~GCP subsection 80-03d~~ Section 10, Article 4.15 (SWPPP, HMCP, and SPCC), use the Contractor submission and Department review deadlines identified in Subsection 641-1.3.

Partial and incomplete submittals will not be accepted for review. Any submittal that is re-submitted or revised after submission, but before the review is completed, will restart the submittal review timeline. No additional Contract time or additional compensation will be allowed due to delays caused by partial or incomplete submittals, or required re-submittals.

- a. **Storm Water Pollution Prevention Plan.** Submit an electronic copy and three hard copies of the SWPPP to the Engineer for approval. Deliver these documents to the Engineer at least 21 days before beginning Construction Activity. Organize and bind the SWPPP and related documents for submittal according to the requirements of Subsection 641-2.1b

The ~~Department~~ Engineer will review the SWPPP submittals within 14 days after they are received. Submittals will be returned to the Contractor, and marked as either "rejected" with reasons listed or as "approved" by the Department. When the submittal is rejected, the Contractor must revise and resubmit the SWPPP. The 14 day review period will restart when the contractor submits an electronic copy and three hard copies of the revised SWPPP to the Engineer for approval.

After the SWPPP is approved by the ~~Department~~ Engineer, the Contractor must sign and certify the approved SWPPP using Form 25D-111. See Subsection 641-1.3d for further SWPPP submittal requirements.

- b. **Hazardous Material Control Plan.** The HMCP Template can be found at the following webpage: [http://www.dot.state.ak.us/stwddes/dcsconst/pop\\_constforms.shtml](http://www.dot.state.ak.us/stwddes/dcsconst/pop_constforms.shtml). Submit an electronic copy and three hard copies of the HMCP, as an appendix to the SWPPP, to the Engineer for approval. The HMCP submittal and review timeline, and signature requirements are the same as the SWPPP.

- c. **Spill Prevention, Control and Countermeasure Plan.** When a SPCC Plan is required under Subsection 641-2.3, submit an electronic copy and three signed hard copies of the SPCC Plan to the Engineer. Deliver these documents to the Engineer at least 21 days before beginning Construction Activity. The Department reserves the right to review the SPCC Plan and require modifications.
- d. **CGP Coverage.** The Contractor is responsible for permitting of Contractor and subcontractor Construction Activities related to the Project. Do not use the SWPPP for Construction Activities outside the Project Zone where the Department is not an operator. Use a SWPPP2 for Construction Activities outside the Project Zone.

After Department approval of the SWPPP and prior to beginning Construction Activity, submit an eNOI with the required fee to ADEC for coverage under the Construction General Permit (CGP). Submit a copy of the signed eNOI and ADEC's written acknowledgement (by letter or other document), to the Engineer as soon as practicable and no later than three days after filing eNOI or receiving a written response.

Do not begin Construction Activity until the conditions listed in Subsection 641-3.1a are completed.

The Department will submit an eNOI to ADEC for Construction Activities inside the Project Zone. The Engineer will provide the Contractor with a copy of the Department's eNOI and ADEC's written acknowledgement (by letter or other document), for inclusion in the SWPPP.

Before Construction Activities occur, transmit to the Engineer an electronic copy of the approved and certified SWPPP, with signed Delegations of Signature Authorities on Forms 25D-107 and 25D-108, SWPPP Certifications on Forms 25D-111 and 25D-109, both permittee's signed eNOIs and ADEC's written acknowledgement.

- e. **Ending CGP Coverage.** Submit an eNOT to ADEC within 30 days after the Engineer has determined the conditions listed in Subsection 641-3.1f have been met. Submit a copy of the signed eNOT and ADEC's acknowledgement letter to the Department within three days of filing the eNOT or receiving a written response.
- f. **ADEC SWPPP Review.** When CGP Part 2.1.3, requires ADEC SWPPP review:
  - (1) Transmit a copy of the Department-approved SWPPP to ADEC using delivery receipt confirmation;
  - (2) Transmit a copy of the delivery receipt confirmation to the Engineer within seven (7) days of receiving the confirmation; and
  - (3) Retain a copy of delivery receipt confirmation in the SWPPP.
- g. **Local Government SWPPP Review.** When local government or the CGP Part 2.1.4, requires local government review:
  - (1) Transmit a copy of the Department-approved SWPPP and other information as required to local government, with the required fee. Use delivery receipt confirmation;
  - (2) Transmit a copy of the delivery receipt confirmation to the Engineer within seven days of receiving the confirmation;
  - (3) Transmit a copy of any comments by the local government to the Engineer within seven days of receipt;
  - (4) Amend the SWPPP as necessary to address local government comments and transmit SWPPP Amendments to the Engineer within seven days of receipt of the comments;

(5) Include a copy of local government SWPPP review letter in the SWPPP; and

(6) File a notification with local government that the project is ending.

- h. Modifying Contractor's eNOI.** When required by the CGP Part 2.7, modify your eNOI to update or correct information within 30 calendar days of the change. Reasons for modification include a change in start or end dates, change in Owner/Operator address and contact information, change in site information, any changes in number of acres to be disturbed, change in decision to use or not use treatment chemicals, or change in location of SWPPP records.

The Contractor must submit an eNOT and then submit a new eNOI instead of an eNOI modification when the operator has changed.

**641-1.4 PERSONNEL QUALIFICATIONS.** Provide documentation in the SWPPP that the individuals serving in these positions meet the personnel qualifications.

- a.** The SWPPP Preparer:

(1) Total disturbed acreage 20 acres or less, must meet at least one of the following qualifications:

- (a) Current certification as a Certified Professional in Erosion and Sediment Control (CPESC);
- (b) Current certification as AK-CESCL, and at least two years' experience in erosion and sediment control, as a SWPPP Manager or SWPPP writer, or equivalent. Provide documentation including project names, project timelines, and work responsibilities demonstrating the experience requirement; or
- (c) Professional Engineer registered in the State of Alaska with current certification as AK-CESCL.

(2) Total disturbed acreage greater than 20 acres, meet 641-1.4a(1) above, and complete a SWPPP Preparation course.

- b.** The Superintendent must meet the following qualifications:

- (1) Current certification as AK-CESCL; and
- (2) Duly authorized representative, as defined in Appendix A, Part 1.12.3 of the CGP.

- c.** The SWPPP Manager must have current certification as AK-CESCL. The SWPPP Manager must meet the experience, and authority requirements identified in the CGP for the Storm Water Lead and Storm Water Inspector positions.

- d.** The Active Treatment System (ATS) operator must have current certification as AK-CESCL, and be knowledgeable in the principles and practices of treatment systems in general, and the operation of the project-specific ATS. The ATS operator must have at least three months field experience with ATS, or completion of an ATS manufacturer's training course, or completion of system operator certification course.

- e.** The Department accepts people having any of the following certificates as equivalent to AK-CESCL, if the certificates are current according to the sponsoring organization's policies:

- (1) CPESC
- (2) CISEC
- (3) CESSWI

(4) CPSWQ

**641-1.5 SIGNATURE/CERTIFICATION REQUIREMENTS AND DELEGATIONS.**

- a. **eNOI and eNOT.** The eNOI and eNOT must be signed and certified by a responsible corporate officer according to CGP Appendix A, Part 1.12. Signature and certification authority for the eNOI and eNOT cannot be delegated.
- b. **Delegation of Signature Authority for Other SWPPP Documents and Reports.** Use Form 25D-108 to delegate signature authority and certification authority to the Superintendent position, according to CGP Appendix A, Part 1.12.3, for the SWPPP, Inspection Reports and other reports required by the CGP. The Superintendent position is responsible for signing and certifying the SWPPP, Inspection Reports, and other reports required by the CGP, except the eNOI and eNOT.

The Engineer will provide the Department's delegation on Form 25D-107, which the Contractor must include in the SWPPP.

- c. **Subcontractor Certification.** Subcontractors must certify on Form 25D-105, that they have read and will abide by the CGP and the conditions of the project SWPPP.
- d. **Signatures and Initials.** Handwrite signatures or initials on CGP documents and SWPPP forms, wherever a signature or initial is required.

**641-1.6 RESPONSIBILITY FOR STORM WATER PERMIT COVERAGE.**

- a. The Department and the Contractor are jointly responsible for permitting and permit compliance within the Project Zone.
- b. The Contractor is responsible for permitting and permit compliance outside the Project Zone. The Contractor has sole responsibility for compliance with ADEC, USACE, and other applicable federal, state, and local requirements, and for securing all necessary clearances, rights, and permits. ~~GCP subsection 70-02~~ Section 10 Article 6.6 describes the requirement to obtain permits, and to provide permit documents to the Engineer.
- c. An entity that owns or operates, a commercial plant (as defined in ~~GCP subsection 80-04d~~ Section 10 Article 5.10 or material source or disposal site outside the Project Zone, is responsible for permitting and permit compliance. The Contractor has sole responsibility to verify that the entity has appropriate permit coverage. ~~GCP subsection 70-02~~ Section 10 Article 6.6 describes the requirement to obtain permits, and to provide permit documents to the Engineer.
- d. The Department is not responsible for permitting or permit compliance, and is not liable for fines resulting from noncompliance with permit conditions:
  - (1) For areas outside the Project Zone;
  - (2) For Construction Activity and Support Activities outside the Project Zone; and
  - (3) For commercial plants, commercial material sources, and commercial disposal sites.

**641-1.7 UTILITY. (RESERVED FOR REGIONS)**

**641-2.1 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS.**

- a. **SWPPP Preparer and Pre-Construction Site Visit.**

Use a SWPPP Preparer to develop the SWPPP and associated documents, according to the requirements of the CGP and COE permit. The SWPPP Preparer must put their name,

qualifications (including the expiration date of any certifications), title and company name in the SWPPP.

The SWPPP Preparer must conduct a pre-construction inspection at the Project site before construction activity begins. If the SWPPP Preparer is not a Contractor employee, the SWPPP Preparer must visit the site accompanied by the Contractor. Give the Department at least seven days advance notice of the site visit, so that the Department may participate.

During the pre-construction inspection, the SWPPP Preparer must identify, or if a draft of the SWPPP has already been prepared verify that the SWPPP fully addresses and describes:

- (1) Opportunities to phase construction activities;
- (2) Appropriate BMPs and their sequencing; and
- (3) Sediment controls that must be installed prior to beginning Construction Activities.

Document the SWPPP Preparer's pre-construction inspection in the SWPPP on Form 25D-106, SWPPP Pre-Construction Site Visit, including the names of attendees and the date.

**b. Developing the SWPPP.**

Use the Department's ~~ESCP, Environmental commitments, and other Contract documents~~ as a starting point for developing the SWPPP. ~~The approved SWPPP replaces the ESCP.~~

Develop the SWPPP with sections and appendices, according to the current Alaska State Department of Transportation (DOT&PF) SWPPP template. Include information required by the Contract and described in the CGP Part 5.0.

- (1) Obtain the following forms after they have been completed by the Department and include them in the SWPPP:
  - (a) SWPPP Delegation of Signature Authority – DOT&PF (25D-107)
  - (b) SWPPP Certification for DOT&PF (25D-109)
  - (c) SWPPP Delayed Action Item Report (25D-113), if needed
- (2) Use the following Department forms for recording information in the SWPPP:
  - (a) SWPPP Amendment Log (25D-114)
  - (b) SWPPP Certification for Contractor (25D-111)
  - (c) SWPPP Construction Site Inspection Report (25D-100)
  - (d) SWPPP Corrective Action Log (25D-112)
  - (e) SWPPP Daily Record of Rainfall (25D-115)
  - (f) SWPPP Delegation of Signature Authority – Contractor (25D-108)
  - (g) SWPPP Grading and Stabilization Activities Log (25D-110)
  - (h) SWPPP Pre-Construction Site Visit (25D-106)
  - (i) SWPPP Project Staff Tracking (25D-127)
  - (j) SWPPP Subcontractor Certification (25D-105)



(k) SWPPP Training Log (25D-125)

(l) SWPPP Noncompliance (25D-143)

SWPPP Template, forms, and instructions are available online at:

[http://www.dot.state.ak.us/stwddes/dcsconst/pop\\_constforms.shtml](http://www.dot.state.ak.us/stwddes/dcsconst/pop_constforms.shtml)

Forms for use on this project will be provided by the Engineer. Compile the SWPPP in three ring binders with tabbed and labeled dividers for each section and appendix.

**c. SWPPP Considerations and Contents.**

- (1) The SWPPP must provide erosion and sediment control measures for all Construction Activity within the Project Zone. Construction activity outside the Project Zone must have permit coverage, using a separate SWPPP2, and separate Contractor Inspections.
- (2) The SWPPP must consider the activities of the Contractor and all subcontractors and utility companies performing work in the Project Zone. The SWPPP must describe the roles and responsibilities of the Contractor, subcontractors, utility companies, and the Department with regard to implementation of the SWPPP. The SWPPP must identify all operators for the Project, including utility companies performing Construction Activity, and identify the areas:
  - (a) Over which each operator has operational control; and
  - (b) Where the Department and Contractor are co-operators.
- (3) For work outside the Project Zone the SWPPP must identify the entity that has storm water permit coverage, the operator, and the areas that are:
  - (a) Dedicated to the Project and where the Department is not an operator; and
  - (b) Not dedicated to the project, but used for the project.
- (4) Account for the Contractor's construction methods and phasing. Identify the amount of mean annual precipitation.
- (5) Comply with the CGP Part 1.4.3 Authorized Non-Storm Water Discharges. List locations where authorized non-storm water will be used, including the types of water that will be used on-site.
- (6) Include the Department's Anti-degradation Analysis in the SWPPP if storm water from the Project Zone discharges into receiving water that is considered a high quality water and that constitutes an outstanding national resource, according to CGP Part 2.1.6.
- (7) Where the project intersects a Public Water System (PWS), the Engineer will notify the PWS contact for the Department and Contractor according to the CGP Part 4.10. Contractor Amend a copy of the communications in Appendix Q.
- (8) There are special requirements in the CGP Part 3.2, for storm water discharges into an impaired water body, and they may include monitoring of storm water discharges. For Projects meeting the permit criteria, the Contractor shall implement a monitoring plan approved by the Department for the storm water within the Project Zone, and shall provide the required information and reports for inclusion in the SWPPP. The Contractor is responsible for monitoring and reporting outside the Project Zone.
- (9) Preserve natural topsoil unless infeasible. Delineate the site according to CGP Part 4.2.1. Use stakes, flags, or silt fence, etc. to identify areas where land disturbing activities will occur and

- areas that will be left undisturbed. Minimize the amount of soil exposed during Construction activity according to CGP Part 4.2.2.
- (10)** Comply with CGP Part 4.4, and the ADEC General Permit for Excavation Dewatering (AKG002000), requirements for dewatering for trenches and excavations.
- (11)** The SWPPP must identify specific areas where potential erosion, sedimentation, or pollution may occur. The potential for wind erosion must be addressed. The potential for erosion at drainage structures must be addressed.
- (12)** Describe methods and time limits, to initiate temporary or final soil stabilization, CGP Part 4.5.1.1. Begin stabilization no later than the end of the next work day, following the day when the earth-disturbing activities have permanently ceased on any portion of the site or temporarily ceased on any portion of the site and will not resume for a period exceeding:
- (a)** Seven days for areas with mean annual precipitation 40 inches or greater; or
  - (b)** Fourteen days for areas with mean annual precipitation less than 40 inches.
  - (c)** Time allotted to complete temporary and final stabilization, Subsection 641-2.1(c)(13)
- (13)** Within seven days of initiating final stabilization, CGP Part 4.5.1.4, either complete final stabilization or continue maintenance of work until final stabilization is complete. Complete temporary stabilization within fourteen days of initiating stabilization, CGP Part 4.5.1.2.
- (14)** Include in the “Stabilize Soils” section of the SWPPP, a description of how you will minimize the amount of disturbed and unstabilized ground in the fall season. Identify anticipated dates of fall freeze-up and spring thaw. Describe how you will stabilize areas when it is close to or past the seasonal time of snow cover or frozen conditions, and before the first seasonal thaw. Include a plan for final stabilization.
- (15)** Plans for Active Treatment Systems must be submitted to ADEC for review at least 14 days prior to use of the system and the Operator of the ATS identified in the SWPPP. Any use of treatment chemicals must be identified on the NOI, documented in the SWPPP, and meet with the requirements in the CGP Part 4.6.
- (16)** The SWPPP must provide designated areas for equipment and wheel washing, equipment fueling and maintenance, chemical storage, staging or material storage, waste or disposal sites, concrete washouts, paint and stucco washouts, and sanitary toilets. These activities must be done in designated areas that are located, to the extent practicable, away from drain inlets, conveyance channels, and waters of the US. No discharges are allowed from concrete washout, paint and stucco washout; or from release oils, curing compounds, fuels, oils, soaps, and solvents. Equipment and wheel washing water that doesn’t contain detergent may be discharged on-site if it is treated before discharge.
- (17)** Design temporary BMPs for a 2 year 24 hour precipitation amount. Describe BMPs in the SWPPP and in SWPPP Amendments, including source controls, sediment controls, discharge points, and temporary and final stabilization measures. Describe the design, placement, installation, and maintenance of each BMP, using words and drawings as appropriate. Describe the design capacity of sediment basins (including sediment ponds and traps). Provide a citation to the BMP Manual or publication used as a source for the BMP, including the manufacturer’s or BMP manual specifications for installation (CGP Part 5.3.6.2). If no published source was used to select or design a BMP, then the SWPPP or SWPPP amendment must state that “No BMP manual or publication was used for this design.”
- (18)** Describe the sequence and timing of activities that disturb soils and of BMP implementation and removal. Phase earth disturbing activities to minimize unstabilized areas, and to achieve

temporary or final stabilization quickly. Whenever practicable incorporate final stabilization work into excavation, embankment and grading activities. Include drawings showing each phase of the project with the BMPs implemented in the phase.

**(19)** Provide a legible site map or set of maps in the SWPPP, showing the entire site and identifying boundaries of the property where construction and earth-disturbing activities will occur, as described in the CGP Part 5.3.5. Include all BMPs on the site map.

**(20)** Identify the inspection frequency in the SWPPP.

**(a)** For areas of the state where the mean annual precipitation is less than 40 inches:

**(1)** Inspect at least once every seven calendar days; or

**(2)** Inspect at least once every 14 calendar days and within 24 hours of the end of a storm event that resulted in a discharge from the site.

**(b)** For areas of the state where the mean annual precipitation is 40 inches or greater:

**(1)** Inspect at least once every seven calendar days.

**(21)** Linear Project Inspections, described in CGP Part 6.5, are not applicable to this contract.

**(22)** The SWPPP must cite and incorporate applicable requirements of the Project permits, environmental commitments, COE permit, and commitments related to historic preservation. Make additional consultations or obtain permits as necessary for Contractor specific activities that were not included in the Department's permitting and consultation.

**(23)** The SWPPP is a dynamic document. Keep the SWPPP current by noting installation, modification, and removal of BMPs, and by using amendments, SWPPP amendment logs, Inspection Reports, corrective action logs, records of land disturbance and stabilization, and any other records necessary to document storm water pollution prevention activities and to satisfy the requirements of the CGP and this specification. See Subsection 641-3.3 for more information.

**d. Recording Personnel and Contact Information in the SWPPP.**

Identify the SWPPP Manager as the Storm Water Lead and Storm Water Inspector positions in the SWPPP. Document the SWPPP Manager's responsibilities in Section 2.0 Storm Water Contacts, of the SWPPP template and:

**(1)** Identify that the SWPPP Manager does not have authority to sign inspection reports (unless the SWPPP Manager is also the designated project Superintendent).

**(2)** Identify that the SWPPP Manager cannot prepare the SWPPP unless the SWPPP Manager meets the Contract requirements for the SWPPP Preparer.

Include in the SWPPP proof of AK-CESCL or equivalent certifications for the Superintendent and SWPPP Manager, and for any acting Superintendent and acting SWPPP Managers. If the Superintendent or SWPPP Manager is replaced permanently or temporarily, by an acting Superintendent or acting SWPPP Manager; record in the SWPPP (use Form 25D-127) the names of the replacement personnel, the date of the replacement. For temporary personnel record their beginning and ending dates.

Provide 24 hour contact information for the Superintendent and SWPPP Manager. The Superintendent and SWPPP Manager must have 24 hour contact information for all Subcontractor SWPPP Coordinators and Utility SWPPP Coordinators.

Include in the SWPPP proof of AK-CESCL or equivalent certifications of ATS operators. Record names of ATS operators and their beginning and ending dates, on Form 25D-127.

The Department will provide proof of AK-CESCL, or equivalent certifications for the Department's Project Engineer, Storm Water Inspectors, and Monitoring Person (if applicable), and names and dates they are acting in that position. Include the Department's staff certifications in Appendix D. Include Department's staff names, dates acting, and assignments, in Section 2.0 of the SWPPP.

#### **641-2.2 HAZARDOUS MATERIAL CONTROL PLAN (HMCP) REQUIREMENTS.**

- a. Prepare the HMCP using the DOT&PF template located at the following DOT&PF link; <http://www.dot.state.ak.us/stwddes/dcspubs/forms.shtml> for prevention of pollution from storage, use, containment, cleanup, and disposal of all hazardous material, including petroleum products related to construction activities and equipment. Include the HMCP as an appendix to the SWPPP. Compile Material Safety Data Sheets in one location and reference that location in the HMCP.
- b. Designate a Contractor's Spill Response Field Representative with 24-hour contact information. Designate a Subcontractor Spill Response Coordinator for each subcontractor. The Superintendent and Contractor's Spill Response Field Representative must have 24-hour contact information for each Subcontractor Spill Response Coordinator and the Utility Spill Response Coordinator.
- c. List and give the location and estimated quantities of hazardous materials (Including materials or substances listed in 40 CFR 117 and 302, and petroleum products) to be used or stored on the Project. Hazardous materials must be stored in covered storage areas. Include secondary containment for all hazardous material storage areas.
- d. Identify the locations where fueling and maintenance activities will take place, describe the activities, and list controls to prevent the accidental spillage of petroleum products and other hazardous materials. Controls include placing absorbent pads or other suitable containment under fill ports while fueling, under equipment during maintenance or repairs, and under leaky equipment.
- e. List the types and approximate quantities of response equipment and cleanup materials available on the Project. Include a list and location map of cleanup materials, at each different work site and readily available off site (materials sources, material processing sites, disposal sites, staging areas, etc.). Spill response materials must be stored in sufficient quantity at each work location, appropriate to the hazards associated with that site.
- f. Describe procedures for containment and cleanup of hazardous materials. Describe a plan for the prevention, containment, cleanup, and disposal of soil and water contaminated by spills. Describe a plan for dealing with contaminated soil and water encountered during construction. Clean up spills or contaminated surfaces immediately.
- g. Describe methods of disposing of waste petroleum products and other hazardous materials generated by the Project, including routine maintenance. Identify haul methods and final disposal areas. Assure final disposal areas are permitted for hazardous material disposal.
- h. Describe methods of complying with the requirements of AS 46.04.010-900, Oil and Hazardous Substances Pollution Control, and 18 AAC 75. Include contact information for reporting hazardous materials and petroleum product spills to the Project Engineer and reporting to federal, state, and local agencies.

#### **641-2.3 SPILL PREVENTION, CONTROL AND COUNTERMEASURE PLAN (SPCC PLAN) REQUIREMENTS.**

Prepare and implement an SPCC Plan when required by 40 CFR 112 when both of the following conditions are present on the Project:

- a. Oil or petroleum products from a spill may reach navigable waters (as defined in 40 CFR 112); and
- b. Total above ground storage capacity for oil and any petroleum products is greater than 1,320 gallons (not including onboard tanks for fuel or hydraulic fluid used primarily to power the movement of a motor vehicle or ancillary onboard oil-filled operational equipment, and not including containers with a storage capacity of less than 55 gallons)

Reference the SPCC Plan in the HMCP and SWPPP.

#### **641-2.4 RESPONSIBILITY AND AUTHORITY OF THE SUPERINTENDENT AND SWPPP MANAGER.**

The Superintendent is responsible for the overall operation of the Project and all Contractor furnished sites and facilities directly related to the Project. The Superintendent shall sign and certify the SWPPP, Inspection Reports, and other reports required by the CGP, except the NOI and NOT. The Superintendent may not delegate the task or responsibility of signing and certifying the SWPPP submitted under Subsection 641-1.3.a, Inspection Reports, and other reports required by the CGP.

The Superintendent may assign certain duties to the SWPPP Manager.

- a. Ensuring Contractor's and subcontractor's compliance with the SWPPP and CGP;
- b. Ensuring the control of erosion, sedimentation, or discharge of pollutants;
- c. Directing and overseeing installation, maintenance, and removal of BMPs;
- d. Performing Inspections; and
- e. Updating the SWPPP including adding amendments and forms.

When Bid Item P641.070.0000 is part of the Contract, the SWPPP Manager must be available at all times to administer SWPPP requirements, and be physically present within the Project Zone or the project office, for at least eight hours per day when construction activities are occurring.

The Superintendent and SWPPP Manager shall be knowledgeable in the requirements of this Item P-641, the SWPPP, CGP, BMPs, HMCP, SPCC Plan, environmental permits, environmental commitments, and historic preservation commitments.

The Superintendent and SWPPP Manager shall have the Contractor's complete authority and be responsible for suspending construction activities that do not conform to the SWPPP or CGP.

**641-2.5 MATERIALS.** Use materials suitable to withstand hydraulic, wind, and soil forces, and to control erosion and trap sediments according to the requirements of the CGP and the Specifications.

- a. **Seed Mix.** Use the seed mixture specified in Item T-901, or as directed by the Engineer.
- b. **Soil Stabilization.** Use soil stabilization material as specified in Item P-682 and T-908.
- c. **Silt Fence.** Use silt fences as specified in Item P-680.
- d. **Straw.** Use straw and straw products certified weed free of prohibited and restricted noxious weed seed and quarantined pests, according to Alaska Administrative Code, Title 11, Chapter 34 (11 AAC 34). When straw or straw products certified according to 11 AAC 34 are not available, use non-certified products manufactured within Alaska before products manufactured in another state, country or territory. Grass, legumes, or any other herbaceous plants produced as hay, shall not be substituted for straw or straw products.
- e. **Other.** Use Oregon Scientific RGR126 wireless rain gauge with temperature, or Taylor 2751 Digital Wireless Rain Gauge with Thermometer, or approved equivalent.

## CONSTRUCTION REQUIREMENTS

**641-3.1 GENERAL.** Comply with the SWPPP and the requirements of the CGP Part 5.0.

**a. Before Construction Activity may Begin.** The following actions must be completed before Construction Activity begins:

- (1) The SWPPP Preparer must visit the Project, the visit must be documented in the SWPPP Form (25D-106), and the SWPPP must be developed (or amended) with findings from the visit;
- (2) The SWPPP must be approved by the Engineer on Form 25D-109;
- (3) The Contractor must be authorized to begin by the Engineer;
- (4) The Project eNOIs for the Department and for the Contractor, as well as any other eNOIs if there are additional operators, must be listed as Active Status on the ADEC website;
- (5) The Department approved SWPPP must be submitted to ADEC and Local Government (when required); and
- (6) The Contractor has transmitted to the Engineer an electronic copy and at least one hardcopy of the approved SWPPP.
- (7) The Delegation of Authority (Forms 25D-108 and 25D-107) for both the Contractor and DOT&PF Engineer are signed.
- (8) Begin winter construction activity according to CGP Part 4.12.2, provided actions (1), (3), and (7) are completed. If winter construction activities may extend beyond spring thaw, the following actions must be completed before spring thaw:
  - (a) Actions (1) through (7), listed above, and
  - (b) Appropriate control measures to minimize erosion and sediment runoff during spring thaw and summer rainfall are installed.
- (9) Post notices. Include the following information:
  - (a) Copy of all eNOIs related to this project;
  - (b) Location of the SWPPP.

Post notices on the outside wall of the Contractor's project office, and near the main entrances of the construction project. Protect postings from the weather. Locate postings so the public can safely read them without obstructing construction activities or the traveling public (for example, at an existing pullout). Do not use retroreflective signs for the SWPPP posting. Do not locate SWPPP signs in locations where the signs may be confused with traffic control signs or devices. Update the notices if the listed information changes.
- (10) Install an outdoor rain gauge per manufacturer's guidance in a readily accessible location on the Project. Projects may utilize the nearest National Weather Service (NWS) precipitation gauge station, if within 20 miles of the project, to determine rainfall amounts during storm events.
- (11) Delineate the site for both land disturbing activities and areas that will be left undisturbed.
- (12) Install sediment controls and other BMPs that must be placed prior to the initiation of Construction Activity.

- b. During Construction.** Before subcontractors or utility companies begin soil disturbing activities, provide to them copies of applicable portions of the SWPPP, and require them to sign a SWPPP Subcontractor Certification, Form 25D-105. Include SWPPP Subcontractor Certifications as an appendix to the SWPPP. Ensure subcontractors and utility companies understand and comply with the SWPPP and the CGP. Inform subcontractors and utility companies of SWPPP amendments that affect them in a timely manner. Coordinate with subcontractors and utility companies doing work in the Project Zone so BMPs, including temporary and final stabilization are installed, maintained, and protected from damage.

Provide on-going training to employees and subcontractors, on control measures at the site and applicable storm water pollution prevention procedures. Training must be specific to the installation, maintenance, protection, and removal of control measures CGP 4.14. Training must be given at a frequency that will be adequate to ensure proper implementation and protection of control measures, and no less frequently than once a month during construction activity. Document on the SWPPP Training Log, Form 25D-125, the dates and attendees to these trainings. Include the SWPPP Training Log as an appendix to the SWPPP.

Notify the Engineer immediately if the actions of any utility company or subcontractor do not comply with the SWPPP and the CGP.

Comply with ~~CGP subsection 70-11 Protection and Restoration of Property and Landscape~~ CSPP Section 10 Article 4.10. Concrete washout must be fully contained.

Comply with CGP Part 4.8.2 for fueling and maintenance activities. Place absorbent pads or other suitable containment under fill ports while fueling, under equipment during maintenance or repairs, and under leaky equipment.

Comply with requirements of the HMCP and SPCC Plan, and all local, state and federal regulations that pertain to the handling, storage, containment, cleanup, and disposal of petroleum products or other hazardous materials.

Keep the SWPPP and HMCP current (refer to Subsection 641-2.1.c, SWPPP Considerations and Contents).

- c. Pollutant Reporting Requirements.** If an incident of non-compliance occurs that may endanger health or the environment a report must be made, CGP, Appendix A, Part 3.4:

- (1) Verbally, immediately report the incident to the Engineer,
- (2) Verbally report to ADEC within 24 hours after the permittee becomes aware of the incident, and
- (3) In writing, report to ADEC within five days after the permittee becomes aware of the circumstances. To report in writing, complete the written noncompliance report on Form 25D-143, and file the written report with ADEC. Coordinate the report with the Engineer. Include in the report:
  - (a) A description of the noncompliance and its causes;
  - (b) The exact dates and times of noncompliance;
  - (c) If not yet corrected the anticipated time the project will be brought back into compliance; and
  - (d) The corrective action taken or planned to reduce, eliminate and prevent reoccurrence.
  - (e) Notify the Engineer and COE Regulatory Program immediately if there is incident of noncompliance with COE Permits.

- d. Hazardous Materials Reporting Requirements.** Any release of a hazardous substance must be reported immediately, to the Engineer as soon as the person has knowledge of the discharge.

Report spills of petroleum products or other hazardous materials to the Engineer and other agencies as required by law, and according to CGP Part 9.3.

**(1) To water:**

- (a)** Any amount released must be reported immediately to the Engineer, ADEC, and the Coast Guard.

**(2) To land:**

- (a)** Any release of a petroleum product in excess of 55 gallons must be reported as soon as the person has knowledge of the discharge CGP Part 9.3.2.

- (b)** Any release of a petroleum product in excess of 10 gallons but less than 55 gallons must be reported to the Engineer and must be reported to ADEC within 48 hours after the person has knowledge of the discharge CGP Part 9.3.2.

- (c)** Any release of a petroleum product in excess of 1 gallon to 10 gallons must be recorded and logged and provided to ADEC on a monthly basis.

- (3)** Use the HMCP and SPCC Plan (if available) for contact information to report spills to regulatory agencies.

- (4)** Within seven calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release to the nearest ADEC Area Response Team Office listed CGP Part 9.3.2.

- (5)** Implement measures to prevent the reoccurrence of and to respond to such releases.

- e. Corrective Action and Maintenance of BMPs.** Implement maintenance as required by the CGP, SWPPP, and manufacturer's specifications, whichever is more restrictive.

**(1) Implement corrective action:**

- (a)** If an incident of noncompliance with the SWPPP, or CGP is identified;

- (b)** If an Inspection or the Engineer identifies the SWPPP or any part of the SWPPP is ineffective in preventing erosion, sedimentation or the discharge of pollutants;

- (c)** If a required BMP was not installed according to the SWPPP schedule or phasing, or was installed incorrectly, or was not installed according to the CGP Part 4.0;

- (d)** If a BMP is not operating as intended, has not been maintained in an effective operation condition, or is unable to effectively perform the intended function;

- (e)** If sediment accumulates more than one-third of the distance of the above-ground height of the silt fence;

- (f)** If sediment accumulates to more than one-half retention height for an inlet BMP, check dam, berm, wattle, or other control measures;

- (g)** If a prohibited discharge of pollutants, as specified in CGP Part 4.7, is occurring or will occur; or





- (4) When temporary or permanent seeding is required, provide a working hydro seeding equipment located within 100 miles of the project by road; with 1,000 gallons or more tank capacity, paddle agitation of tank, and the capability to reach the seed areas with an uniform mixture of water, seed, mulch and tackifier. If the project is located in an isolated community the hydro-seeder must be located at the project.
- (5) Before applying temporary or permanent seeding, prepare the surface to be seeded to reduce erosion potential and to facilitate germination and growth of vegetative cover. Apply seed and maintain seeded areas. Reseed areas where growth of temporary vegetative cover is inadequate to stabilize disturbed ground.
- (6) Apply permanent seed according to Item T-901, within the time periods allowed by the CGP and the contract, at locations where seeding is indicated on the plans and after land-disturbing activity is permanently ceased.
- (7) When installing a culvert or other drainage structure where stream bypass is not used, install temporary or final stabilization concurrently or immediately after placing the culvert or drainage structure in a manner that complies with the SWPPP, applicable project permits and prevents discharge of pollutants. Install temporary or final stabilization:
  - (a) At the culvert or drainage structure inlet and outlet; and
  - (b) In the areas upstream and downstream that may be disturbed by the process of installing the culvert, culvert end walls, culvert end sections, or drainage structure.
- (8) Before deactivating a stream bypass or stream diversion used for construction of a bridge, culvert, or drainage structure, install final or temporary stabilization when approved by the Engineer:
  - (a) At the inlet and outlet of the culvert, drainage structure, or bridge;
  - (b) In the area upstream and downstream of the culvert, drainage structure, or bridge, that is disturbed during installation or construction of the culvert, drainage structure, or bridge; and
  - (c) Under the bridge.

Within seven days of initiating final stabilization, either complete final stabilization or continue maintenance of work until final stabilization is complete, CGP Part 4.5.1.5.

Complete temporary stabilization within 14 day of initiating stabilization, CGP Part 4.5.1.2.

**g. Ending CGP Coverage and BMP Maintenance in the Project Zone.**

- (1) The Engineer will determine the date that all the following conditions for ending CGP coverage have been met within the Project Zone:
  - (a) Land disturbing activities have ceased;
  - (b) Final Stabilization has been achieved on all portions of the Project Zone, according to the CGP PART 4.5.2 (including at Department furnished material sources, disposal sites, staging areas, equipment areas, etc.); and
  - (c) Temporary BMPs have been removed.
- (2) After the Engineer has determined the conditions for ending CGP coverage have been met, the Department will:

- (a) Send written notice to the Contractor with the date that the conditions were met;
- (b) Submit an eNOT to ADEC; and
- (c) Provide a copy of the eNOT and ADEC's acknowledgement letter to the Contractor.

The Contractor is responsible for ending permit coverage within the Project Zone, by submitting an eNOT to ADEC within 30 days of meeting the conditions for ending CGP coverage. The Contractor is responsible for BMP maintenance and SWPPP updates until permit coverage is ended.

If the Contractor's CGP eNOI acreage includes Support Activities and any other areas where the Department is not an Operator, the Contractor may not be able to file an eNOT at the same time as the Department. In this case, the Contractor must amend the SWPPP and separate SWPPP2(s), to indicate the Department's CGP coverage has ended, and the Department is no longer an Operator within the Project Zone.

The Contractor must indicate in the SWPPP the areas that have reached Final Stabilization, and the dates land disturbing activities ended and Final Stabilization was achieved. The Contractor must submit an eNOT to ADEC, and insert copies of the Department's and the Contractor's eNOTs with ADEC's acknowledgement letters in the appendix of the SWPPP.

The Contractor must submit a copy of each signed eNOT and ADEC's acknowledgement letter to the Department within three days of filing the eNOT or receiving a written response.

The Contractor is responsible for coordinating local government inspections of work and ending permit coverage with local government. See Subsection 641-1.3e for more information.

**h. Transmit final SWPPP.**

Transmit one copy of the final SWPPP, including all amendments, appendices and maps, to the Engineer; when the project eNOTs are filed, or within 30 days of the Department's eNOT being filed, whichever is sooner. Transmittal must be by both electronic and at least one hard copy.

**641-3.2 SWPPP DOCUMENTS, LOCATION ON-SITE, AVAILABILITY, AND RECORD RETENTION.**

The SWPPP and related documents maintained by the Contractor are the Record for demonstrating compliance with the CGP. Copies of SWPPP documents transmitted to the Engineer under the requirements of this specification are informational and do not relieve the Contractor's responsibility to maintain complete records as required by the CGP and this specification.

Keep the SWPPP, HMCP and SPCC Plan at the on-site project office. If there is not an on-site project office, keep the documents at a locally available location that meets CGP requirements and is approved by the Engineer. Records may be moved to another office for record retention after the eNOTs are filed. Records may be moved to another office during winter shutdown. Update on-site postings if records are relocated during winter shutdown. Provide the Department with copies of all Records.

Retain Records and a copy of the SWPPP, for at least three years after the date of eNOT. If EPA or ADEC inspects the project, issues a Notice of Violation (NOV), or begins investigation for a potential NOV before the retention period expires, retain the SWPPP and all Records related to the SWPPP and CGP until at least three years after EPA and/or ADEC has determined all issues related to the investigation are settled.

The SWPPP and related documents must be made available for review and copy, to the Department and other regulatory agencies that request them. See CGP Parts 5.10, 6.6 and 9.5.

**641-3.3 SWPPP INSPECTIONS, AMENDMENTS, REPORTS, AND LOGS.** Perform Inspections, prepare Inspection Reports, and prepare SWPPP Amendments in compliance with the SWPPP and the CGP. Update SWPPP Corrective Action Log Form 25D-112, SWPPP Amendment Log Form 25D-114, SWPPP

Grading and Stabilization Activities Log Form 25D-110, SWPPP Project Staff Tracking Form 25D-127, and SWPPP Daily Record of Rainfall Form 25D-115. For active projects update the Records daily.

- a. Inspection during Construction.** Conduct Inspections according to the schedule and requirements of the SWPPP and CGP.

Inspections required by the CGP and SWPPP must be performed by the Contractor's SWPPP Manager and the Department's Storm water Inspector jointly, unless approved by the Engineer, when:

- (1) One of the inspectors is not on site, access is only by air, and weather delayed or canceled flights;
- (2) One of the inspectors is sick;
- (3) The project is on a reduced frequency inspection schedule with no staff on site, the only access to the site is by air, and it is economical to send only one inspector; or
- (4) When the Engineer determines a safety concern that makes joint inspection impracticable.

When this is the case, the Operator who conducts the Inspection must provide a copy of the Inspection Report to the other Operator within three days of the Inspection date and document the date of the report transmittal.

- b. Inspection Reports.** Use only the DOT&PF SWPPP Construction Site Inspection Report, Form 25D-100 to record Inspections. Changes or revisions to Form 25D-100 are not permitted; except for adding or deleting data fields that list: Location of Discharge Points, and Site Specific BMPs. Complete all fields included on the Inspection Report form; do not leave any field blank.

Insert a Complete-by-Date for each corrective action listed that complies with:

- (1) Subsection 641-3.1d, and
- (2) The CGP.

Provide a copy of the completed, unsigned Inspection Report to the Engineer by the end of the next business day following the inspection.

The Superintendent must review, correct errors, and sign and certify the Inspection Report, within three days of the date of Inspection. The Engineer may coordinate with the Superintendent to review and correct any errors or omissions before the Superintendent signs the report. Corrections are limited to adding missing information or correcting entries to match field notes and conditions present at the time the Inspection was performed. Deliver the signed and certified Inspection Report to the Engineer on the same day the Superintendent signs it.

The Engineer will sign and certify the Inspection Report and will return the original to the Contractor within three working days.

The Engineer may make corrections after the Superintendent has signed and certified the Inspection Report. The Engineer will initial and date each correction. If the Engineer makes corrections, the Superintendent must recertify the Inspection Report by entering a new signature and date in the white space below the original signature and date lines. Send a copy of the recertified Inspection Report to the Engineer on the day it is recertified.

If subsequent corrections to the certified Inspection Report are needed, document the corrections in an amendment memo that addresses only the omitted or erroneous portions of the original Inspection Report. The Superintendent and the Engineer must both sign and certify the amendment memo. The issuance of an amendment memo does not relieve the Contractor of liquidated

damages that may have been incurred as a result of the error on the original certified inspection report.

- c. **Inspection before Seasonal Suspension of Work.** Conduct an Inspection before seasonal suspension of work to confirm BMPs are installed and functioning according to the requirements of the SWPPP and CGP.
- d. **Reduced Inspection Frequencies.** Conduct Inspections according to the inspection schedule indicated in the approved SWPPP. Any change in inspection frequency must be approved by the Engineer, and beginning and ending dates documented as an amendment to the SWPPP.

If the Engineer approves and the entire site is stabilized, the frequency of inspections may be reduced to at least one inspection every 30 days. At actively staffed sites, inspect within two business days of the end of a storm event that results in a discharge from the site.

When work is suspended due to fall freeze-up, the Engineer may suspend inspection requirements after fourteen days of freezing conditions if:

- (1) Soil disturbing activities are suspended; and
- (2) Soil stabilizing activities are suspended.

Inspections must resume according to the normal inspection schedule identified in the SWPPP, at least 21 days before anticipated spring thaw. See CGP Part 6.2.3.

The Engineer may waive requirements for updating the Grading and Stabilization Activities Log and Daily Record of Rainfall during seasonal suspension of work. If so, resume collecting and recording weather data on the Daily Record of Rainfall form one month before thawing conditions are expected to result in runoff. Resume recording land disturbance and stabilization activities on the Grading and Stabilization Activities Log when Construction Activity resumes.

- e. **Stabilization before Fall Freeze up and Spring Thaw.** Stabilize Construction Activities within the Project Zone with appropriate BMPs prior to the anticipated date of fall freeze up, in accordance with the CGP, Part 4.12.

Exceptions to stabilization prior to anticipated date of fall freeze up include:

- (1) When stabilization activities are precluded by snow cover or frozen ground conditions prior to the anticipated date of fall freeze up, or
- (2) When winter construction activity is authorized by the Engineer and conducted according to the contract.

Stabilize Construction Activities within the Project Zone with appropriate BMPs prior to spring thaw, as defined in the CGP.

- f. **Inspection before Project Completion.** Conduct Inspection to ensure Final Stabilization is complete throughout the Project, and temporary BMPs that are required to be removed are removed. Temporary BMPs that are biodegradable and are specifically designed and installed with the intent of remaining in place until they degrade, may remain in place after project completion.
- g. **Items and Areas to Inspect.** Conduct Inspections of the areas required by the CGP and SWPPP.
- h. **SWPPP Amendments and SWPPP Amendment Log.** The Superintendent and the SWPPP Manager are the only persons authorized to amend the SWPPP and update the SWPPP Amendment Log, Form 25D-114. The Superintendent or the SWPPP Manager must sign and date amendments to the SWPPP and updates to the SWPPP Amendment Log.

SWPPP Amendments must be approved by the Engineer.

Amendments must occur:

- (1) Whenever there is a change in design, construction operation, or maintenance at the construction site that has or could cause erosion, sedimentation or the discharge of pollutants that has not been previously addressed in the SWPPP;
- (2) If an Inspection identifies that any portion of the SWPPP is ineffective in preventing erosion, sedimentation, or the discharge of pollutants;
- (3) Whenever an Inspection identifies a problem that requires additional or modified BMPs
- (4) Whenever a BMP is modified during construction, or a BMP not shown in the original SWPPP is added;
- (5) If the Inspection frequency is modified (note beginning and ending dates); or
- (6) When there is a change in personnel who are named in the SWPPP, according to Subsection 641-2.1d.

Amend the SWPPP narrative as soon as practicable after any change or modification, but in no case, later than seven days following identification of the need for an amendment. Every SWPPP Amendment must be signed and dated. Cross-reference the amendment number with the Corrective Action Log or SWPPP page number, as applicable. When a BMP is modified or added, describe the BMP according to Subsection 641-2.1c.

Keep the SWPPP Amendment Log current. Prior to performing each scheduled Inspection, submit to the Engineer a copy of the pages of the Amendment Log that contain new entries since the last submittal. Include copies of any documents amending the SWPPP.

Keep the SWPPP Amendment Log as an appendix to the SWPPP.

- i. **Site Maps.** Document installation, routine maintenance, and removal of BMPs by making notes on the SWPPP Site Maps. Include the date and the recording person's initials by these notes. Identify areas where Construction Activities begin, areas where Construction Activities temporarily or permanently cease, and areas that are temporarily or permanently stabilized.
- j. **Corrective Action Log.** The Superintendent and SWPPP Manager are the only persons authorized to make entries on the SWPPP Corrective Action Log, Form 25D-112. Document the need for corrective action within 24 hours of either:
  - (1) Identification during an inspection; or
  - (2) Discovery by the Department's or Contractor's staff, a subcontractor, or a regulatory agency inspector.

Modification or replacement of a BMP, installation of a new BMP not shown in the original SWPPP, overdue BMP maintenance, or other reasons listed as corrective actions in 641-3.1d must be documented on the Corrective Action Log.

Within 24 hours of discovery, update the Corrective Action Log, Form 25D-112, with the date of discovery and proposed corrective action. If discovered during an inspection, update log with inspection date and proposed corrective actions noted on the Inspection Report. If discovered outside of an inspection, update the log with the date of discovery, the proposed corrective action, and the date the corrective action was completed.

After the corrective action has been accomplished, note in the Corrective Action Log the action taken and if a SWPPP amendment was needed. Date and initial the entry.

Keep the Corrective Action Log current and submit a copy to the Engineer prior to performing each scheduled SWPPP Inspection.

Keep the Corrective Action Log as an appendix to the SWPPP.

- k. Grading and Stabilization Activities Log.** The Superintendent and SWPPP Manager are the only persons authorized to date and initial entries on the SWPPP Grading and Stabilization Activities Log, Form 25D-110. Use the SWPPP Grading and Stabilization Activities Log, to record land disturbance and stabilization activities.

Keep the Grading and Stabilization Activities Log current and submit a copy to the Engineer prior to performing each scheduled SWPPP Inspection. Keep the Grading and Stabilization Activities Log organized and completed to demonstrate compliance with the CGP Part 4.5.

Keep the Grading and Stabilization Activities Log as an appendix to the SWPPP.

- l. Daily Record of Rainfall.** Use SWPPP Daily Record of Rainfall, Form 25D-115, to record weather conditions at the Project. Update the form daily and include the initials of the person recording each day's entry. Submit a copy to the Engineer prior to performing each scheduled Inspection. Keep the Daily Record of Rainfall as an appendix to the SWPPP.

**m. Staff Tracking Log.**

Use the SWPPP Project Staff Tracking Form 25D-127, to keep staff records current. Include Records of the AK-CESCL or equivalent qualifications for the Superintendent, SWPPP Manager, ATS operator, any acting Superintendent and acting SWPPP Managers, and beginning and end dates for temporary personnel assignments related to administration of the CGP or Item P-641. Update the SWPPP Staff Tracking Log within 24 hours of any changes in personnel, qualifications, or other staffing items related to administration of the CGP or Item P-641.

**641-3.4 FAILURE TO PERFORM WORK.**

The Engineer has authority to suspend work and withhold monies according to ~~CGP subsections 50-01 and 80-06~~ CSPP Section 10 Articles 5.1 and 5.24 for the reasons listed under ~~CGP subsection 80-06~~ Article 5.24 and for an incident of noncompliance with the CGP or SWPPP, that may endanger health or the environment or for failure to perform work related to Item 641.

An incident of noncompliance includes, but is not limited to, the Contractor's failure to:

- a. Obtain appropriate permits before Construction Activities occur;
- b. Perform SWPPP Administration;
- c. Perform timely Inspections;
- d. Update the SWPPP;
- e. Transmit updated SWPPP, Inspection Reports, and other updated SWPPP forms to the Engineer;
- f. Maintain effective BMPs to control erosion, sedimentation, and pollution in accordance with the SWPPP, the CGP, and applicable local, state, and federal requirements;
- g. Perform duties according to the requirements of Item P-641; or

- h. Meet requirements of the CGP, SWPPP, or other permits, laws, and regulations related to erosion, sediment, or pollution control.
- i. Any other requirements established or included in the contract.

No additional Contract time or additional compensation will be allowed due to delays caused by the Engineer's suspension of work.

**641-3.5 ACCESS TO WORK.**

The Project, including any related off-site areas or support activities, must be made available for inspection, or sampling and monitoring, by the Department and other regulatory agencies. See CGP, Part 6.6.

**METHOD OF MEASUREMENT**

**641-4.1** Measure work according to GCP Section 90 and as follows:

- a. Items P641.010.0000, P641.030.0000, P641.070.0000 and P641.090.0000, are lump sum.
- b. Items P641.020.0000, P641.040.0000, P641.050.0000, P641.080.0000 and P641.100.0000 will be measured on a contingent sum basis as specified by the Directive authorizing the work.
- c. Item P641.060.0000 will be measured on a contingent sum basis with withholding determined by the Department.

**TABLE 641-1 BMP VALUES – RESERVED**

Liquidated Damages assessed according to Table 641-2 are not an adjustment to the Contract amount. These damages charges are related to Contract performance but are billed by the Department to the Contractor, independent of the Contract amount. An amount equal to the Liquidated Damages may be withheld for unsatisfactory performance, from payment due under the Contract, until the Contractor remits payment for billed Liquidated Damages.

**TABLE 641-2 – (Version C) EROSION, SEDIMENT AND POLLUTION CONTROL – LIQUIDATED DAMAGES**

<b>Code</b>	<b>Specification Section Number and Description</b>	<b>Deductible Amount in Dollars</b>	<b>Cumulative Deductible Amounts in Dollars</b>
<b>a</b>	641-1.4 Failure to have a qualified (AK-CESCL or equivalent) SWPPP Manager	Calculated in Code b or f	
<b>b</b>	Failure to meet SWPPP requirements of: (1) 641-2.1a Name of SWPPP Preparer (2) Not Applicable (3) 641-3.3h Sign and Date SWPPP amendments by qualified person (4) 641-3.2 Records maintained at project and made available for review	\$750 per omission	
<b>c</b>	Not Applicable		
<b>d</b>	641-3.3e Failure to stabilize a Project prior to fall freeze up.	\$5,000 per Project per year	
<b>e</b>	641-2.1a Failure to conduct pre-construction inspections before Construction Activities on all projects greater than 1 acre.	\$2,000 per Project	
<b>f*</b>	641-3.3. Failure to conduct and record CGP Inspections	\$750 per Inspection	Additional \$750 for every additional 7 day



Code	Specification Section Number and Description	Deductible Amount in Dollars	Cumulative Deductible Amounts in Dollars
	641-3.3a Personnel conducting Inspections and Frequency 641-3.3b Inspection Reports, use Form 25D-100, completed with all required information		period without completing the required inspection.
<b>g</b>	641-3.1d Corrective action, failure to timely accomplish BMP maintenance and/or repairs. In effect until BMP maintenance and/or repairs is completed.	\$500 per Project per day	
<b>h</b>	641-3.1c Failure to provide to the Engineer and ADEC a timely oral noncompliance report of violations or for a deficient oral noncompliance report	\$750 for the first day the report is late or deficient	Additional \$750 for every 14 day period with- out the required information
<b>i</b>	641-3.1c Failure to provide to the Engineer and ADEC a timely written noncompliance report, use Form 25D-143, of violations or for a deficient written noncompliance report	\$750 for the first day the report is late or deficient	Additional \$750 for every 14 day period without the required information
<b>j</b>	641.3.4 Failure to comply with the requirements of the CGP, approved SWPPP, and Item P-641, except as listed above	\$750 per occurrence for the first day of noncompliance	Additional \$750 for every day the deficiency remains uncorrected

**Code f\*** Liquidated Damages according to Code f will not be billed for typographic errors and minor data entry errors, except the liquidated damages will be assessed for these errors when:

- (1) the contractor has previously been notified and subsequent inspection reports repeat the same or similar error,
- (2) multiple inspection reports are submitted after the submission due date and the same or similar errors are repeated on multiple overdue reports,
- (3) an error in recording the inspector's AK-CESCL certification date results in an inspector performing the inspection during a period when their certification was lapsed or was otherwise invalid.

## BASIS OF PAYMENT

**641-5.1** See Subsection 641-3.4 Failure to Perform Work, for additional work and payment requirements.

- a. Item P641.010.0000 Erosion, Sediment and Pollution Control Administration.** At the Contract lump sum price for administration of all work under this Section. Includes, but is not limited to, SWPPP and HMCP and SPCC Plan preparation, agency fees for SWPPP reviews, SWPPP amendments, pre-construction Inspections, Inspections, monitoring, reporting, and Record keeping or copying Records related to the SWPPP and required by the CGP, and Record retention.
- b. Item P641.020.0000 Temporary Erosion, Sediment and Pollution Control.** At the contingent sum prices specified for all labor, supervision, material, equipment, and incidentals to install, maintain, remove and dispose of approved temporary erosion, sedimentation, and pollution control BMPs required to implement the SWPPP and SPCC Plan.
- c. Item P641.030.0000 Temporary Erosion, Sediment and Pollution Control.** At the Contract lump sum price for all labor, supervision, material, equipment, and incidentals to install, maintain, remove and dispose of temporary erosion, sedimentation, and pollution control BMPs identified in the SWPPP and SPCC Plan.
- d. Item P641.040.0000 Temporary Erosion, Sediment and Pollution Control Additives.** At the contingent sum prices specified in the Directive to authorize the work, for all labor, supervision, materials, equipment, and incidentals for extra, additional, or unanticipated work, to install, maintain, remove and dispose of temporary erosion, sedimentation, and pollution control BMPs not covered by Item P641.030.0000. All additional Erosion, Sediment, and Pollution Control

Administration necessary due to this item will not be paid for separately but will be subsidiary to other bid items.

- e. **Item P641.050.0000 Temporary Erosion, Sediment and Pollution Control by Directive.** At the contingent sum prices specified in the Directive using time and materials to authorize the work, for all labor, supervision, materials, equipment, and incidentals to install, maintain, remove and dispose of temporary erosion, sedimentation, and pollution control BMPs. Prices for this item will be by time and materials according to GCP Subsection 90-05, or by mutual agreement between the Engineer and Contractor. All additional Erosion, Sediment, and Pollution Control Administration necessary due to this item will not be paid for separately but will be subsidiary to other bid items.
- f. **Item P641.060.0000 Withholding.** The Engineer may withhold an amount equal to Liquidated Damages, assessed according to Item P-641, from payment due the Contractor. Liquidated Damages for violations of the Contract, CWA, CGP, are determined by the Engineer according to Table 641-2. The Engineer may withhold payment due the Contractors until the Contractor pays the Liquidated Damages to the Department.

The Department will not release performance bonds until Liquidated Damages assessed according to Item P-641 are paid to the Department, and all requirements according to GCP subsection 30-05 are satisfied.

- g. **Item P641.070.0000 SWPPP Manager.** At the Contract lump sum price for a SWPPP Manager that conforms to this specification. When Item P641.070.0000 appears in the Bid Schedule, the SWPPP Manager must be a different person than the superintendent, and must be physically present during construction activity with duties and authority as described in Subsection 641-2.4. When Item P641.070.0000 does not appear in the Bid Schedule, the SWPPP Manager is subsidiary to Item P641.010.0000.
- h. **Subsidiary Items.** Temporary erosion, sediment and pollution control measures that are required outside the Project Zone are subsidiary. Work required by the HMCP and SPCC Plan including hazardous material storage, containment, removal, cleanup and disposal, are subsidiary to Item P641.010.0000 Erosion, Sediment and Pollution Control Administration.
- i. **Work under other pay items.** Work that is paid for directly or indirectly under other pay items will not be measured and paid for under Item P-641. This work includes but is not limited to:
  - (1) Dewatering;
  - (2) Shoring;
  - (3) Bailing;
  - (4) Permanent seeding;
  - (5) Installation and removal of temporary work pads;
  - (6) Temporary accesses;
  - (7) Temporary drainage pipes and structures;
  - (8) Diversion channels;
  - (9) Settling impoundment; and
  - (10) Filtration.

Permanent erosion, sediment and pollution control measures will be measured and paid for under other Contract items when shown on the bid schedule.

- a. **Work at the Contractor's Expense.** Temporary erosion, sediment and pollution control measures that are required due to carelessness, negligence, or failure to install temporary or permanent controls as scheduled or ordered by the Engineer, or for the Contractor's convenience, are at the Contractor's expense.

Payment will be made under:

Item P641.010.0000	Erosion, Sediment, and Pollution Control Administration – per lump sum
Item P641.030.0000	Temporary Erosion, Sediment, and Pollution Control – per lump sum
Item P641.060.0000	Withholding – per contingent sum



## ITEM P-650 AIRCRAFT TIE-DOWN

### DESCRIPTION

**650-1.1** This item consists of furnishing and installing aircraft tie-down anchors according to these specifications and the details on the Plans, or as directed by the Engineer.

### MATERIALS

**650-2.1 GENERAL.** Meet the strength and/or capacity requirements of this section for the type of anchor specified.

Substitution of products as approved equals will be determined by comparing ratings for tensile breaking strength and pull-out capacity that exceed the specified minimums when installed under prevailing soil or rock conditions. The practicality of installing proposed anchors at the plan locations and corrosion resistance will also be considered.

~~Locate existing tie-downs and record their locations such that new tie-downs may be placed in a similar layout.~~

~~Cut existing tie-downs off at the lowest point available after excavation in the area is complete. Remove existing tie-downs completely under Item P-151.~~

~~Install tie-downs such that the new tie-down is offset 18 inches or as directed by the Engineer to avoid hitting the existing anchor with the new installation at the locations shown on Plans.~~

### 650-2.2 SOIL ANCHOR TIE-DOWNS.

- a. **Driven Toggle.** Provide an anchor assembly with a minimum tensile breaking strength of 9,000 pounds, a minimum working load capacity of 3,500 pounds and a minimum field pull-out capacity of 5,000 pounds. Provide anchors equipped with stainless steel cable, swaged eyes at cable ends, and no intermediate connections.
- b. **Buried Plate.** Provide an anchor assembly meeting the details shown on the Plans.
- c. **Helical "Screw" Anchor.** Provide an anchor assembly with minimum tensile breaking strength of 9,000 pounds, a minimum working load capacity of 3,500 pounds, and a minimum field pull-out capacity of 5,000 pounds.

For each anchor assembly, provide a chain extension to the anchor cable so that the cable eye is buried 12 inches minimum below finish grade and the chain extends several links above finish grade after locking the anchor. Use 3/8-inch grade 43 high test hot galvanized steel chain with two 3/8-inch removable coupling links, one at each end of the chain.

**650-2.3 ROCK ANCHOR TIE-DOWNS.** Rock anchors shall be 1/2-inch diameter Williams Solid Bar "Spin Lock" Rock Bolts, Williams Titan Injection Anchor 30/16, or an approved equal. Provide anchor assembly with a minimum tensile breaking strength of 9,000 pounds and minimum field pull-out capacity of 5,000 pounds. Provide chain and chain coupling links meeting the same requirements as specified for soil anchor tie downs.

**650-2.4 TEMPORARY TIE-DOWNS.** Temporary tie-down anchors shall provide a minimum 500 pounds of resistance to uplift per anchor. Temporary anchors shall be laid out as shown on the Plans or as approved by the Engineer. Each anchor shall be provided with a 2-inch link or eye to which aircraft can be tethered. If above ground weights are used they shall be painted with reflective paint to be visible from any horizontal angle.

## CONSTRUCTION METHODS

**650-3.1 GENERAL.** Soil and Rock Anchor tie-downs shall be installed as shown on the Plans.

Install anchor eye to the end of the anchor shaft by either bolting or as recommended by the manufacturer and approved by the Engineer. Eye must be able to pass a 1-inch rope or pin.

### **650-3.2 SOIL ANCHOR TIE-DOWNS.**

- a. **Driven Toggle.** Drive to sufficient depth to develop the minimum pull-out strength according to the manufacturer's installation instructions. Predrilling may be required depending on soil class. Anchor placement shall be achieved by methods recommended in the manufacturer's installation instructions. Backfill material, when required, shall be aggregate compacted to the satisfaction of the Engineer. If the anchor is set in pavement, backfill to a level 2-inches below finish grade. Two-component sealant shall be used to fill the remainder of the hole to a level 1-inch below finish grade.
- b. **Buried Plate.** Install each plate on a level and compacted surface at 5 feet minimum below finish grade. Place backfill with the chain plumb and under tension. Meet the material and compaction requirements for the applicable lift of material involved.
- c. **Helical "Screw" Anchor.** Helical anchors shall be handled, stored, and installed in accordance with the manufacturer's recommendations. The helix of the helical anchors shall be installed a minimum of 6 feet below finish grade. Under no circumstances shall the manufacturer's recommended maximum allowable torque be exceeded at any time during installation.

The helix must be advanced in a continuous manner that allows the helix to "screw" into the soil matrix rather than "auger" through the soil matrix, resulting in disturbed soils around the helices. The rate of advance should provide a rotation of 5 to 15 rotations per minute. Apply uniform down pressure to maintain a penetration rate commensurate with the helix pitch. The rate of rotation and magnitude of down pressure may require adjustments during installation.

Prior to installing helical anchors in paved areas, core through the asphalt using a circular coring machine approved by the engineer. Install as shown on the Plans and compact to the satisfaction of the Engineer.

The helical anchors installed shall be field tension tested to the design pull-out load under the supervision of the Engineer to confirm tension load performance.

**650-3.3 ROCK ANCHOR TIE-DOWNS.** Rock anchors shall be anchored in sound bedrock at sufficient penetration to develop the minimum pull-out strength according to the manufacturer's instructions.

**650-3.4 TEMPORARY TIE-DOWNS.** Temporary tie-downs shall be produced that can be located to provide tie downs for aircraft displaced by the Contractor's operations. Tie-downs shall not require any permanent modifications to existing facilities or pavements and shall be re-locatable using readily available equipment. Initial placement and subsequent relocations of tie-downs shall be accomplished at the direction of the Engineer at no additional cost to the State.

**650-3.5 MANUFACTURER'S CERTIFICATION AND ACCEPTANCE TESTING.** For anchors where minimum tensile breaking strength or working load capacity is specified, provide manufacturer's certification that requirements are met. For anchors where minimum field pull-out capacities are specified, provide an Engineer approved testing apparatus that can apply and measure the required minimum field pull-out capacity. Field test each anchor and certify each test by recording the date of the test, the force applied, and the person completing the test. Tabulate this data and deliver to the Engineer within 24 hours of completing the tests.

### METHOD OF MEASUREMENT

**650-4.1** Measure according to GCP Section 90 and by each set, consisting of 3 anchors, completed and accepted in final position.

### BASIS OF PAYMENT

**650-5.1** At the contract price, per each set of 3 anchors, for each of the pay items shown in the bid schedule.

Payment will be made under:

Item P650.020.0000      Soil Anchor Tie-down – per set





## ITEM P-660 RETROREFLECTIVE MARKERS AND CONES

### DESCRIPTION

**660-1.1** Furnish and install airport retroreflective markers and traffic cones in accordance with the Plans, the safety plan, and the specifications at the locations indicated on the Plans or as directed by the Engineer. Assemble and install markers using all materials and incidentals necessary to place completed markers into operation to the satisfaction of the Engineer. Remove existing reflective marker cones and threshold markers for salvage and offer to the owner for possession.

### MATERIALS

#### 660-2.1 MARKERS.

- a. **Type I Marker.** Semi-flush centerline marker conforming to FAA AC 150/5345-39 *Specification for L-853, Runway and Taxiway Retroreflective Markers* and certified under AC 150/5345-53 *Airport Lighting Equipment Certification Program*.
- b. **Type II Marker.** Elevated marker for edge marking conforming to FAA AC 150/5345-39x, "Specification for L-853. Runway and Taxiway Lighting Retroreflective Markers" and certified under AC 150/5345-53 *Airport Lighting Equipment Certification Program*. Provide flexible or frangible markers in accordance with the height, marker colors, and retro-reflective colors shown on the Plans. If not called on the Plans, provide a finished marker height that is 30 inches above finish grade, marker color orange, and retroreflective colors as required by AC 150/5345-39. If frangible markers are supplied, ensure that the mounting system and tether are certified. When retro-reflective sheeting is used, provide manufacturer applied sheeting.
- c. **Cone, 18-Inch.** Reflective traffic cone, 18 inches in height, orange color. Fit each cone with retro-reflective sheeting to the height specified on the Plans. When no height dimension is specified, fit with a 7-inch wide band of retro-reflective sheeting centered on the cone. Use pressure sensitive, flexible, high intensity retroreflective sheeting, conforming to ASTM D4956, Type III. Provide the appropriate sheeting color(s) as indicated on the Plans or if none is indicated supply with white colored band. Provide each cone with ~~an anchoring tether of weather and corrosion resistant material capable of securing the assembly to prevent foreign object debris (FOD) hazard to aircraft similar to the tether required for Type II Markers that are frangible~~ minimum 8 pound weighted base.

### CONSTRUCTION REQUIREMENTS

**660-3.1** Install markers and/or cones at the locations shown on the Plans, called for in the specifications or as directed by the Engineer. Stabilize Type II Markers by using the manufacturer's recommended methods of driving the supporting posts into the ground or providing a certified mounting system. If frangible Type II Markers or cones are provided, secure the tether to a hard point in accordance with AC 150/5345-39 per the manufacturer's recommendations.

Remove existing reflective markers and threshold marking panels as shown on the Plans or as directed for salvage and offer to the owner for possession. Markers not claimed by the owner become the property of the Contractor to be disposed of in a manner approved by the Engineer.

### METHOD OF MEASUREMENT

**660-4.1** Measure according to GCP Section 90 and by the number of markers or cones furnished and installed of the specified type, at locations approved by the Engineer. When the pay items shown below are absent from the bid schedule, no measurement for payment will be made.

Removal and salvaging of existing markers and panels will be subsidiary to the installation of reflective markers and/or cones and will not be measured for payment.

### **BASIS OF PAYMENT**

**660-5.1** Payment will be made at the contract unit price for each furnished and accepted item. This price will be full compensation for furnishing all materials, for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item. If the following pay items are absent from the bid schedule, no payment will be made.

~~Payment will be made under:~~

## ITEM P-661 STANDARD SIGNS

### DESCRIPTION

**661-1.1** Furnish and install standard signs. The location and type of installation will be as shown on the Plans or as designated.

### MATERIALS

**661-2.1** Use materials that conform to the following:

- a. **Sheet Aluminum.** Use alloy 6061-T6, 5052-H36, 5052-H38, or recycled aluminum meeting alloy 3105, as specified in ASTM B 209. Meet the thickness of aluminum sheet designated on the Plans. Verify alloy and temper designations by mill certification.

Treat the aluminum base metal sheets with coating for aluminum to meet ASTM B921, Class 2. Handle the cleaned and coated base metal only by a mechanical device or by operators wearing clean cotton or rubber gloves. After cleaning and coating operations, protect the panels at all times from contact or exposure to greases, oils, dust or other contaminants.

Make each sign panel a continuous sheet for all lengths 72 inches or less in the horizontal direction. Use no more than one vertical splice for signs up to 144 inches in length and 48 inches or less in height.

Meet the panel dimensions specified with a tolerance of 1/16-inch. Furnish metal panels that are cut to size and shape and free of buckles, warp, dents, cockles, burrs and any other defects resulting from fabrication. Complete all possible fabrication, including shearing, cutting and punching of holes prior to the base metal preparation.

- b. **Reflective Sheeting.** Meet ASTM D4956, for the type specified.
- c. **Sign Posts.** Use the type and size of posts designated on the Plans.

(1) Perforated Steel Posts.

- (a) Fabricate posts from 0.105-inch thick cold-rolled carbon steel sheets, commercial quality, to meet ASTM A 653 and ASTM A 924. Zinc coat, both sides, to meet coating designation G90. Form posts into a steel tube, roll to size, and weld in the corner.
- (b) Perforate all members for their entire length with 7/16-inch diameter holes on 1-inch centers.
- (c) Furnish members that are straight and with a smooth, uniform finish, with no splices.
- (d) Ensure that all perforations and cut off ends are free from burrs.
- (e) Ensure that consecutive sizes will telescope freely with a minimum of play.
- d. **Sign Fabrication.** Use Type IV reflective sheeting (for lettering, symbols, borders, and background) on sheet aluminum panels.
- e. **Sign Posts and Bases.** Use sign posts and bases of the types specified. The structural aspects of design and materials for sign supports must comply with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. Do not splice sign posts.
- f. **Concrete.** Use concrete that shall conform to the requirements of Item P-610.

**661-2.2** Flashing sign shall be a manufactured product with internal circuitry assembled at the factory. Wiring and electronic components shall be concealed and resistant to weather, vandalism, and tampering. Sign shall be a ruggedized product suitable for extreme weather conditions and include eight red LED lights equally spaced around the perimeter that flash upon approaching traffic. LED lights shall dim in low light conditions. Sign shall also include manufacturer's recommended controller, and radar kit to detect approaching traffic. Rated for 100,000 hours and -40 degrees F.

### CONSTRUCTION REQUIREMENTS

**661-3.1** Attach sign panels to posts using the types and sizes of fastening hardware shown on the Plans. For flashing signs, attach sign panels, controller, and radar kit as required by manufacturer's instructions. Provide conduit, wiring, and incidentals per the manufacturer's instruction for a complete and operational system to the Engineer's approval. Adjust radar per the Engineer's approval.

All materials and finished signs are subject to inspection and acceptance in place.

- a. Surfaces exposed to weathering must be free of defects in the coating that impair serviceability or detract from general appearance or color match.
- b. Finished signs must be clean and have no chatter marks, burrs, sharp edges, loose rivets, delaminated reflective sheeting, or aluminum marks. Do not make repairs to the face sheet.

Install breakaway assemblies according to the manufacturer's written instructions.

Remove and replace all foundations requiring more than three shims to plumb a post without extra compensation.

Construct the top of any foundation located on a slope so that the finished slope passes through the top center of the foundation. Grade the area 24 inches up and down slope of the foundation edge so that no portion of the foundation projects above the surrounding slope and water will drain away from the foundation.

Attach a label to the back of all standard signs in the lower right corner. Make the label at least 15 square inches and show the year the sign was purchased from the manufacturer. Show the last two digits of the year in clear and bold numbers. Make the label from Type I or brighter reflective sheeting. Use background and legend colors meeting Table 661-1.

**Table 661-1. DECAL COLORS**

YEAR	BACKGROUND COLOR	LEGEND COLOR
XXX1	Yellow	Black
XXX2	Red	White
XXX3	Blue	White
XXX4	Green	White
XXX5	Brown	White
XXX6	Orange	Black
XXX7	Black	White
XXX8	White	Black
XXX9	Purple	White
XXX0	Strong Yellow-Green	Black

*Note: Central values and tolerance limits for each color, as referenced in the Manual on Uniform Traffic Control Devices (MUTCD), are available from the Federal Highway Administration, (HHS-30), 400 7th St. SW, Washington, D.C. 20590*

**661-3.2 SIGN PLACEMENT AND INSTALLATION.** Sign locations are approximate and subject to field adjustment by the Engineer.

Do not allow the top of the embedded steel tube to extend more than 2 inches above the surrounding ground and concrete foundation.

On all signs, install 2-inch diameter wind washers, colored to match the sign face, between the fastener head and the sign. Use rust-resistant washers fabricated from a material equal in strength to the sign blank.

### METHOD OF MEASUREMENT

**661-4.1** Measure according to GCP Section 90 and by the total area of legend-bearing sign panel erected in place. No deductions in quantity for corner rounding will be made. Nominal dimensions for sign sizes indicated on the Plans will be used to calculate sign pay quantities. Octagons and round signs will be measured as rectangles.

Flashing signs will be measured per each, complete and accepted in place.

### BASIS OF PAYMENT

**661-5.1** Payment will be made at the contract price per unit of measurement. Sign posts, bases, mounting hardware, and concrete used for sign bases are subsidiary. For flashing signs, sign controller, radar unit, conduit, and wiring are subsidiary. Payment is for a complete, operating system. The price is full compensation for furnishing all supplies, material and labor required to install all equipment and materials to complete the work, including all installation, connections, testing, and commissioning.

Payment will be made under:

Item P661.010.0000	Standard Sign – per square foot
Item P661.050.0000	Flashing Sign – per each



## **ITEM P-662 ADJUST VALVE BOX**

(New item in its entirety)

### **DESCRIPTION**

**662-1.1** The Work under this Section consists of providing all operations pertaining to adjustment of existing mainline or hydrant valve boxes to finish grade, including the replacement of any and all broken valve box sections, lids, and dust pans.

### **MATERIALS**

#### **662-2.1 MARKERS.**

Valve boxes are to meet the requirements of and be constructed of the following individual parts:

Lid – cast or ductile iron with lifting ears that conforms with and fits closely the top section and is rated heavy duty

Top section- cast or ductile iron, rated heavy duty, 18" minimum height, minimum 6" inner diameter, recessed to receive the lid

Dust pan – cast or ductile iron, 3" minimum height, ¼" minimum thick material, lift handle/bar and fits into and rests on the riser

Riser – cast or ductile iron pipe that fits inside the top section and over the bottom section, minimum 10' long

Bottom section – cast or ductile iron, rated heavy duty, 24" minimum height, with round or oval bottom hood sections to fit over the top of the valve

Geotextile – woven, class 2 in conformance with CPSS Section 20.25 – Geotextile fabric

Polyethylene film – 8 mil in conformance with CPSS Section 60.07 – Polyethylene Encasement

Burlap bag – all natural, biodegradable fabric woven from jute fibers with openings of less than 1/8"

Tape – minimum 2" wide, 20 mil thick, UPC approved PVC Tape

Heavy duty rated items are to meet AASHTO M306 criteria. Internal diameter of the smallest section shall not be less than five inches (5"). Minimum thickness of the metal shall not be less than five-sixteenth inch (5/16"). Castings shall be smooth and the workmanship shall be acceptable to the Engineer.

### **CONSTRUCTION REQUIREMENTS**

**662-3.1** All valve box adjustments will be accomplished as directed by the Engineer. During the adjustment of the valve boxes, the top section will be replaced with a new top section, dust pan, and lid marked "water," per the water utility specifications. Any salvaged top sections will be identified by the Engineer. All salvaged top sections will be delivered to the City by the Contractor. Any damage to a mainline valve box resulting from construction under this contract shall be repaired or the damaged portion replaced at the Contractor's expense. The Contractor shall be responsible for ensuring that the valve box is vertical, clean, to proper grade, and readily accessible for operation of the valve.

Contractor shall adjust the valve box to finish grade prior to placement of asphalt pavement. After-the-fact cutting of new asphalt for adjustments is not accepted. Any adjustment(s) requiring cutting of new asphalt shall not be paid and shall be deducted from the quantity.

### **METHOD OF MEASUREMENT**

**662-4.1** Measure according to GCP Section 90 and by the number of valve boxes adjusted, complete in place.

### **BASIS OF PAYMENT**

**662-5.1** Payment will be subsidiary to P-401 Hot Mix Asphalt Pavement.



## ITEM P-670 HAZARDOUS AREA BARRIERS

### DESCRIPTION

**670-1.1** Provide barriers for use on the project required under GCP subsection 70-09. Provide each barrier complete with flasher unit and flag in accordance with the dimensions, design, and details shown on the Plans. Haul and place barriers as shown on the Plans or as directed by the Engineer. Relocate barriers as conditions warrant.

When used during periods of darkness, such barricades, warning signs and hazard markings shall be suitably illuminated. Barricades shall be spaced ~~not more than 25 feet apart~~ as shown in the CSPP.

~~Provide additional flasher units and flags, when specified, for use on Department-supplied barriers.~~

### MATERIALS

**670-2.1** Use materials that conform to the following:

- a. **Hazard Marker Barrier, Timber.** Provide construction-grade Douglas Fir-Larch with nominal dimensions of 12 inches by 12 inches and a length of 8 feet. All timber that is exposed to weather, water, or soil shall be pressure treated to the current edition of the AWPAs Standards, or AASHTO M 133, using preservatives registered with the US Environmental Protection Agency. Products shall be treated according AWPAs Standard U1, Use Category System. Use either oil base or latex exterior paint in colors international orange and white.
- b. **Hazard Marker Barrier, Plastic.** Provide 10-inch by 10-inch by 8-foot nominal dimension portable water-ballast barriers made from high impact, safety orange and white, UV-resistant, high density polyethylene (HDPE) plastic. Provide barriers with pre-molded flag staff and flasher bracket attachment holes. Provide barriers that are designed as a modular system to allow assembly/disassembly and nesting for compact storage, and to permit the option of physically bolting multiple barriers together to provide a continuous barrier wall. Provide 6-inch by 72-inch reflective striping panel for attachment to one side of each barrier.

**670-2.2 FLAG.** Provide heavy vinyl coated nylon, 18-inch by 18-inch flag with an integral diagonal metal, fiberglass, or plastic stay to make the flag self-supporting. Provide flag in color fluorescent orange and mounted on a 3/4-inch by 30-inch staff.

**670-2.3 FLASHER UNIT.** Provide battery-operated omnidirectional flashing red light. Provide flasher unit with mounting bracket designed for the appropriate barrier type.

- a. **Flasher Unit for Timber Barrier.** Meet Manual on Uniform Traffic Control Devices (MUTCD) requirements for Type A Warning Lights. Supply one set of non-standard tools, such as the on/off switch or battery access tool, for each 5 flasher units furnished.
- b. **Flasher Unit for Plastic Barrier.**

Composition	High impact, polycarbonate plastic lens and base
Flashing Rate	60 flashes per minute
Brightness	6,000 millicandela (mcd)
LED	Total of 3 red
Photo Cell	Allows for solar light to automatically shut off in higher level light conditions and turn on in lower light conditions

## CONSTRUCTION REQUIREMENTS

**670-3.1 GENERAL.** On the top side and at opposite ends of each barrier, mount one flag and one flasher unit per manufacturer's instructions. ~~Tether flag to the barrier.~~

**a. Hazard Marker Barrier, Timber.**

- (1) Preparation.** Prior to painting, notch the underside of each timber to allow for the use of a forklift. Cut two 4-inch high by 12-inch wide notches spaced 36 inches center to center, centered on the long axis of the timber.
- (2) Painting.** Apply one coat of primer and one coat of finish white color paint on all sides and the ends followed by two coats of orange finish paint to form the stripes on the sides. Paint orange stripes 24 inches wide and offset by 6 inches from one side to the next giving a "barber pole" effect.
- (3) Flag and Flasher Unit.** Mount the flag 24 inches from one end of the timber by drilling a hole 1/8-inch larger than the diameter of the staff by 8 inches deep. Mount the flasher unit 24 inches from the opposite end of the timber.

**b. Hazard Marker Barrier, Plastic.** Fill barriers with water for ballast in accordance with manufacturer's recommendations. When shown on the Plans or directed by the Engineer, interlock barrier units using manufacturer recommended connectors to form a continuous wall separating the hazardous work area from aircraft movement areas. Adhere reflective striping panels to one side of each barrier.

**670-3.2 DELIVERY.** Deliver hazard marker barriers, flasher units, and flags to the project site prior to commencing work within the Air Operations Area.

## METHOD OF MEASUREMENT

**670-4.1** Hazard marker barriers, complete with flag and flasher unit will be measured by the number of units furnished and accepted. When the pay items shown below are absent from the bid schedule, no measurement for payment will be made.

Flasher units and flags to be used on Department-supplied barriers will be measured by the number of units furnished and accepted.

## BASIS OF PAYMENT

**670-5.1** Payment covers all costs associated with furnishing and storing hazard marker barriers, flasher units, and flags, including tools, batteries, and incidentals. If the following pay items are absent from the bid schedule, no payment will be made.

Work required for placing, erecting, moving, and maintaining barriers is subsidiary.

Payment will be made under:

## ITEM P-671 RUNWAY AND TAXIWAY CLOSURE MARKERS

### DESCRIPTION

**671-1.1** Furnish, install, and maintain runway and/or taxiway closure markers at the locations shown on the Plans or as directed by the Engineer. Where a new runway is built to replace an existing runway, install runway closure markers on the old runway immediately after the new runway has been opened for operations. Place markers as shown on the Plans or as directed by the Engineer. Relocate markers as required. Materials supplied under this item may be used as temporary closure markers as required in ~~GCP subsection 80-04~~ Item G-110.

### MATERIALS

**671-2.1** Use materials that conform to the following.

**a. Vinyl Mesh Panel.**

- (1) Panel Material.** High tenacity vinyl coated polyester mesh fabric, 9 ounces per square yard (oz/yd<sup>2</sup>), 70% closed mesh allowing water to flow through. Use 3.0 oz/yd<sup>2</sup> woven polyester fabric, coated after weaving with 6.0 oz/yd<sup>2</sup> coating of poly vinyl chloride, color traffic yellow. Minimum tensile strength 230 by 200 pounds (lbs) grab method and 200 by 140 lbs strip method. Meet ASTM D 471 for water absorption, 7 days @160°F, 5.0% maximum weight gain and ASTM D 750 for weathering, 2,500 hours, no appreciable change in color, no cracking, minimum crazing.
- (2) Seams, Perimeter Hem, and Thread.** Double flat felled seams, double stitched, and 3-ply perimeter hem sewn with UV resistant #92 bonded polyester thread.
- (3) Grommets.** No. 2 brass rolled-rim spur grommets installed through hem at 30-inch intervals along marker perimeter.
- (4) Anchors.** 3/8-inch diameter deformed reinforcing steel at least 18 inches long, including a hook formed as a 4-inch segment bent perpendicular to the anchor stem.

**b. Snow Fence Panel.**

- (1) Panel Material.** Wire-supported wood lathe snow fence, pre-treated with a suitable wood stain.
- (2) Paint Type:** (select one)
  - (a)** AASHTO M248, Type F (Alkyd resin)
  - (b)** FSS TT-P-19D(1) Paint Latex (Acrylic emulsion, Exterior).
- (3) Paint Color:** Traffic Yellow, #33538
- (4) Anchors:** 3/8-inch diameter deformed reinforcing steel at least 18 inches long, including a hook formed as a 4-inch segment bent perpendicular to the anchor stem.

**c. Temporary Illuminated Panel.**

- (1)** Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program (ALECP). The AC 150/5345-53, the latest certified equipment list, and the address list of certified airport lighting equipment manufacturers are available on the FAA webpage at: [https://www.faa.gov/airports/engineering/airport\\_lighting/](https://www.faa.gov/airports/engineering/airport_lighting/).

## CONSTRUCTION REQUIREMENTS

671-3.1 Meet the following requirements.

- a. **Vinyl Mesh Panel.** ~~Secure by driving anchors into the embankment through all grommets with sandbags at a spacing and enough quantity to secure the panels from movement against wind and propeller wash.~~
- b. **Snow Fence Panel.** Apply to the upper side of the panels, two coats of paint that result in a dense and consistent color. Construct panels double layered, with upper layer wood lathe oriented to lower lathe at right angles to provide a solid yellow appearance.

Combine standard manufactured widths to provide plan dimensions, if necessary.

Secure panels by driving anchors into the embankment at 30-inch intervals around the perimeter of each panel. If more than one standard manufactured width is combined to obtain plan dimensions, provide anchors on each strip.

- c. **Temporary Illuminated Panel.** Locate the marker where shown on the plans or as directed by the Engineer. The contractor shall maintain an uninterrupted operation of the closure marker. Maintenance records shall be kept by the Contractor for all portable lighted markers and will be turned in to the Engineer when construction is complete.

## METHOD OF MEASUREMENT

671-4.1 By the number of markers of the specified type, installed and accepted as completed units in place. No additional measurement will be made for removing and relocating markers for various stages of work. When the pay items shown below are absent from the bid schedule, no measurement for payment will be made.

## BASIS OF PAYMENT

671-5.1 Payment will be made at the contract unit price for each furnished and accepted item of the marker type specified. . If the following pay items are absent from the bid schedule, no payment will be made.

Payment will be made under:

## TESTING REQUIREMENTS

ASTM D 471	Rubber Property – Effect of Liquids
ASTM D 750	Rubber Deterioration in Carbon-Arc Weathering Apparatus

## ITEM P-681 GEOTEXTILE FOR SEPARATION AND STABILIZATION

### DESCRIPTION

**681-1. 1** Prepare ground surface, and furnish and place geotextiles for separation, stabilization, and/or reinforcement as shown on the Plans.

### MATERIALS

**681-2.1 MATERIALS.** Use materials that conform to the following:

- a. Separation.** Meet AASHTO M 288 for Separation, except provide a minimum permittivity of  $0.50 \text{ sec}^{-1}$ , and meet Class 3 Strength Property Requirements.
- b. Stabilization.** Meet AASHTO M 288 for Stabilization, except provides a minimum permittivity of  $0.50 \text{ sec}^{-1}$ , and meet Class 1 Strength Property Requirements.
- c. Reinforcement.** Meet the requirements in Table 681-1 for Type 1 or Type 2.

Package, label, handle and store geotextile materials according to ASTM D 4873.

**TABLE 681-1. GEOTEXTILE REINFORCEMENT PROPERTIES**

Property	Test Method	Units	Requirement <sup>a</sup>	
			Type 1	Type 2
Grab Tensile	ASTM D4632	lb.	200/200	400/400
Grab Elongation	ASTM D4632	% (MD)	10	10
Wide Width Tensile	ASTM D4595	lb/in. (ultimate)	200/200	400/400
Wide Width Tensile	ASTM D4595	lb/in. (@ 5% strain)	100/100	200/200
Seam Breaking Strength	ASTM D4632	lb./in.	180	360
Puncture	ASTM D6241	lb.	500	1500
Trapezoidal Tear	ASTM D4533	lb.	100	150
AOS	ASTM D4751	U.S. sieve size	#30 <sup>b</sup>	#30 <sup>b</sup>
Permittivity	ASTM D4491	$\text{sec}^{-1}$	0.20	0.20
Flow Rate	ASTM D4491	gal./min./ft <sup>2</sup>	10	10

<sup>a</sup> Minimum Average Roll Values (MARV) in machine direction (MD) / cross-machine direction (XD) unless otherwise specified

<sup>b</sup> Maximum average roll value

Sewing Thread. Use high strength polypropylene, or polyester. Do not use nylon thread. Use thread of contrasting color to that of the geotextile itself.

### CONSTRUCTION REQUIREMENTS

**681-3.1. SURFACE PREPARATION.** Prepare ground surface by removing stumps, brush, boulders, and sharp objects. Fill holes and ruts over 3 inches deep, with material shown on the Plans or as approved by the Engineer.

**681-3.2. GEOTEXTILE PLACEMENT.** Unroll geotextile directly onto the prepared surface. Stretch geotextile to remove any creases, folds or wrinkles. Do not drag the geotextile through mud or over sharp objects that could damage the geotextile. Do not expose geotextiles to sunlight for longer than 14 days after removal of protective covering. Do not allow geotextiles to get wet prior to installation.

- a. **Separation and Stabilization.** Lay geotextile for embankment separation and stabilization parallel to roadway centerline. On horizontal curves, place in segment lengths not exceeding those listed in Table 681-1, with butt ends cut to match and sewn or overlapped. On tangents, straighten the geotextile and sew or overlap butt ends. Shingle overlaps in the same direction as fill placement. Prevent overlapped edges from lifting during construction.
- b. **Reinforcement.** Lay the machine direction of the geotextile for embankment reinforcement perpendicular to the roadway centerline or as shown on the Plans. Join segments by sewing or an approved bonding or attachment process. Shingle overlaps in the same direction as fill placement if seams are not sewn. Prevent overlapped edges from lifting during construction.

**TABLE 681-2. GEOTEXTILE PLACEMENT ON CURVES**

Degree of Curve	Maximum Segment Length (ft.)
1	125
2	90
3	75
4	65
5	55
6	50

**681-3.3. JOINING.** Join adjacent geotextiles for separation or stabilization by overlapping or sewing. Join adjacent geotextiles for reinforcement by sewing or as shown on the Plans.

- a. Sew seams with a Butterfly or J-Seam using a double-thread chain stitch (lock stitch). Bring adjacent sections of geotextile together and fold so that the stitching penetrates four layers of geotextile for the full seam length. Make the stitching line 1-1/4 inches ( $\pm 1/4$ -inch) from the folded edge of the seam and at least 1/2-inch from the free edge of the geotextile. Sew seams so that they face upward and can be easily inspected by the Engineer. Illustrations showing correct stitch formation and seam configurations are provided in Figure 1-2 (page 1-28) of the FHWA publication, *Geosynthetic Design & Construction Guidelines*, FHWA-NHI-07-092, August 2008.
- b. Overlap geotextile sections by a minimum of 3 feet at all longitudinal and transverse joints. Place the beginning of each new roll beneath the end of the previous roll to prevent the advancing fill from lifting the geotextile. Shingle in the direction of construction.

**681-3.4. MATERIAL PLACING AND SPREADING.** During placing and spreading of material, maintain a minimum depth of 12 inches of cover material; or a minimum depth equal to the separation distance between multiple layers of geotextile as shown on the Plans when this separation distance is less than 12 inches; at all times between the geotextile and the wheels or tracks of the construction equipment. Limit the size and weight of construction equipment to reduce rutting in the initial lift above the geotextile to not greater than 3 inches deep to prevent overstressing the geotextile.

Spread the material in the direction of the upper overlapped geotextile. Maintain proper overlap and geotextile continuity. If sewn or bonded seams are used, place the cover material and spread in only one direction for the entire length of the geotextile. On weak subgrades limit height of dumped cover material to prevent localized subgrade and/or geotextile failure. Do not drop stones or frozen material larger than 1 foot in diameter directly onto the geotextile from a height of more than 1 foot.

Compact using a smooth drum roller. Do not allow construction equipment to make sudden stops, starts, or turns on the cover material. Do not allow turning of vehicles on the initial lift of cover material above the geotextile. Fill any ruts over 3 inches deep occurring during construction with material shown on the Plans; do not grade adjacent material into rut; and compact to the specified density.

**681-3.5. GEOTEXTILE REPAIR.** Repair and replace damaged geotextile (torn, punctured, or disturbed at the overlaps or sewn joints). For damage evidenced by visible geotextile damage, subgrade pumping, intrusion, or embankment distortion, remove the backfill around and under the damaged or displaced area, and repair with material matching the damaged material. Make patches overlap or sew patches to the existing geotextile.

- a. **Separation and Stabilization.** Overlay torn area with geotextile with a minimum 3 foot overlap around the edges of the torn or damaged area or sew and bond according to Subsection 681-3.3a. Ensure the patch remains in place when cover material is placed over the affected area.
- b. **Reinforcement.** Sew according to Subsection 681-3.3a unless joining by overlap is shown on the Plans. Ensure the patch remains in place when cover material is placed over the affected area.

#### **METHOD OF MEASUREMENT**

**681-4.1** Measure according to GCP Section 90, and by multiplying plan neat line width by the measured length in final position parallel to installation centerline along the ground surface. No allowance will be made for overlap, whether at joints or patches.

#### **BASIS OF PAYMENT**

**681-5.1** Payment will be made at the contract unit price per square yard. Material used to fill ruts and holes will be paid for under separate materials pay items.

Payment will be made under:

Item P681.010.0000      Geotextile, Separation – per square yard





## ITEM P-682 GEOTEXTILE FOR DRAINAGE AND EROSION CONTROL

### DESCRIPTION

**682-1.1.** Prepare ground surface, and furnish and place geotextiles for subsurface drainage and erosion control, as shown on the Plans.

### MATERIALS

**682-2.1.** Use materials that conform to the following for the class specified in the bid schedule:

- a. **Subsurface Drainage.** Meet AASHTO M 288 for Subsurface Drainage, except provide a minimum permittivity of  $0.50 \text{ sec}^{-1}$ , and meet Class 2 Strength Property Requirements.
- b. **Erosion Control.** Meet AASHTO M 288 for Permanent Erosion Control and meet Class 1 Strength Property Requirements.

Package, label, handle and store geotextile materials according to ASTM D 4873.

Sewing Thread. Use high strength polypropylene, or polyester. Do not use nylon thread. Use thread of contrasting color to that of the geotextile itself.

### CONSTRUCTION REQUIREMENTS

**682-3.1 SURFACE PREPARATION.** Prepare ground surface by removing stumps, brush, boulders, and sharp objects. Fill holes and ruts over 3 inches deep, with material shown on the Plans or as approved by the Engineer. Construct smooth and stable trench walls.

**682-3.2. GEOTEXTILE PLACEMENT.** Unroll geotextile directly onto the prepared surface. Stretch geotextile to remove any creases, folds or wrinkles. Place geotextile in a manner which will ensure intimate contact between the trench wall and the geotextile (i.e., no voids, folds, or wrinkles). The geotextile may be held in place with securing pins at 3-foot spacing along all edges (but not closer than 2 inches from the edge) to prevent movement during construction. Do not expose geotextiles to sunlight for longer than 14 days after removal of protective covering. Do not allow geotextile rolls to get wet prior to installation.

- a. **Subsurface Drainage.** In trenches, after placing the geotextile and material shown on the Plans, fold the geotextile over the top of the material shown on the Plans to produce a minimum overlap of 12 inches, for trenches greater than 12 inches wide. In trenches less than 12 inches wide, make the overlap equal to the width of the trench. Then cover the geotextile with the subsequent course of material.
- b. **Erosion Control.** Place and anchor geotextile on the approved surface so it will not be torn or excessively stretched by placement of the overlying materials. Secure the geotextile to the slope but secure it loosely enough so that the geotextile will not tear when riprap or other cover material is placed on the geotextile. The geotextile shall not be keyed at the top of the slope until the riprap or other cover material is in place at the top of the slope. Anchor the terminal ends of the geotextile using key trenches or aprons with a minimum of 24 inches depth into the soil substrate at the crest and toe of slope, or as shown on the Plans. Place geotextile with the machine direction parallel to the direction of water flow (normally parallel to the slope for erosion control runoff and wave action, and parallel to the stream or channel).

**682-3.3. JOINING.** Join geotextile by sewing or overlapping.

- a. Sew seams with a Butterfly or J-Seam using a double thread chain stitch (lock stitch). Bring adjacent sections of geotextile together and fold so that the stitching penetrates four layers of geotextile for the full seam length. Make the stitching line 1-1/4 inches ( $\pm 1/4$ -inch) from the folded

edge of the seam and at least 1/2-inch from the free edge of the geotextile. Sew seams so that they can be easily inspected by the Engineer or representative. Illustrations showing correct stitch formation and seam configurations are provided in Figure 1-2 (page 1-28) of the FHWA publication, *Geosynthetic Design & Construction Guidelines*, FHWA-NHI-07-092, August 2008. Conform both factory and field sewn seams to the strength requirements of Table 1 as outlined in the AASHTO M288 for subsurface drainage and erosion control applications.

- b. Overlap geotextile sections by a minimum of 3 feet at all longitudinal and transverse joints. Overlap successive geotextile sheets in the direction of flow so that the upstream sheet is placed over the downstream sheet and/or upslope over downslope. In trenches, where overlapped seams are constructed in the longitudinal trench direction, make the overlap equal to the width of the trench.

**682-3.4. PLACEMENT OF COVER MATERIAL.** Following placement of the geotextile on the prepared surface, place cover material of the type shown on the Plans. Place the cover material and armor from the bottom to the top of the slope using methods which minimize tearing and/or excessive stretching of the geotextile. In underwater applications, place the geotextile and the required thickness of cover material in the same day. Maintain proper overlap and geotextile continuity. Do not exceed the allowable drop heights for cover material shown in Table 682-1. Do not allow stones with a weight of more than 100 pounds to roll down the slope on the geotextile. Do not grade the slope in a way that will disturb the cover material or armor stone once it has been placed. Backfill all voids in the riprap or other cover material, which allows the geotextile to be visible, with material shown on the Plans, so that the geotextile is completely covered.

**TABLE 682-1. ALLOWABLE DROP HEIGHT FOR GEOTEXTILE**

INDIVIDUAL STONE Max. Weight (lbs)	ALLOWABLE DROP HEIGHT (ft)	
	UNPROTECTED GEOTEXTILE	PROTECTED GEOTEXTILE*
< 5	3	3
5-250	0	3
> 250	0	0**

*\*Protected geotextile is defined as having a gravelly covering (cushion layer) at least 6 inches thick.*

*\*\*If stones greater than 250 pounds must be dropped or if a height of drop greater than 3 feet is required, then perform field trials to determine the minimum cushion thickness and/or maximum height of safe drop without damaging the geotextile.*

Maintain a minimum depth of 12 inches of cover material between the geotextile and the wheels or tracks of the construction equipment.

**682-3.5. GEOTEXTILE REPAIR.** Should the geotextile be torn, punctured, or the overlaps or sewn joints disturbed (as evidenced by visible geotextile damage), remove the backfill around the damaged area and repair or replace the damaged area at no additional expense to the State. Make repairs to the damaged area with a patch of the same type of geotextile originally placed. Overlay torn area with geotextile with a minimum 3-foot overlap around the edges of the torn area. Ensure that the patch remains in place when material is placed over the affected area.

**METHOD OF MEASUREMENT**

**682-4.1.** Measure according to GCP Section 90, and by multiplying plan neat line width by the measured length in final position parallel to installation centerline along the ground surface. No allowance will be made for geotextile in key trenches or for overlap, whether at joints or patches.

## BASIS OF PAYMENT

682-5.1. Payment will be subsidiary to D-785 Subgrade Infiltration System~~made at the contract unit price per square yard. Material used to fill ruts and holes will paid for under separate materials pay items at the unit price for the type of material used.~~



# ITEM T-901 SEEDING

## DESCRIPTION

**901-1.1** This work consists of preparing the ground and applying seed and fertilizer in conformance with the Plans and Specifications.

The intent of this work is to provide a living vegetative cover in the areas indicated on the Plans and to maintain the cover for the term of the Contract.

## MATERIALS

**901-2.1 SEED.** Provide the seed mixture as specified in the Special Provisions. Provide seed collected or harvested within 2 years of the targeted seeding date. Provide all seed in pure live seed (PLS) unless otherwise directed.

Provide seed true of genus and species. Meet the applicable requirements of the State of Alaska Seed Regulations, 11 AAC 34, Articles 1 and 4, and the Federal Seed Act, 7 CFR Part 201.

Seed shall conform to the following seed mix type and application rate.

### Hay mix

**Application Rate: 5 lbs./1,000 s.f.**

<u>NAME</u>	<u>Proportion By Weight</u> <u>(% min)</u>	<u>Purity</u>	<u>Germination</u>
<u>Alaska Brome</u>	<u>50%</u>	<u>85%</u>	<u>90%</u>
<u>Manchar Brome</u>	<u>50%</u>	<u>85%</u>	<u>90%</u>

The Engineer will review requests for species or cultivar substitution(s); genus substitution is not allowed. Substitution requests need to be submitted a minimum of 60 calendar days in advance of delivery.

**a. Prohibited and Restricted Noxious Weeds and Quarantined Pests.** Provide seed and appliances certified to be free of prohibited noxious weeds or quarantined pests, and certified to contain no more than the maximum allowable tolerances for restricted noxious weeds, according to Alaska Administrative Code, Title 11, Chapter 34 (11 AAC 34).

(1) Seed or appliances found to contain prohibited noxious weeds or quarantined pests will be rejected, according to 11 AAC 34.020(a) and 11 AAC 105-180, respectively.

(2) Seed or appliances found to contain restricted noxious weed seed in excess of the maximum allowable tolerance per pound will be rejected, according to 11 AAC 34.020(b).

(3) Prohibited and restricted noxious weeds are listed in 11 AAC 34.020, and can be viewed at the following webpage: <http://plants.alaska.gov/invasives/noxious-weeds.htm>.

**b. Labeling.** Ensure each bag or container of individual seed species is labeled to meet requirements of 11 AAC 34.010. Do not remove labels from bags or containers.

- c. **Certification.** Certify seed is free of prohibited noxious weeds and restricted noxious weeds are within allowable tolerances. Provide to the Engineer no later than 10 days prior to seeding 4 signed copies of a statement signed by the vendor identifying the lot number or lot numbers, certifying each lot of seed has been tested within the preceding nine months, by a recognized seed testing laboratory, a member of the Association of Official Seed Certifying Agency (AOSCA), or the Alaska Plant Materials Center.

Include the following in each certification:

- (1) name and address of laboratory
- (2) date of test
- (3) lot number
- (4) seed name
- (5) percent pure seed
- (6) percent germination
- (7) percent weed content
- (8) percent inert matter

Seed will be rejected if:

- a. Contains prohibited noxious weeds;
- b. Contains restricted noxious weeds above maximum allowable tolerances;
- c. Not certified as tested within the preceding nine months;
- d. Wet, moldy, or otherwise damaged in transit or storage; or
- e. Containers do not have labels or the labels have been removed.

Seed may be rejected for:

- f. Discrepancies in the lot numbers listed on the statement to the lot numbers indicated on the labels of the seed containers.

The Contractor shall immediately remove rejected seed from the project premises. If seed is rejected for containing prohibited noxious weeds or for exceeding maximum allowable tolerances of restricted noxious weeds, dispose of rejected seed according to 11 AAC 34.075(g).

**901-2.2 FERTILIZER.** ~~Provide a 20-20-10 fertilizer containing~~ Fertilizer shall be applied at a rate to provide 2 lbs. actual Nitrogen per 1,000 square feet of area. In the absence of soil tests and direction from the Engineer, apply 16-16-16 at the rate of 8 lbs. per 1,000 square feet. Fertilizer shall contain no cyanamid compounds or hydrated lime. Tolerances of the chemical ingredients shall be plus or minus 2%.

Use standard commercial fertilizer supplied separately or in mixtures, and in moisture proof containers. Mark each container with the total net weight and with the manufacturer's guaranteed analysis of the contents showing the percentage for each ingredient.

## CONSTRUCTION METHODS

**901-3.1 SOIL PREPARATION.** Clear all areas to be seeded of stones 4-2 inches in diameter and larger and of all sticks, stumps, noxious weeds, and other debris or irregularities that might interfere with the seeding operation, growth of grass, or subsequent maintenance of the grass covered areas.

Just prior to seeding, roughen the surface of all areas to be seeded by track-walking transversely up and down the slopes or using a scarifying slope board. Round the top and bottom of the slopes, when necessary, to facilitate tracking and to create a pleasing appearance, but do not disrupt drainage flow lines. Where fill is adjacent to wetlands, keep the equipment entirely on the fill slope.

**901-3.2 SEEDING SEASONS.** Seed and fertilize between May 15 and August 15.

Do not seed during windy conditions or when climatic conditions or ground conditions would hinder placement or proper growth.

**901-3.3 APPLICATION.** Apply seed and fertilizer at the rates specified in the Special Provisions. Use either of the following methods:

**a. Hydraulic Method.**

- (1) Mix a slurry of seed, fertilizer, water, and other components as required by the Special Provisions. Add seed to the slurry mixture no more than 30 minutes before application.
- (2) Use hydraulic seeding equipment that will maintain a continuous agitation and apply a homogeneous mixture through a spray nozzle. The pump must produce enough pressure to maintain a continuous nonfluctuating spray that will reach the extremities of the seeding area, without causing damage to the seed bed. Use a hose attachment to reach areas where a fixed nozzle cannot reach.
- (3) ~~If m~~ Mulch material is required, add it to the water slurry in the hydraulic seeder after adding the proportionate amounts of seed and fertilizer. Mulch shall be applied at a rate of 45 lbs/1,000 sf.
- (4) Apply slurry at a rate that distributes all materials evenly.

**b. Dry Method.**

- (1) Use mechanical spreaders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, or other approved mechanical spreading equipment.
- (2) Moisten the soil prior to the application of seed and fertilizer and immediately afterwards.
- (3) Mix or rake the seed and fertilizer into the seed bed to a depth of 1/2 inch, unless mulch material is to be applied immediately.

**901-3.4 MAINTENANCE OF SEEDED AREAS.** Protect seeded areas against traffic using approved warning signs or barricades. Repair surfaces that are gullied or otherwise damaged following seeding by regrading and reseeding, as directed. Maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

Keep temporary erosion control measures in place until the vegetation is accepted.

Water the seeded areas, as required, for proper germination and growth. Use equipment that can acceptably water all seeded areas without vehicular traffic on seeded areas.

Reseed any seeded areas not showing evidence of satisfactory growth, as directed.

**901-3.5 FINAL ACCEPTANCE.** Final acceptance will be based on the following criteria and must provide 70% vegetative coverage of the seeded area. If seeding is completed by July 15th, coverage must be

attained by September 30th. If seeding is completed by August 15th, coverage must be attained by June 15th of the following season. Final acceptance will be based on the Engineer's approval.

### METHOD OF MEASUREMENT

**901-4.1** Measure work according to GCP Section 90, and as follows:

- a. **Seeding by the acre.** By the area of ground surface acceptably seeded, fertilized, and maintained. Required reseeding is subsidiary.
- b. **Seeding by the pound.** By the weight of seed acceptably placed, fertilized, and maintained. Fertilizer, mulch, and water ~~are~~ subsidiary. Any other work required will be measured separately.
- c. **Water for maintenance.** By the Mgal (1,000 gallons) acceptably placed. Use a conversion factor of 8.34 pounds per gallon, if measured by weight. Use a conversion factor of 7.48 gallons per cubic foot, if measured by volume.

### BASIS OF PAYMENT

**901-5.1** Soil preparation, mulch, fertilizer, and water required for hydraulic method are subsidiary. ~~Mulching will be measured and paid for under Item T-908.~~

- a. **Seeding by the Acre.** Payment is for established vegetative mat.
- b. **Seeding by the Pound.** Payment is for established vegetative mat.
- c. **Water for Seeding.** Water applied for growth of vegetative mat.

Payment will be made under:

Item T901.020.0000      Seeding – per pound



## ITEM T-905 TOPSOIL

### DESCRIPTION

**905-1.1** This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the Engineer.

### MATERIALS

**905-2.1 TOPSOIL.** Provide a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials and reasonably free from roots, clods, hard clay, noxious weeds, tall grass, brush sticks, stubble or other litter, and which is free draining and non-toxic.

The gradation shall conform to selected Class in Table 1 when tested according to ATM 304 If no class is indicated, meet the grading requirements in Table 1 for Class A topsoil.

**TABLE 905-1. TOPSOIL GRADING**

Sieve Designation	Percent Passing By Weight	
	CLASS A	CLASS B
3-2 in	-	100
1/2 in.	100	-90-100
No. 4	95-100	75-100
No. 16	64-90	50-95
No. 200	30-60	20-80
Organic Matter	10-40	5 min.

Percent of organic matter will be determined by loss-on-ignition of oven dried samples using ATM 203.

When necessary, amend natural topsoil to meet the above specifications, using approved materials and methods.

### CONSTRUCTION METHODS

**905-3.1 PREPARING THE GROUND SURFACE.** Where grades in the areas to be topsoiled have not been established, smooth-grade the areas to the grades shown on the Plans. Maintain the prescribed grades in an even and properly compacted condition to prevent the formation of low places or pockets where water will stand.

Clear the surface of the area to be topsoiled of all stones larger than 2 inches in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting.

Immediately prior to dumping and spreading the topsoil, loosen the surface, by approved means, to a minimum depth of 2 inches to facilitate bonding of the topsoil to the covered subgrade soil.

**905-3.2 OBTAINING TOPSOIL.** Prior to the stripping of topsoil from designated areas, remove any vegetation, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, using approved methods.

When suitable topsoil is available on the site, remove this material from the designated areas to the depth directed. Spread the topsoil on areas already tilled and smooth-graded, or stockpile in approved areas. Grade the stockpile sites and adjacent areas which have been disturbed if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, locate and obtain the supply, subject to approval. Notify the Engineer sufficiently in advance of operations in order that necessary measurements and tests can be made. Remove the topsoil from approved areas and to the depth as directed. Haul the topsoil to the site of the work and stockpile or spread as required.

**905-3.3 PLACING TOPSOIL.** Spread the topsoil evenly on the prepared areas to a uniform depth of 4 inches after compaction. Do not spread when the ground or topsoil is frozen or excessively wet.

After spreading, break up any large stiff clods and hard lumps with a pulverizer or other effective means. Rake up and dispose of all stones or rocks (2 inches or more in diameter), roots, litter, or any foreign matter. After spreading, compact the topsoil with a cultipacker or by other approved means. The compacted topsoil surface shall conform to the required lines, grades, and cross sections. Promptly remove any topsoil or other dirt falling upon pavements or other surface courses.

Track topsoil with a dozer to make track marks running perpendicular to the direction of drainage.

#### **METHOD OF MEASUREMENT**

**905-4.1** Measure according to GCP subsection 90-02 and by the square yard, placed and accepted.

#### **BASIS OF PAYMENT**

**905-5.1** Payment will be made at the contract unit price per square yard. Stockpiling and rehandling topsoil are subsidiary.

Payment will be made under:

Item T905.010.0020 Topsoiling, Class B – per square yard

#### **TESTING REQUIREMENTS**

ATM 304 WAQTC FOP for AASHTO T 27/T 11 Sieve Analysis of Fine and Coarse Aggregates

**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**EXHIBIT D**

**FAA CIRCULAR 150/5370-2G  
OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION**





U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Advisory Circular

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**Subject:** Operational Safety on  
Airports During Construction

**Date:** 12/13/2017  
**Initiated By:** AAS-100

**AC No:** 150/5370-2G  
**Change:**

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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.**

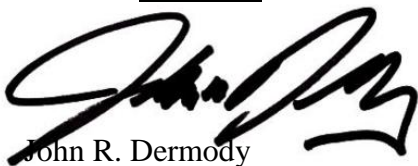
Throughout this AC, U.S. customary units are used followed with “soft” (rounded) conversion to metric units. The U.S. customary units govern.

7 **Where to Find this AC.**

You can view a list of all ACs at [http://www.faa.gov/regulations\\_policies/advisory\\_circulars/](http://www.faa.gov/regulations_policies/advisory_circulars/). You can view the Federal Aviation Regulations at [http://www.faa.gov/regulations\\_policies/faa\\_regulations/](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)<sup>1</sup> for each affected taxiway; designated approach visibility minimums;

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<sup>1</sup> 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](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.

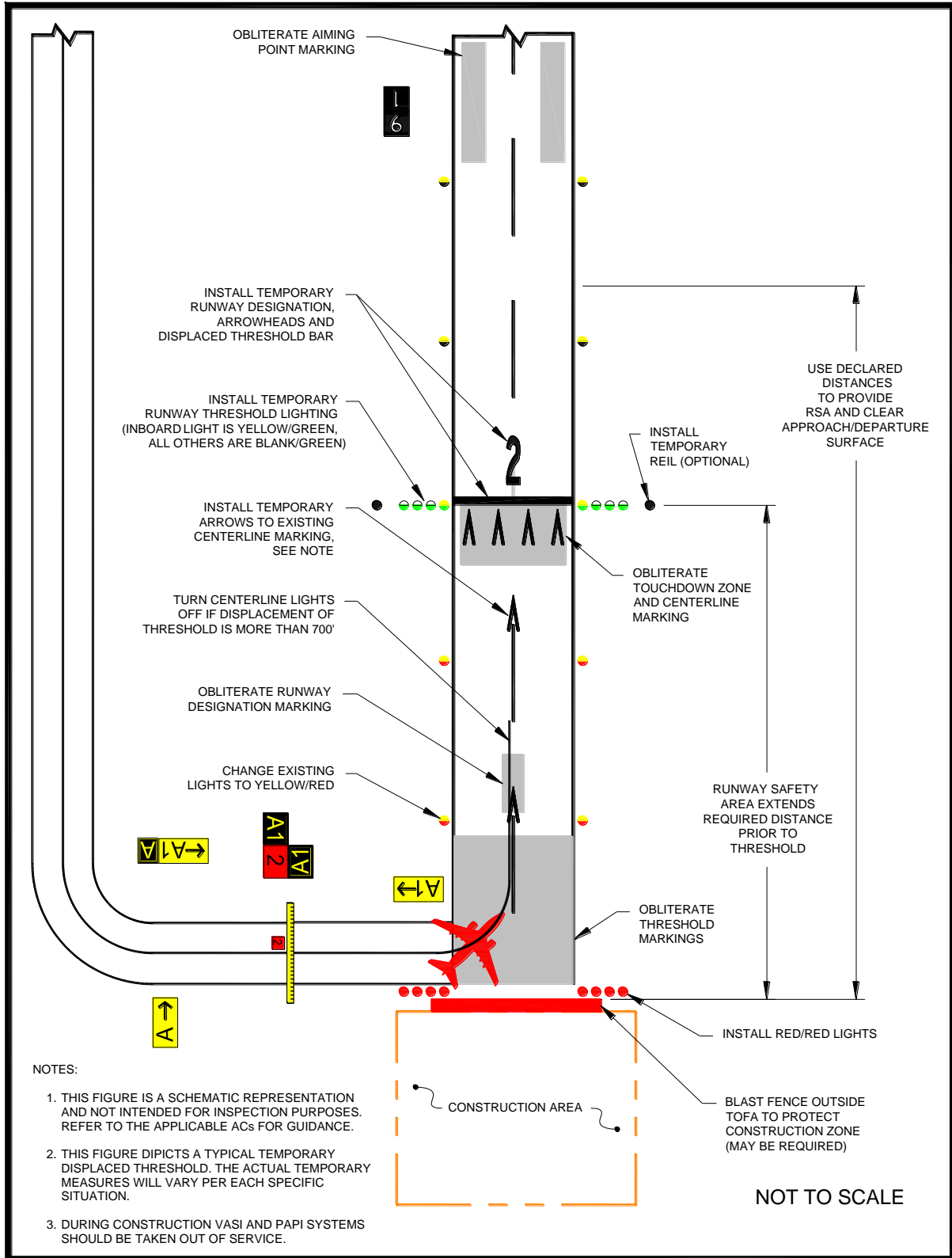
2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

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 2-2. 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/](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 States 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](http://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**

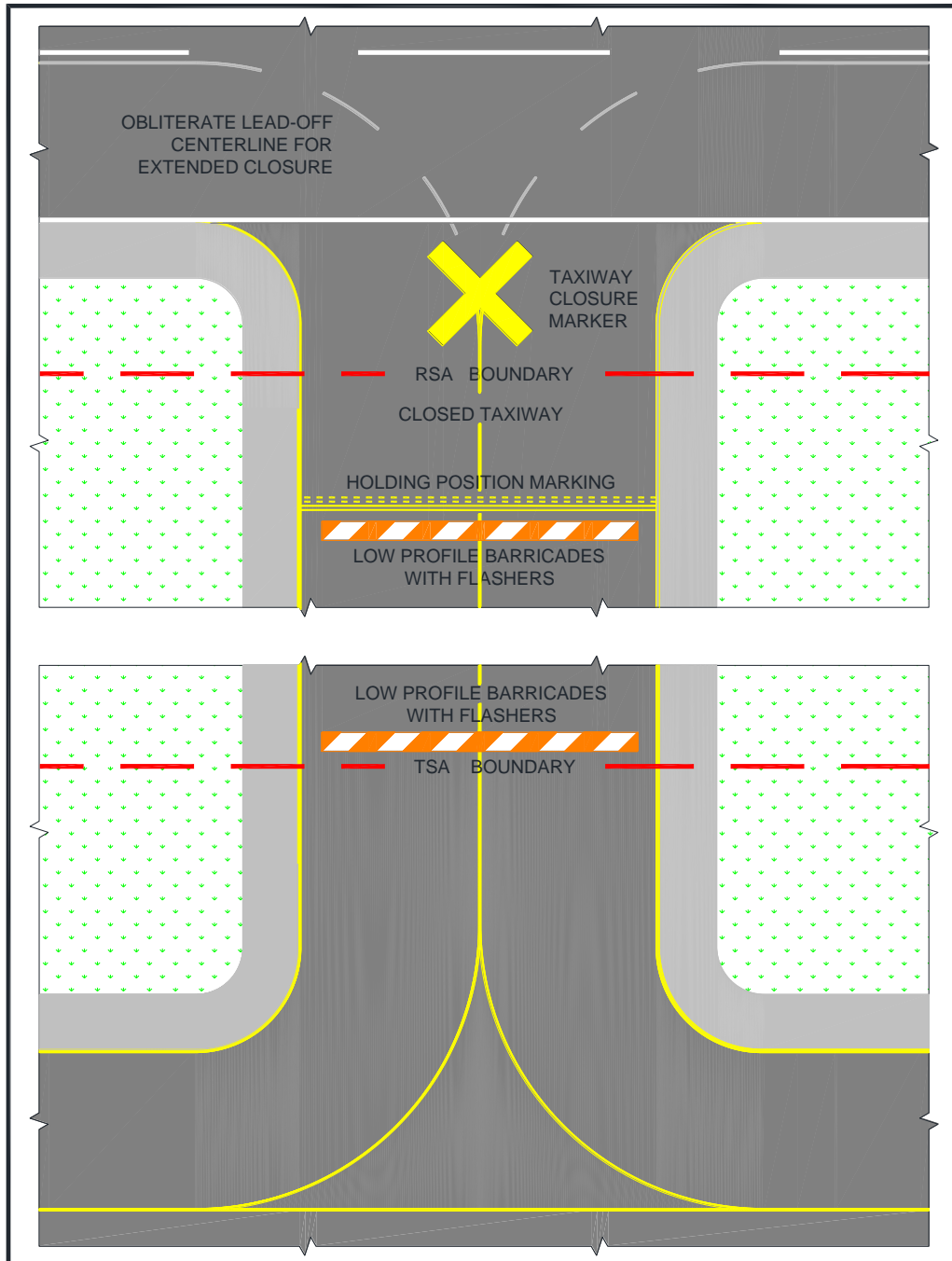


1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see [AC 150/5340-1](#)). Obliterate or cover markings prior 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.

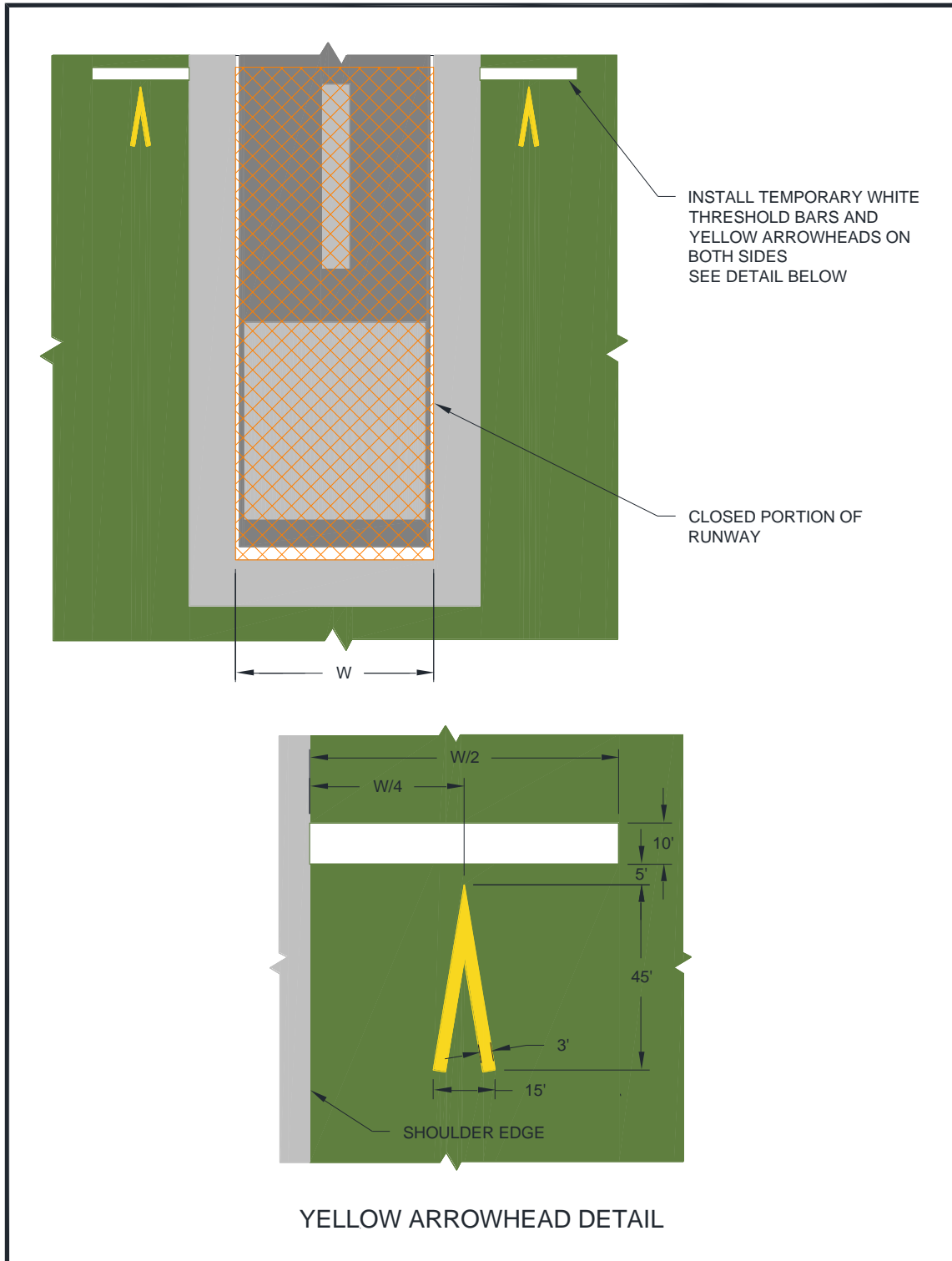
- 2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. 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 be 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**

<b>Number</b>	<b>Title and Description</b>
<u>AC 150/5200-28</u>	<i>Notices to Airmen (NOTAMs) for Airport Operators</i> Guidance for using the NOTAM System in airport reporting.
<u>AC 150/5200-30</u>	<i>Airport Field Condition Assessments and Winter Operations Safety</i> Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
<u>AC 150/5200-33</u>	<i>Hazardous Wildlife Attractants On or Near Airports</i> Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
<u>AC 150/5210-5</u>	<i>Painting, Marking, and Lighting of Vehicles Used on an Airport</i> Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
<u>AC 150/5210-20</u>	<i>Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports</i> Guidance to airport operators on developing ground vehicle operation training programs.
<u>AC 150/5300-13</u>	<i>Airport Design</i> FAA standards and recommendations for airport design. Establishes approach visibility minimums as an airport design parameter, and contains the Object Free area and the obstacle free-zone criteria.
<u>AC 150/5210-24</u>	<i>Airport Foreign Object Debris (FOD) Management</i> Guidance for developing and managing an airport foreign object debris (FOD) program

Number	Title and Description
<u>AC 150/5320-15</u>	<p><i>Management of Airport Industrial Waste</i></p> <p>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.</p>
<u>AC 150/5340-1</u>	<p><i>Standards for Airport Markings</i></p> <p>FAA standards for the siting and installation of signs on airport runways and taxiways.</p>
<u>AC 150/5340-18</u>	<p><i>Standards for Airport Sign Systems</i></p> <p>FAA standards for the siting and installation of signs on airport runways and taxiways.</p>
<u>AC 150/5345-28</u>	<p><i>Precision Approach Path Indicator (PAPI) Systems</i></p> <p>FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.</p>
<u>AC 150/5340-30</u>	<p><i>Design and Installation Details for Airport Visual Aids</i></p> <p>Guidance and recommendations on the installation of airport visual aids.</p>
<u>AC 150/5345-39</u>	<p><i>Specification for L-853, Runway and Taxiway Retroreflective Markers</i></p>
<u>AC 150/5345-44</u>	<p><i>Specification for Runway and Taxiway Signs</i></p> <p>FAA specifications for unlighted and lighted signs for taxiways and runways.</p>
<u>AC 150/5345-53</u>	<p><i>Airport Lighting Equipment Certification Program</i></p> <p>Details on the Airport Lighting Equipment Certification Program (ALECP).</p>
<u>AC 150/5345-50</u>	<p><i>Specification for Portable Runway and Taxiway Lights</i></p> <p>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.</p>
<u>AC 150/5345-55</u>	<p><i>Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure</i></p>

<b>Number</b>	<b>Title and Description</b>
<u>AC 150/5370-10</u>	<i>Standards for Specifying Construction of Airports</i> Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
<u>AC 150/5370-12</u>	<i>Quality Management for Federally Funded Airport Construction Projects</i>
EB 93	<i>Guidance for the Assembly and Installation of Temporary Orange Construction Signs</i>
FAA Order 5200.11	<u>FAA Airports (ARP) Safety Management System (SMS)</u> Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.
FAA Certalert 98-05	<i>Grasses Attractive to Hazardous Wildlife</i> Guidance on grass management and seed selection.
FAA Form 7460-1	<u>Notice of Proposed Construction or Alteration</u>
FAA Form 7480-1	<u>Notice of Landing Area Proposal</u>
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**

<b>Number</b>	<b>Title</b>
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**

<b>Term</b>	<b>Definition</b>
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, <i>Safe, Efficient Use, and Preservation of the Navigable Airspace</i> . (See guidance available on the FAA web site at <a href="https://oeaaa.faa.gov">https://oeaaa.faa.gov</a> .) The form may be downloaded at <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a> , or filed electronically at: <a href="https://oeaaa.faa.gov">https://oeaaa.faa.gov</a> .
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 <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a> .
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

<b>Term</b>	<b>Definition</b>
	the authority of 14 CFR Part 139, <i>Certification of Airports</i> .
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 <a href="#">AC 150/5300-13</a> 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 <a href="#">AC 150/5300-13</a> 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 <a href="#">AC 150/5300-13</a> .
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 <a href="#">AC 150/5300-13</a> .
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 <a href="#">AC 150/5300-13</a> 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	
<b>General Considerations</b>					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	<u>2.5</u>				
Operational safety is a standing agenda item for construction progress meetings.	<u>2.5</u>				
Scheduling of the construction phases is properly addressed.	<u>2.6</u>				
Any formal agreements are established.	<u>2.5.3</u>				
<b>Areas and Operations Affected by Construction Activity</b>					
Drawings showing affected areas are included.	<u>2.7.1</u>				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	<u>2.7.1.1</u>				
Access routes used by ARFF vehicles affected by the project are addressed.	<u>2.7.1.2</u>				
Access routes used by airport and airline support vehicles affected by the project are addressed.	<u>2.7.1.3</u>				
Underground utilities, including water supplies for firefighting and drainage.	<u>2.7.1.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	<u>2.7.1.5</u>				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	<u>2.7.1</u>				
Temporary changes to taxi operations are addressed.	<u>2.7.2.1</u>				
Detours for ARFF and other airport vehicles are identified.	<u>2.7.2.2</u>				
Maintenance of essential utilities and underground infrastructure is addressed.	<u>2.7.2.3</u>				
Temporary changes to air traffic control procedures are addressed.	<u>2.7.2.4</u>				
<b>NAVAIDs</b>					
Critical areas for NAVAIDs are depicted on drawings.	<u>2.8</u>				
Effects of construction activity on the performance of NAVAIDs, including unanticipated power outages, are addressed.	<u>2.8</u>				
Protection of NAVAID facilities is addressed.	<u>2.8</u>				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	<u>2.8</u>				
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	<u>2.8, 2.13.1, 2.13.5.3.1, 2.18.1</u>				
<b>Contractor Access</b>					
The CSPP addresses areas to which contractor will have access and how	<u>2.9</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
the areas will be accessed.					
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	<u>2.9</u>				
The location of stockpiled construction materials is depicted on drawings.	<u>2.9.1</u>				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	<u>2.9.1</u>				
Requirements for proper stockpiling of materials are included.	<u>2.9.1</u>				
Construction site parking is addressed.	<u>2.9.2.1</u>				
Construction equipment parking is addressed.	<u>2.9.2.2</u>				
Access and haul roads are addressed.	<u>2.9.2.3</u>				
A requirement for marking and lighting of vehicles to comply with <i>AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport</i> , is included.	<u>2.9.2.4</u>				
Proper vehicle operations, including requirements for escorts, are described.	<u>2.9.2.5, 2.9.2.6</u>				
Training requirements for vehicle drivers are addressed.	<u>2.9.2.7</u>				
Two-way radio communications procedures are described.	<u>2.9.2.9</u>				
Maintenance of the secured area of the airport is addressed.	<u>2.9.2.10</u>				
<b>Wildlife Management</b>					
The airport operator's wildlife management procedures are addressed.	<u>2.10</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
<b>Foreign Object Debris Management</b>					
The airport operator's FOD management procedures are addressed.	<u>2.11</u>				
<b>Hazardous Materials Management</b>					
The airport operator's hazardous materials management procedures are addressed.	<u>2.12</u>				
<b>Notification of Construction Activities</b>					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	<u>2.13</u>				
Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.	<u>2.13.1</u>				
A list of local ATO/Technical Operations personnel is included.	<u>2.13.1</u>				
A list of ATCT managers on duty is included.	<u>2.13.1</u>				
A list of authorized representatives to the OCC is included.	<u>2.13.2</u>				
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	<u>2.8, 2.13.2, 2.18.3.3.9</u>				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	<u>2.13.2</u>				
Emergency notification procedures for medical, fire fighting, and police	<u>2.13.3</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	<u>2.13.4</u>				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	<u>2.13.5</u>				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	<u>2.13.5.3.2</u>				
<b>Inspection Requirements</b>					
Daily and interim inspections by both the airport operator and contractor are specified.	<u>2.14.1, 2.14.2</u>				
Final inspections at certificated airports are specified when required.	<u>2.14.3</u>				
<b>Underground Utilities</b>					
Procedures for protecting existing underground facilities in excavation areas are described.	<u>2.15</u>				
<b>Penalties</b>					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	<u>2.16</u>				
<b>Special Conditions</b>					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	<u>2.17</u>				
<b>Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs</b>					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	<u>2.18.1</u>				
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	<u>2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with <u>AC 150/5340-1</u> , <i>Standards for Airport Markings</i> , is specified.	<u>2.18.2</u>				
Detailed specifications for materials and methods for temporary markings are provided.	<u>2.18.2</u>				
The requirement for lighting to conform to <u>AC 150/5340-30</u> , <i>Design and Installation Details for Airport Visual Aids</i> ; <u>AC 150/5345-50</u> , <i>Specification for Portable Runway and Taxiway Lights</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.3</u>				
The use of a lighted X is specified where appropriate.	<u>2.18.2.1.2</u> , <u>2.18.3.2</u>				
The requirement for signs to conform to <u>AC 150/5345-44</u> , <i>Specification for Runway and Taxiway Signs</i> ; <u>AC 150/5340-18</u> , <i>Standards for Airport Sign Systems</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.4</u>				
<b>Marking and Signs For Access Routes</b>					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to <u>AC 150/5340-18</u> and, to the extent practicable, with the MUTCD and/or State highway specifications.	<u>2.18.4.2</u>				
<b>Hazard Marking and Lighting</b>					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	<u>2.20.1</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	<u>2.20.1</u>				
The CSPP considers less obvious construction-related hazards.	<u>2.20.1</u>				
Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.	<u>2.20.2.1</u>				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	<u>2.20.2.1</u>				
Red lights meeting the luminance requirements of the State Highway Department are specified.	<u>2.20.2.2</u>				
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.	<u>2.20.2.3</u>				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	<u>2.20.2.3</u>				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	<u>2.20.2.5</u>				
Markings for temporary closures are specified.	<u>2.20.2.5</u>				
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	<u>2.20.2.7</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
<b>Work Zone Lighting for Nighttime Construction</b>					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	<u>2.21</u>				
<b>Protection of Runway and Taxiway Safety Areas</b>					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	<u>2.22.1.1,</u> <u>2.22.3.1</u>				
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	<u>2.22.1.2,</u> <u>2.22.3.2</u>				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	<u>2.22.3.3</u>				
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions.	<u>2.22.1.4</u>				
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	<u>2.22.1.4</u>				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	<u>2.22.1.4</u>				
Grading and soil erosion control to maintain RSA/TSA standards are	<u>2.22.3.5</u>				



Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	<u>2.22.2</u>				
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	<u>2.22.3</u>				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	<u>2.22.4</u>				
Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.	<u>2.22.4.3.6</u>				
Provisions for protection of runway approach/departure areas and clearways are included.	<u>2.22.6</u>				
<b>Other Limitations on Construction</b>					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	<u>2.23.1.2</u>				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	<u>2.23.1.3</u>				



**APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST**

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

**Table D-1. Potentially Hazardous Conditions**

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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.		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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).		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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.		

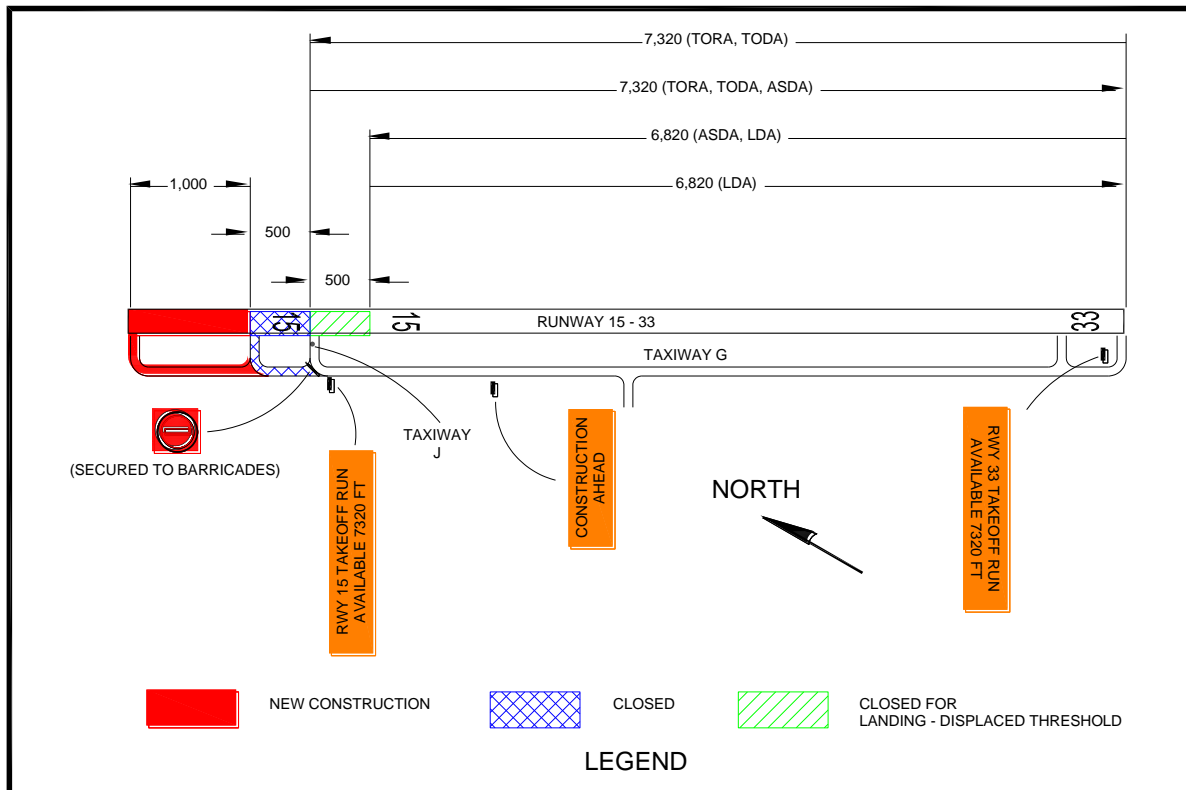
**APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE**

**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**

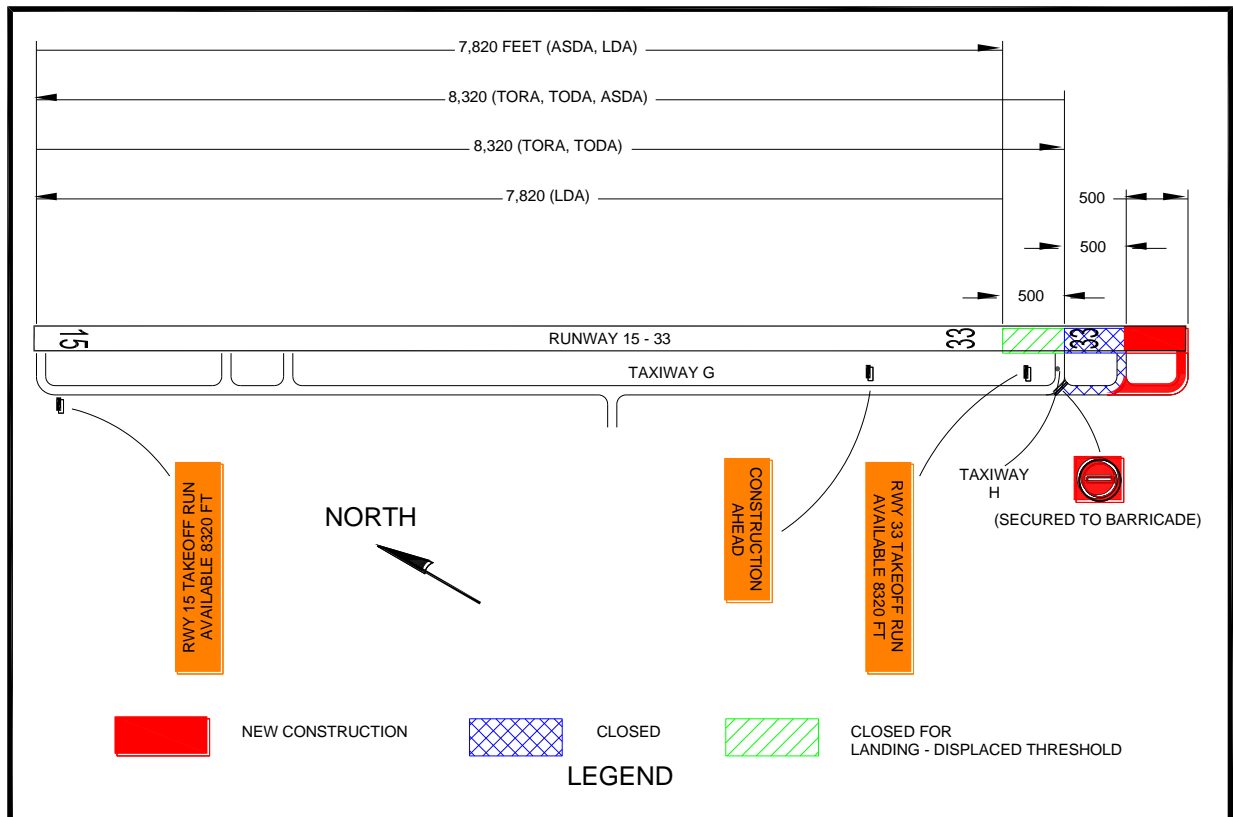


**Note 1:** Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

**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**



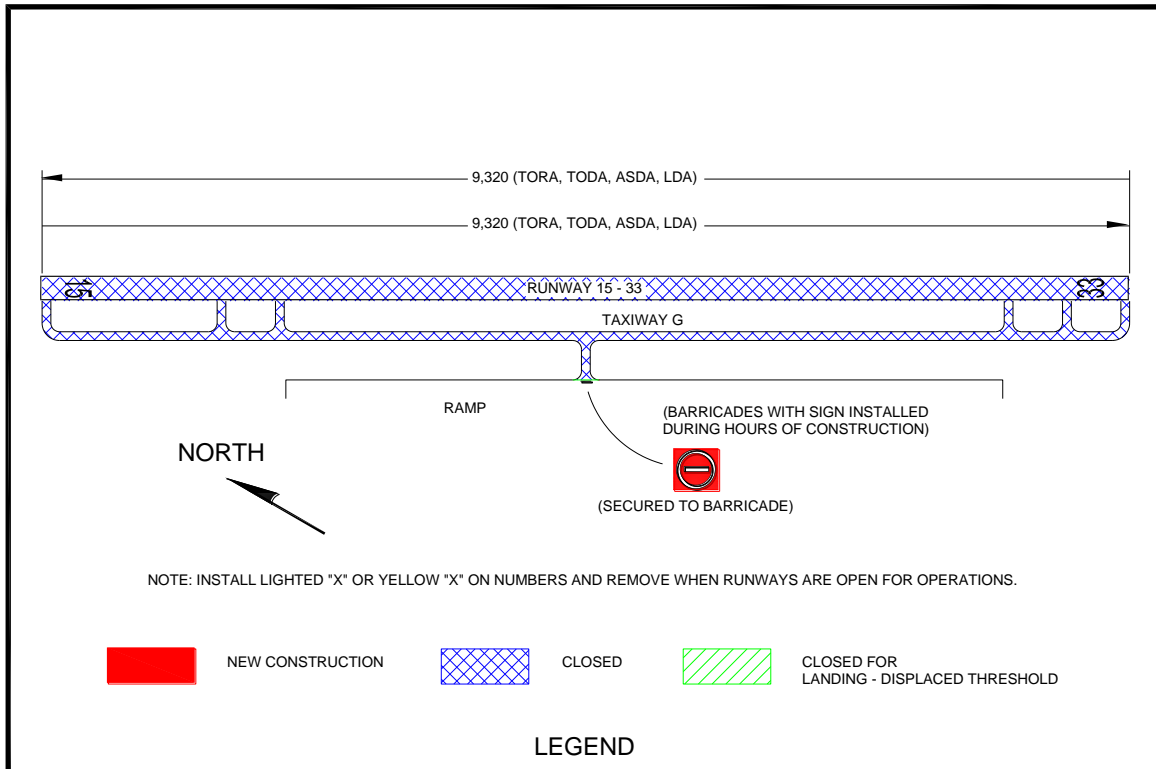
**Note 1:** Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

**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**

<b>Project</b>	<b>Runway 15-33 Extension and Repaving</b>			
<b>Phase</b>	<b>Normal (Existing)</b>	<b>Phase I: Extend Runway 15 End</b>	<b>Phase II: Extend Runway 33 End</b>	<b>Phase III: Repave Runway</b>
<b>Scope of Work</b>	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
<b>Effects of Construction Operations</b>	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
<b>Construction Phase</b>	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
<b>Runway 15 Average Aircraft Operations</b>	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
<b>Runway 33 Average Aircraft Operations</b>	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
<b>Runway 15-33 Aircraft Category</b>	C-IV	C-IV	C-IV	C-IV
<b>Runway 15 Approach Visibility Minimums</b>	1 mile	1 mile	1 mile	1 mile
<b>Runway 33 Approach Visibility Minimums</b>	$\frac{3}{4}$ mile	$\frac{3}{4}$ mile	$\frac{3}{4}$ mile	1 mile

**Note:** Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.

<b>Project</b>		<b>Runway 15-33 Extension and Repaving</b>			
<b>Phase</b>		<b>Normal (Existing)</b>	<b>Phase I: Extend Runway 15 End</b>	<b>Phase II: Extend Runway 33 End</b>	<b>Phase III: Repave Runway</b>
<b>Runway 15 Declared Distances</b>	<b>TORA</b>	7,820	7,320	8,320	9,320
	<b>TODA</b>	7,820	7,320	8,320	9,320
	<b>ASDA</b>	7,820	7,320	7,820	9,320
	<b>LDA</b>	7,820	6,820	7,820	9,320
<b>Runway 33 Declared Distances</b>	<b>TORA</b>	7,820	7,320	8,320	9,320
	<b>TODA</b>	7,820	7,320	8,320	9,320
	<b>ASDA</b>	8,320	6,820	8,320	9,320
	<b>LDA</b>	7,820	6,820	7,820	9,320
<b>Runway 15 Approach Procedures</b>		LOC only	LOC only	LOC only	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
<b>Runway 33 Approach Procedures</b>		ILS	ILS	ILS	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
<b>Runway 15 NAVAIDs</b>		LOC	LOC	LOC	LOC
<b>Runway 33 NAVAIDs</b>		ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR
<b>Taxiway G ADG</b>		IV	III	IV	IV
<b>Taxiway G TDG</b>		4	4	4	4
<b>ATCT (hours open)</b>		24 hours	24 hours	24 hours	0500 - 2000
<b>ARFF Index</b>		D	D	D	D

<b>Project</b>	<b>Runway 15-33 Extension and Repaving</b>			
<b>Phase</b>	<b>Normal (Existing)</b>	<b>Phase I: Extend Runway 15 End</b>	<b>Phase II: Extend Runway 33 End</b>	<b>Phase III: Repave Runway</b>
<b>Special Conditions</b>	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
<b>Information for NOTAMs</b>		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**

<b>Runway/Taxiway</b>	<b>Aircraft Approach Category* A, B, C, or D</b>	<b>Airplane Design Group* I, II, III, or IV</b>	<b>Safety Area Width in Feet Divided by 2*</b>

\*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	: 1
			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.

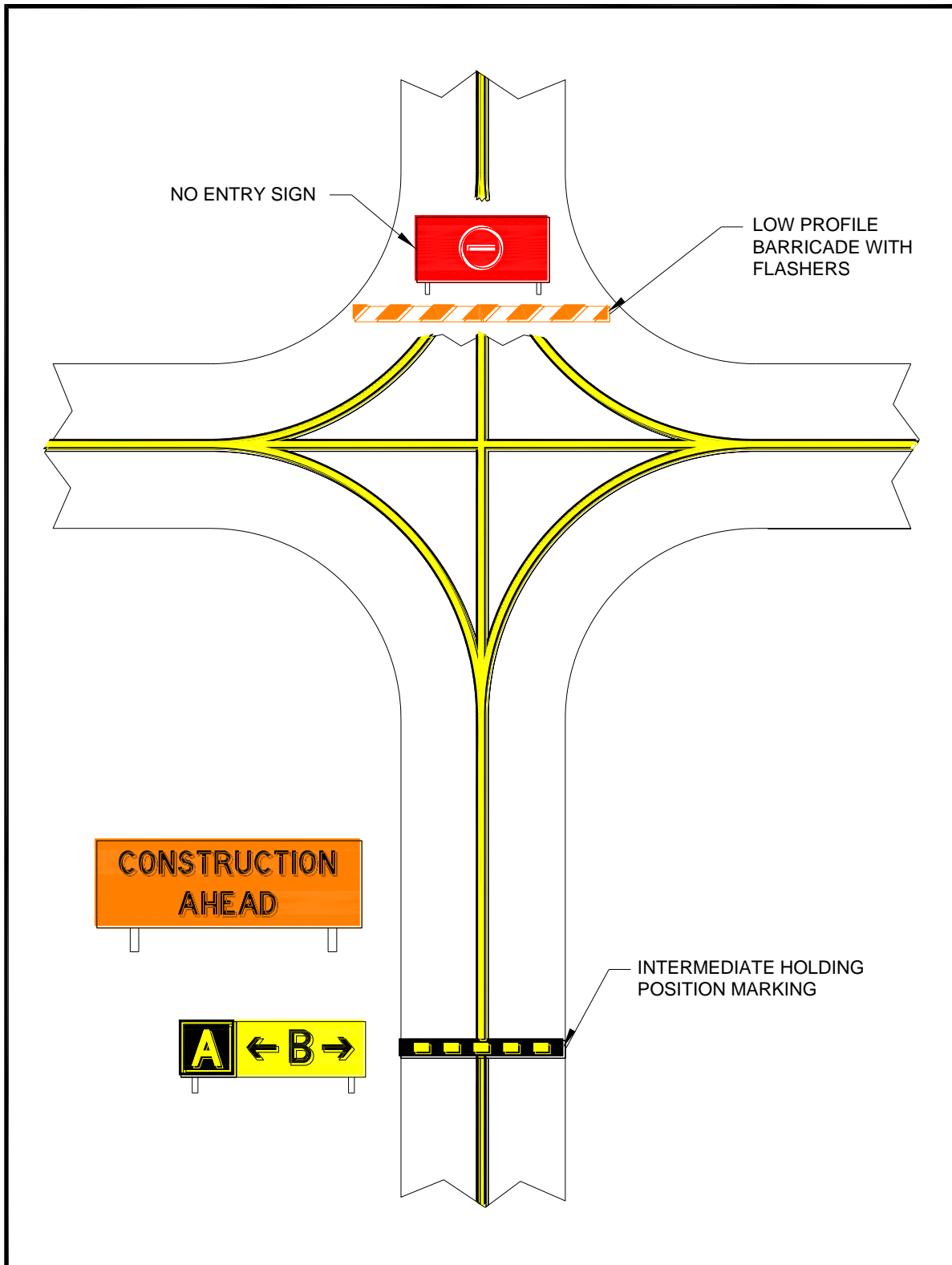
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**APPENDIX F. ORANGE CONSTRUCTION SIGNS**

**Figure F-1. Approved Sign Legends**



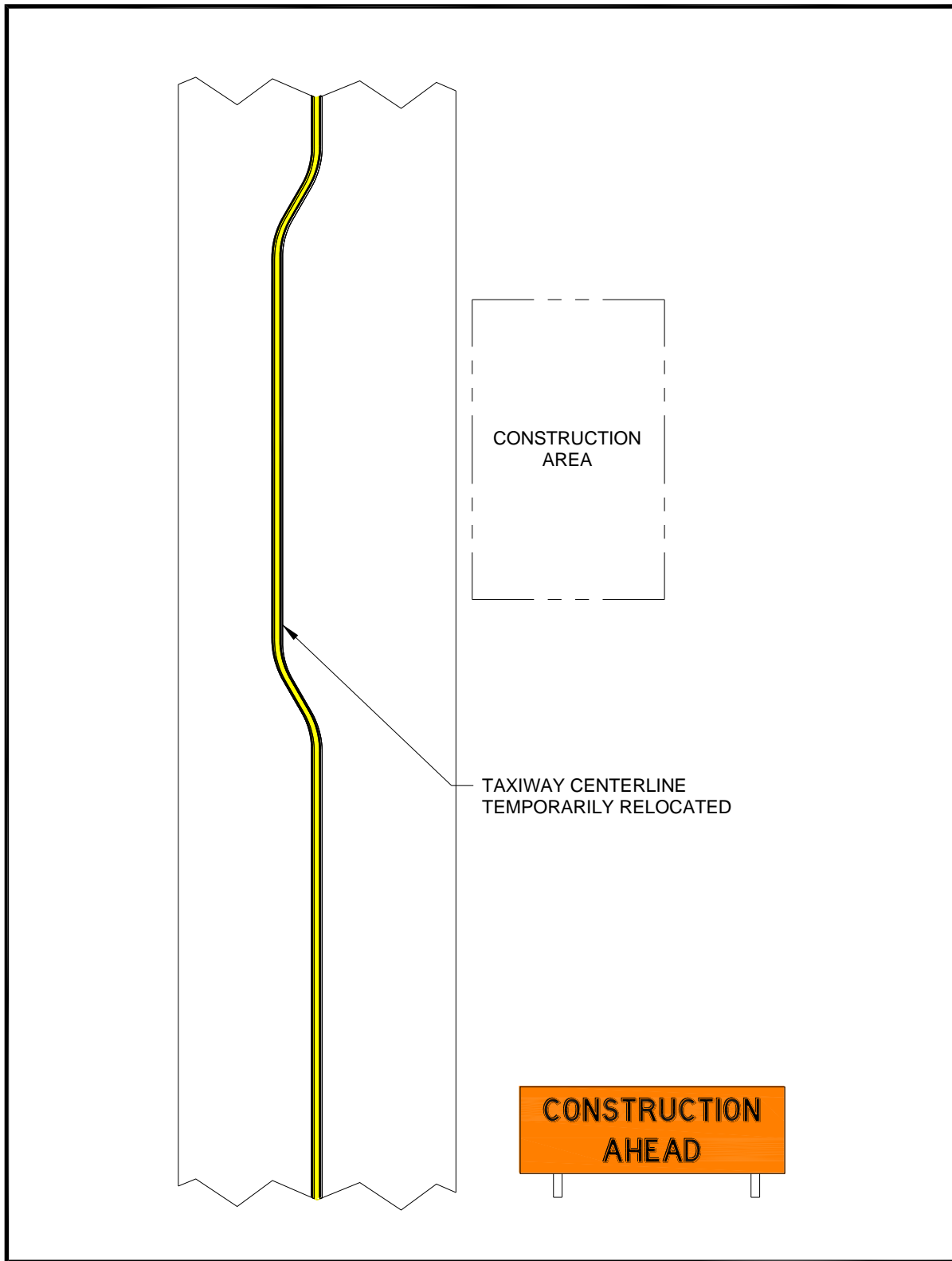
**Figure F-2. Orange Construction Sign Example 1**



**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: \_\_\_\_\_

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**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**EXHIBIT E**

**MATERIAL TESTING AND SAMPLING FREQUENCY**



**AIRPORT CONSTRUCTION – Materials Sampling & Testing Frequency (MSTF) Table**

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Excavation	Acceptance	(5)	Gradation, P.I. (4), Moisture (or visual description if organic)	1 per 5,000 CY waste or undesignated waste cut	For unsuitable excavation number consecutively EX-W-1. No need to test if waste is designated on plans
Embankment	Acceptance	(5)	Standard Density	As required by changes in material	Number consecutively BM-SD-1 or EX-SD-1.
			Field Density (1)	1 per 1,500 CY or 1 per 3,000 Tons (6)	Number consecutively BM-D-1 or EX-D-1.
			Gradation, P.I. (4) and Deleterious (visual)	1 per 5,000 CY or 1 per 10,000 Tons (6)	Number consecutively BM-G-1 or EX-G-1.
	Independent Assurance	(5)	Standard Density (2)	1 per source	Use numbers that correspond to acceptance samples. Include field test results with sample.
			Field Density (1)	1 per 15,000 CY or 1 per 30,000 Tons	
			Gradation and Deleterious (visual)	1 per 50,000 CY or 1 per 100,000 Tons	
Bedding & Backfill for Structures (Drainage Items, Ducts, Conduits, etc.)	Acceptance	(5)	Standard Density	As required by change in material	
			Field Density (1)	(3)	
			Gradation, P.I. (4), and Deleterious (visual)	1 per source or as required by change in material	

**General:** When acceptance testing is performed in the Department’s Regional Laboratories that are accredited in the specified test method, Independent Assurance (IA) testing is not required. If the regional laboratories perform acceptance testing and choose to perform IA testing, they must use different personnel and equipment for IA testing than was used for acceptance testing.

- 1) If material is impractical for field density, document quantity and/or area by reporting percent oversize and compactive effort used on a proper density acceptance form. IA density testing is not required when material (as shown by gradation testing) is Too Coarse to Test (TCTT). Any material can be rejected based on failure to meet any one of the criteria.
- 2) Required when Standard Density is performed in the project laboratory.
- 3) One density per structure (pipe, conduit, manhole, catch basin, inlet, utility vault, etc.), with a minimum of one density per 100 lineal feet of structure installed same day and same manner. Perform densities within 18 inches of the structure or outside diameter of the pipe. Frequency may be reduced to 1 per 200 lineal feet for electrical conduits when approved by Regional Quality Assurance Engineer (RQE) or Regional Materials Engineer (RME).
- 4) Perform Plasticity Index (P.I.) tests on the first five acceptance samples at the start of production from any source. If these tests indicate the material to be non-plastic, additional acceptance tests need only be performed when IA samples are taken. The RQE or RME may reduce the number of tests required if the source is known to have no value for liquid limit and be non-plastic.
- 5) See the specified test method for minimum sample size.
- 6) For large unclassified embankments, a field density and gradation testing frequency of 1/10,000 CY or 1/20,000 Tons is acceptable subject to the approval of the RQE, RME or Statewide Materials Engineer (SME).

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Subbase Course	Source Quality	150 lbs.	L.A. Wear, Degradation	1 per source prior to use or as required based on change in material	Allow minimum of 14 days for transport and testing. Number consecutively Q-SB-1 or Q-SC-1
	Acceptance	(6)	Standard Density	1 per source and as required based on change in material	Number consecutively SB-SD-1
			Field Density (1)	1 per 1,000 CY or 1 per 2,000 Tons	Number consecutively SB-D-1
			Gradation, L.L. P.I. (3), Deleterious	1 per 2,500 CY or 1 per 5,000 Ton (3)	Number consecutively SB-G-1
	Independent Assurance	(6)	Standard Density (2)	1 per source	Use numbers that correspond to acceptance samples. Include field test results with sample.
			Field Density (1)	1 per 10,000 CY or 1 per 20,000 Tons	
			Gradation, L.L., P.I. (3), Deleterious,	1 per 25,000 CY or 1 per 50,000 Tons	
Crushed Aggregate Base Course	Source Quality	150 lbs.	L.A. Wear, Degradation, Soundness, Nordic Abrasion (7),	1 per source prior to use or as required based on change in material	Allow minimum 14 days for transport and testing. Number consecutively Q-BC-1
	Acceptance	(6)	Standard Density	1 per source and as required based on change in material	Number consecutively BC-SD-1
			Field Density (1)	1 per 200 CY or 400 Tons	Number consecutively BC-D-1
			Gradation, L.L., P.I. (3), Fracture, SE, Deleterious,	1 per 400 CY or 1 per 800 Tons (3) (4) (5)	Number consecutively BC-G-1
	Independent Assurance	(6)	Standard Density (2)	1 per source	Use numbers that correspond to acceptance samples. Include field test results with sample
			Field Density (1)	1 per 2,000 CY or 1 per 4,000 Tons	
			Gradation, L.L., P.I. (3), Fracture, SE, Deleterious	1 per 4,000 CY or 1 per 8,000 Tons	

- 1) If material is impractical to test for field density, document quantity and/or area by reporting percent oversize and compactive effort used on a proper density acceptance form. IA density testing is not required when material (as shown by gradation testing) is Too Coarse to Test (TCTT).
- 2) Required when Standard Density is performed in project laboratory.
- 3) Perform Liquid Limit (L.L.) and Plastic Index (P.I.) tests on the first five acceptance samples at the start of production from any source. If these tests indicate the material to be non-plastic, additional acceptance tests need only be performed when IA samples are taken. The RQE or RME may reduce the number of tests required if the source is known to have no value for liquid limit and be non-plastic.
- 4) Perform fracture tests on the first ten acceptance tests. If these tests indicate the fracture to be 5% or more above specification, additional acceptance tests need only be performed when IA samples are taken.
- 5) Perform Sand Equivalent (SE) tests on the first five acceptance tests. If these tests indicate the material meets specification, additional acceptance tests need only be performed when IA samples are taken. The SE test is not required for Aggregate Surface Course.
- 6) See the specified test method for minimum sample size.
- 7) Include Nordic Abrasion testing of source material. Report test results to Statewide Materials section.



Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Aggregate Surface Course	Source Quality	150 lbs.	L.A. Wear, Degradation, Soundness, Nordic Abrasion (7),	1 per source prior to use or as required based on change in material	Allow minimum 14 days for transport and testing. Number consecutively Q-SC-1
	Acceptance	(6)	Standard Density	1 per source and as required based on change in material	Number consecutively SC-SD-1
			Field Density (1)	1 per 500 CY or 1 per 1,000 Tons	Number consecutively SC-D-1
			Gradation, L.L., P.I. (3), Fracture, Deleterious,	1 per 1,000 CY or 1 per 2,000 Tons (3) (4)	Number consecutively SC-G-1
	Independent Assurance	(6)	Standard Density (2)	1 per source	Use numbers that correspond to acceptance samples. Include field test results with sample
			Field Density (1)	1 per 5,000 CY or 1 per 10,000 Tons	
			Gradation, L.L., P.I. (3), Fracture, Deleterious	1 per 10,000 CY or 1 per 20,000 Tons	
<ol style="list-style-type: none"> <li>1) If material is impractical to test for field density, document quantity and/or area by reporting percent oversize and compactive effort used on a proper density acceptance form. IA density testing is not required when material (as shown by gradation testing) is To Coarse to Test (TCTT).</li> <li>2) Required when Standard Density is performed in project laboratory.</li> <li>3) Perform Liquid Limit (L.L.) and Plastic Index (P.I.) tests on the first five acceptance samples at the start of production from any source. If these tests indicate the material to be non-plastic, additional acceptance tests need only be performed when IA samples are taken. The RQE or RME may reduce the number of tests required if the source is known to have no value for liquid limit and be non-plastic.</li> <li>4) Perform fracture tests on the first ten acceptance tests. If these tests indicate the fracture to be 5% or more above specification, additional acceptance tests need only be performed when IA samples are taken.</li> <li>5) Perform Sand Equivalent (SE) tests on the first five acceptance tests. If these tests indicate the material meets specification, additional acceptance tests need only be performed when IA samples are taken. The SE test is not required for Aggregate Surface Course.</li> <li>6) See the specified test method for minimum sample size.</li> <li>7) Include Nordic Abrasion testing of source material. Report test results to Statewide Materials section.</li> </ol>					

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Plant Hot Mix Asphalt and Asphalt Treated Base Course	Source Quality	150 lbs. Aggregate	L.A. Wear, Degradation, Sodium Sulfate Loss, Nordic Abrasion (10)	1 per source prior to use or as required based on change in material	Allow 25 days for transport and testing.
	Mix Design	500 lbs. Aggregate (7)	Mix Design (1) (2) L.L., P.I. (3), Fracture, Sand Equivalent (SE), Flat & Elongated (F&E),	1 per source and as required based on change in material	Allow 15 days or contract specified time for mix design and testing after receiving contractor's proposed gradation. AB = asphalt binder, same as asphalt cement. If possible sample AB at the plant for the Mix Design.
		5 one gallon. cans of AB,			
		1 pint of Anti-strip			
	Acceptance	(8)	MSG (Maximum Specific Gravity)	1 per Lot (1) (9)	(1) From Mix Design on first lot and then from the first subplot of each additional lot
			Mat Density, Gradation, Binder Content, L.L., P.I. (3), Fracture, F&E, SE, Deleterious, Thickness	1 per subplot (3) (4) (5) (6) (9)	Ross Count (AASHTO T 195, Coating Test) as required by RQE or RME.
			Joint Density	(9)	Top Lift (1)
	Independent Assurance	(8)	MSG	1 per project minimum (1)	Required when MSG is run in the field.
			Mat Density, Gradation, Binder Content, L.L., P.I. (3), Fracture, F&E, SE	1 per 10 sublots	Use numbers that correspond to acceptance samples. Include field test results with sample.
	Information	30 lbs.	3-Marshall Biscuits or 2-gyratory samples	1 per Mix Design minimum	Compare results to Mix Design.

- 1) Refer to project specifications.
- 2) Recommendations regarding anti-strip requirements must be determined for each mix design.
- 3) Perform Liquid Limit (L.L.) and Plastic Index (P.I.) tests on the first five acceptance samples at the start of production from any source. If these tests indicate the material to be non-plastic, additional acceptance tests need only be performed when IA samples are taken. The RQE or RME may reduce the number of tests required if the source is known to have no value for liquid limit and be non-plastic.
- 4) Perform fracture tests on the first ten acceptance tests. If these tests indicate the fracture to be 5% or more above specification, additional acceptance tests need only be performed when IA samples are taken.
- 5) Perform Sand Equivalent (SE) tests on the first five acceptance tests. If these tests indicate the material meets specification, additional acceptance tests need only be performed when IA samples are taken.
- 6) Perform Flat and Elongated (F&E) tests on the first five acceptance samples from any source. For known sources, the RQE or RME may waive this requirement.
- 7) For multiple stockpiles, proportion each stockpile sample to the proposed Job Mix Design blend ratio.
- 8) See the specified test method for minimum sample size.
- 9) May not be applicable to Asphalt Treated Base Course. Refer to project specifications.
- 10) Include Nordic Abrasion testing of source material. Report test results to Statewide Materials section.

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Asphalt Binder	Source Quality	(1)	(1)	1 per each grade and source prior to use	Manufacturer's certification required
	Acceptance (1)	Three 1-quart cans		1 per 50,000 gals. or 1 per 200 Tons	Sampled on project. Test for anti-strip if required by RQE or RME.
Liquid Asphalt for: a) Prime Coat b) Tack Coat c) Seal Coats d) Asphalt Surface Treatment	Source Quality	(1)	Type and Grading	1 per each grade and source prior to use	Manufacturer's certification required
	Acceptance	1-1 gallon plastic jug (for emulsified asphalt)	(1)	1 per 50,000 gallons or 1 per 200 Tons	Sample must be tested by Lab that did not test material for Quality. Material sampled prior to dilution
Aggregate for Seal Coats and Asphalt Surface Treatments	Source Quality	150 lbs. Aggregate	Fracture, F&E, L.A. Wear, Soundness, Degradation	1 per source prior to use or as required by change in material prior to use	Allow 25 days for transport and testing.
	Acceptance	(4)	Gradation, Fracture, F&E, Deleterious (visual)	1 per 500 Tons (2) (3)	May be taken from stockpile or production
	Independent Assurance		Gradation, Fracture, F&E, Deleterious (visual)	1 per 5,000 Tons	May be taken from stockpile or production

- 1) Refer to project specifications.
- 2) Perform fracture tests on the first ten acceptance tests. If these tests indicate the fracture to be 5% or more above specification, additional acceptance tests need only be performed when IA samples are taken.
- 3) Perform Flat and Elongated (F&E) tests on the first five acceptance samples from any source. For known sources, the RQE or RME may waive this requirement.
- 4) See the specified test method for minimum sample size.

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Portland Cement Concrete	Source Quality				
a. Cement and Cementitious	Quality	a. Two 1-gal. cans, each	See Remarks	1 per shipment (2) (4)	Allow 40 days for transport and testing. Manufacturer's certification required
b. Water		b. ½ gal. in glass jar	See Remarks	1 per source	Allow 20 days for testing or potable water accepted by Project Engineer.
c. Coarse Aggregate		c. 100 lbs.	Deleterious Substances, L.A. wear, Soundness	1 per source	Allow 25 days for transport and testing.
d. Fine Aggregate		d. 25 lbs.	Deleterious Substances, Soundness	1 per source	Allow 25 days for transport and testing.
Portland Cement Concrete	Mix Design Submittal (1) (3)				
a. Cement and Cementitious	Mix Design	a. 94 lbs., each	Mix Design Verification as required by RQE or RME	1 per source prior to use	For verification of Contractor-furnished mix design, allow 40 days for transport and testing.
b. Water		b. None			
c. Coarse Aggregate		c. 330 lbs.			
d. Fine Aggregate		d. 220 lbs.			
e. Admixtures		e. 1 qt. each			
<ol style="list-style-type: none"> <li>1) Refer to project specifications.</li> <li>2) Cement stored in silos or bins over six months, or in bags over three months, may require re-testing. See project specifications.</li> <li>3) Manufacturer's certifications and aggregate test reports required.</li> <li>4) Manufacturer's Certification for cement used on project may be accepted in lieu of sampling as approved by the RQE or RME.</li> </ol>					

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Concrete Continued:					
Coarse Aggregate	Acceptance	(5)	Gradation and Deleterious (visual)	1 per 200 CY (6)	Number consecutively CA-G-1
Fine Aggregate			Gradation, Deleterious (visual), Fineness Modulus	1 per 200 CY (6)	Number consecutively FA-G-1
Mix		As required by test method	Temperature, Slump, % Air, Water/Cement Ratio, Unit Weight, Yield, Proportions per CY	1 per ½ days pour (2) or 1 per 200 CY	(3)
		Cylinders or beams	Compressive strength or Flexural strength (1)	1 per ½ days pour (2) or 1 per 200 CY	Mold two (6"x12") or three (4"x8") cylinders or 2 (6"x6"x20") beams. Test at 28 days. (1) (4)
	Information	Cylinders or beams	Compressive strength or Flexural strength	As required (e.g. for 7 day break)	Mold two (6"x12") or three (4"x8") cylinders or 2 (6"x6"x20") beams "As Required" for Strength Data.
Coarse Aggregate	Independent Assurance	(5)	Gradation and; Deleterious (visual)	1 per 2,000 CY with minimum of 1 per project if over 100 CY is placed (6)	Use numbers that correspond to acceptance samples. Include field test results with sample.
Fine Aggregate			Gradation, Deleterious (visual), Fineness Modulus		
Mix		As required by test method	Temperature, Slump, % Air, Water/Cement Ratio, Unit Weight, Yield, Proportions per CY	1 per 2,000 CY	
		Cylinders or beams	Compressive strength or Flexural strength	1 per 2,000 CY	
<ol style="list-style-type: none"> <li>1) Refer to project specifications.</li> <li>2) Half day's pour considered to be 6 hours or less.</li> <li>3) Commercial sources which are periodically inspected do not have to be tested if day's total quantity of concrete placement is less than 5 CY as determined by the Project Engineer. Placement reports summarizing all minor pours will be completed.</li> <li>4) For non-structural or minor concrete construction, as determined by the RQE or RME, 1 set minimum per project is recommended.</li> <li>5) See the specified test method for minimum sample size.</li> <li>6) For known Commercial sources that are periodically inspected, the RQE or RME may reduce the frequency of sampling and testing to 1 per project per mix design.</li> </ol>					

Material	Type of Sample	Sample Size	Type of Tests	Frequency	Remarks
Misc. Hardware	Source Quality	(1)		1 per pay item or assembly, min.	Approved by <del>designated authority</del> ; reference MCL Engineer
Concrete Reinforcing Steel	Source Quality	(2)		1 for each type, grade and size in a shipment	Approved by <del>designated authority</del> ; reference MCL Engineer
Joint Sealer, Joint Filler, and Curing Materials for Concrete	Source Quality	1 Quart for each liquid (see remarks)	See remarks (1)	1 per type	<del>Project Engineer documentation if on QPL. If not on QPL, manufacturer's certification or sample for testing.</del>
Porous Backfill	Source Quality	(3)	Clay Lumps, Deleterious	1 per source (4)	
	Acceptance		Gradation, Deleterious (visual)	1 per source or as required based on change in material	Number consecutively PB-G-1
Topsoil	Source Quality	15 lbs.	Organic content, Gradation, pH	1 per source prior to use or as required by change in material	Allow 15 days for transport and testing.
	Acceptance	(3)	Gradation	1 per 15,000 SY or 1 per 2,500 CY	Number consecutively TS-G-1
Signals and Lighting	Quality and Acceptance	Within 30 days following award of the contract, the contractor shall submit to the Project Engineer for approval a complete list of material and equipment that is proposed to be used for this item. The data shall include catalog cuts, diagrams, test reports, manufacturers' certifications, etc. The above data shall be submitted in eight sets. Any proposed deviation from the plans shall also be submitted.			
<ol style="list-style-type: none"> <li>1) Certificates of Compliance per Specifications GCP- 60.</li> <li>2) Mill Test Reports to include heat numbers, fabrication date, physical and chemical properties, and Buy American certification (when required by specifications).</li> <li>3) See the specified test method for minimum sample size.</li> <li>4) For known quarry sources, the RQE or RME may waive Clay Lumps testing if visual inspection for deleterious materials has been performed and the percent passing (by weight) the No. 200 sieve is 3% or less.</li> </ol>					

## **Small Quantities of Miscellaneous Materials and Installations**

**If the Pay Item quantity at bid opening is equal to or less than the amounts listed below, the following applies:**

1. Acceptance and Independent Assurance sampling & testing is not required.
2. Documentation required to support the Acceptance decision is:
  - I. Asphalt/Aggregate Mixtures and Bituminous Materials – Mix design and Project Materials Report (PMR).
  - II. Portland Cement Concrete – Mix design, batch tickets, Concrete Placement Report (CPR), and PMR.
  - III. Soils and Aggregates – PMR.
3. Inspection of materials and workmanship is still required.
4. Source quality testing may be required as noted below.

### **I. Small Quantities of Asphalt/Aggregate Mixtures and Bituminous Materials:**

- a) Bituminous Material — not to exceed 85 Tons of asphalt binder or 15 Tons for other liquid asphalt.
- b) Landscaping, paved ditches and flumes -- all quantities.
- c) Temporary materials -- all quantities.

### **II. Small Quantities of Portland Cement Concrete:**

- a) Sidewalks — not to exceed 150 Square Yards per day.
- b) Curb and gutter — not to exceed 250 Lineal Feet per day.
- c) Slope paving and headers -- all quantities.
- d) Landscaping, paved ditches and flumes -- all quantities.
- e) Catch basins, manholes, inlets, inspection holes; and grout for risers, pipes and invert channels – all quantities.
- f) Culvert headwalls for pipe diameters 48 inches or less -- all quantities.
- g) Cable markers -- all quantities.
- h) Temporary materials -- all quantities.

### **III. Small Quantities of Soils and Aggregates:**

- a) Embankment, Borrow, Aggregates for Base Course, Surface Course, and Subbase — not to exceed 500 Tons or 250 Cubic Yards with PMR; 1,000 Tons or 500 Cubic Yards with PMR and source quality report (4).
- b) Riprap or Armor Stone — not to exceed 500 Tons or 250 Cubic Yards.
- c) Topsoil — not to exceed 600 Square Yards or 100 Cubic Yards.
- d) Temporary materials -- all quantities.





**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**EXHIBIT F**

**CONSTRUCTION SAFETY AND PHASING PLAN NARRATIVE**



# Warren “Bud” Woods Palmer Municipal Airport

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Construct Taxiway N, Improve Airport Drainage, and Construct Apron E

## Construction Safety and Phasing Plan

*Prepared for:*

**City of Palmer**

231 W. Evergreen Ave.  
Palmer, AK 99645

*Prepared by:*



202 W Elmwood Ave  
Palmer, AK 99645

February 2022



## Introduction

This Construction Safety and Phasing Plan (CSPP) is for use during the Construct Taxiway N and Improve Airport Drainage Project in Palmer, Alaska. It has been prepared in conformance with the FAA Standard of Practice 2.0 (SOP 2.0), and Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5370-2G *Operational Safety on Airports During Construction*. This AC may be downloaded from:

[http://www.faa.gov/airports/resources/advisory\\_circulars/](http://www.faa.gov/airports/resources/advisory_circulars/)

The purpose of this CSPP is to present information needed for construction in an effort to maintain airport safety, minimize disruption to the operations of air and ground traffic, and to allow the project to be completed quickly. The designated work areas for this project include the Taxiway A, B, H, J, K, L, N, Taxilane T, Apron E, Runway 10/28, Large Aircraft Apron, and airport drainage areas. The Contractor will control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in areas that are not under construction.

This CSPP provides information on some of the coordination, limitations, and restrictions that will be required to accomplish this project. Some details have been left for the Contractor to provide, so that they may accomplish the work according to their own means and methods, as much as practical. The Contractor's plans to complete the work are subject to approval by the Engineer, and will require coordination and review by the Airport Manager, Federal Aviation Administration (FAA), and possibly other organizations or individuals. Please note that the term Airport Manager is used for simplicity in terms of FAA nomenclature; the term as used in this document refers to the City of Palmer's Airport Superintendent or designee. The Contractor is required to submit a Safety Plan Compliance Document (SPCD) to the Project Engineer (Engineer) describing how they will perform the work in compliance with this CSPP and the requirements set forth in current version of FAA AC 150/5370-2. The Contractor's work schedule (including a critical path method schedule) will be included in Section 2 Phasing of the SPCD. The SPCD must be submitted to the Engineer for approval prior to the commencement of any construction activities and prior to the preconstruction conference.

AC 150/5370-2 mandates the format and content of the CSPP and SPCD. All references to construction safety plans, security plans, and construction phasing in the Project Manual refer to this CSPP and the Contractor's approved SPCD.

The FAA requires the CSPP and the SPCD to be "stand-alone" documents that can be circulated to the relevant sections of the FAA for review and approval. The CSPP and SPCD are both enforceable parts of the contract documents.

The Safety Plan sheets and Construction Phasing Plan sheets within the project plans are referred to in the CSPP and SPCD as the Construction Safety and Phasing Plan Drawings. The FAA requires that the CSPP include those plans as an appendix. The Contractor can find these sheets within the project plans.



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## Appendices

Appendix A: Construction Safety and Phasing Plan Drawings as Shown in the Plan Set



# LIST OF ACRONYMS

AC	Advisory Circular
AOA	Air Operations Area
ARC	Airport Reference Code
ARFF	Airport Rescue and Fire Fighting
ATO	Air Traffic Organization
AWOS	Automated Weather Observation Station
CFR	Code of Federal Regulations
CSPP	Construction Safety and Phasing Plan
CTAF	Common Traffic Advisory Frequencies
Engineer	Project Engineer
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FOD	Foreign Object Debris
HAZMAT	Hazardous Materials Management
HMCP	Hazardous Materials Control Plan
MUTCD	Manual on Uniform Traffic Control Devices
NAVAID	Navigational Aids
NOTAM	Notice to Airmen
OFA	Object Free Area
OFZ	Obstacle Free Zone
OSHA	Occupational Safety and Health Administration
PAQ	Warren “Bud” Woods Palmer Municipal Airport
RSA	Runway Safety Area
ROFA	Runway Object Free Area
SDS	Safety Data Sheets
SPCC	Spill Prevention Control and Countermeasure
SPCD	Safety Plan Compliance Document
SWPPP	Storm Water Pollution Prevention Plan
TSA	Taxiway Safety Area
TOFA	Taxiway Object Free Area



## **Section 1. Coordination**

Pre-design, pre-bid, and pre-construction conferences will be conducted by the Engineer in accordance with AC 150/5370-12 *Quality Management for Construction Projects*. Throughout the design of the project, airport operational safety will be considered. The Contractor's point of contact with the Airport Manager is through the Engineer. Airport operators and/or tenants impacted during construction have been, or will be, given the opportunity to provide comments and pose questions during the design process. Airport operational safety will also be addressed at the pre-bid and pre-construction conferences to introduce the issues specific to the construction of the Project.

### **1.1 Contractor Progress Meetings**

Ongoing coordination will be addressed at weekly construction progress meetings, which will include the Airport Owner, Engineer, and Contractor. These meetings will discuss specific safety issues associated with work planned for the upcoming week and will address potential impacts to airport operations. Throughout construction activities, the Contractor, Engineer, and Airport Manager will perform onsite inspections to ensure that proper airport operational safety guidelines are adhered to. Any deficiencies noticed during these inspections, whether caused by negligence, oversight, or project scope change, will be remediated immediately.

### **1.2 Scope or Schedule Changes**

Changes in the scope and/or duration of the project may necessitate revisions to this CSPP. The FAA Airports Regional or District office will be promptly notified of any proposed changes to this CSPP. Changes to this document require review and approval by the airport operator and the FAA prior to implementation. In addition, the Airport Manager or, as assigned, the Engineer will coordinate proposed changes with all appropriate local or federal government agencies. Schedule changes will be communicated with the Engineer on a daily basis to ensure that Notices to Airmen (NOTAM's) can be kept current at all times.

### **1.3 FAA Air Traffic Organization (ATO) Coordination**

There are no FAA owned NAVAIDs at Warren "Bud" Woods Palmer Municipal Airport (PAQ). Coordination with the FAA ATO is not applicable for this project.

## **Section 2. Phasing**

This project consists of several improvements, including constructing a parallel taxiway for Runway 10/28 that meets FAA standards and removing non-standard Taxiway B from Runway 10 to Taxiway A. This project will also include Apron E construction; storm water capacity improvements, including an infiltration basin; grading of safety areas; and removal of airspace obstacles. Construction can be completed by the Contractor in their preferred order and multiple work items can undergo construction at the same time. The closure of Runway 10/28 and closure of Runway 16/34 will not occur at the same time. Runway and taxiway closures will be scheduled to minimize the disruption to regular activities of airport users.

Construction activities are anticipated to begin in May of 2022 and all work is anticipated to be substantially complete by the end of August 2023. Final completion is anticipated in October of 2023.

The project is divided into four work areas. Graphical exhibits specifically indicating operational safety procedures and restrictions in each work area have been provided with this CSPP and are shown in the project drawing set. Work areas are described below and Table 1 on page 11 provides relevant runway and taxiway dimensional information.

While work areas will be closed to air traffic for construction as described below, the airport will remain open to air traffic for the duration of construction. Work will be performed adjacent to active air traffic, both on the ground and in the air. Aircraft always have right-of-way. It is therefore required that the Contractor constantly monitor the Common Traffic Advisory Frequency (CTAF) to ensure that construction activities do not impact air traffic and the safety of aviators and construction crews.

Contractor will schedule work to ensure that airport users have continual access to Runways 16/34, 16S/34S, and 10/28. Contractor will ensure that no electrical outage effects the FAA Automatic Weather Observation System (AWOS) equipment. A NOTAM will be put into effect no less than four (4) hours prior to work in any portion of the runway safety area or taxiway safety area and the airport will otherwise remain open to operations.

Construction activities will be sequenced to minimize impact to operations and maintain access to open portions of taxiways and runways to the greatest extent practical. The Contractor must ensure that equipment, materials and construction crew remain in areas indicated for staging, hauling, or areas that are closed to air traffic during construction.

During construction of this project outages of airfield lighting circuits will occur to allow for the reconfiguration of taxiway lighting.

The Contractor will place flaggers near Runway 10/28, as shown on the plans, where a construction haul route crosses the active aircraft movement area. Vehicles and pedestrians will be held outside of the Air Operations Area (AOA) until the arrival aircraft has landed or departing aircraft has taken off, and cleared the AOA.

**Work Area 1.** This work area includes construction south of the Runway 10/28 Obstacle Free Zone (OFZ) and west of Taxiway A. Taxiway A will be closed at Taxiway F and Runway 10/28 when work is within the Taxiway Object Free Area (TOFA) of Taxiway A. The Large Aircraft Apron will be closed 20-feet beyond the construction work area. Work in Work Area 1 is permitted from 6AM to 10PM, Monday through Sunday.

**Work Area 2.** This work area includes construction within the Runway 10/28 OFZ and Runway 10 approach surface. Runway 10/28 will be closed during construction in Work Area 2. Taxiway B will be closed east of Runway 16/34 and Taxiways L and H will be closed on the south side of Taxiway B. Closure of Runway 10/28 is permitted 24 hours a day on all days of the week. Closures will be permitted for a maximum of 14 days total and closure that are less than 24 hours in duration will be counted as a one day closure. Closure are permitted to be discontinuous. Coordinate the closure schedule with the Engineer. During closures, the runway will be marked closed with illuminated temporary closure markers (lighted X's) at

each threshold. The Contractor will not park vehicles nor stage material or equipment within the ROFZ. Runway 10/28 shall not be closed at the same time as Runway 16/34.

**Work Area 3.** This work area includes construction north of the Runway 10/28 OFZ and approach surface and west of Taxiway A. Portions of Taxiway A will be closed when work is within the TOFA of Taxiway A. The edges of Apron A, B, C, D, and Division of Forestry will be closed 20-feet beyond the construction work area. Intermittent closures of Taxiway A, B, C, D, E, H, J, K, and L will be phased to maintain access between lease lots, aprons and runways. Work will be phased to minimize the number of areas closed at any given time. Access to all runways will be maintained at all times. Taxiway closures during the removal of Taxiway B and construction of Taxiway J will be scheduled such that lease lot users have access to Runway 10/28 at all times. Work in Work Area 3 is permitted from 6AM to 10PM, Monday through Saturday.

**Work Area 4.** This work area includes construction southeast of Runway 34. Work in Work Area 4 is permitted from 6AM to 10PM, Monday through Saturday. Additionally, Runway 16/34 will be closed when equipment may penetrate the approach surface as shown on Sheet S1.06. Closure of Runway 16/34 is permitted from 10PM to 6AM and will have a maximum duration of 14 nights. During closures, the runway will be marked closed with illuminated temporary closure markers (lighted X's) at each threshold. Runway 16/34 will not be closed at the same time as Runway 10/28.

### **Section 3. Areas and Operations Affected by the Construction Activity**

Construction will not impact approach visibility minimums, operating hours, Airport Reference Code (ARC) category, and Aircraft Rescue and Fire Fighting (ARFF) index. During work on the taxiway lighting, temporary electrical outages will be permitted for the runway and taxiway lighting circuits.

Runways, taxiways, and aprons will be closed at different times during construction. Runway closure markers and taxiway closure markers will be placed to prevent inadvertent access to the runway, taxiway, and apron construction areas.

Runway 16/34 will be temporarily closed while work is performed in Work Area 4 that may penetrate the approach surface as shown on the CSPP drawings. See Section 2 for more information.

Runway 10/28 will be temporarily closed while work is performed in Work Area 2 as shown on the CSPP drawings. See Section 2 for more information.

The Contractor will ensure that no construction operations or electrical outages affect the FAA AWOS equipment. No temporary electrical outage will be allowed to the runway lighting circuits, except those related to the closure of runways

### **Section 4. Protection of NAVAIDs**

There are no NAVAIDs on at PAQ.

### **Section 5. Contractor Access**

This CSPP details those areas to which the Contractor must have access, and how Contractor personnel will access those project work areas. These points of access, along with access routes, will be subject to

change as construction of this project progresses. The Engineer will communicate these changes at construction coordination meetings when required.

The Contractor will coordinate with the Engineer regarding all events affecting the airfield lighting circuits at least 24 hours in advance. The Engineer will coordinate access to the electric equipment enclosure through the Airport Manager to facilitate “tagging out” of portions of the airfield lighting system as necessary.

Waste disposal areas at the airport are shown on the plans. All excess material will be removed by the Contractor and disposed of off airport property unless otherwise directed by the Engineer.

### **5.1 Location of Stockpiled Construction Materials**

The 22,000 square foot Contractor staging area is located off of Cope Industrial Way as indicated on the plans. This site is used by the City of Palmer for snow storage. The Airport Manager will assign an alternative staging area that is located on the airport in the event that a substantial amount of snow remains on this site at the start of construction. Stockpile areas will be limited to the identified stockpile and staging areas. Stockpiles may not be placed within the taxiway or runway object free areas (OFA) at any time. Staged materials and equipment will not exceed 25 feet in height. See Section 16 regarding hazard marking for the staging area. See Section 6 regarding provisions preventing stockpile material from becoming wildlife attractants. See Section 7 regarding provisions preventing staged material from becoming Foreign Object Debris (FOD).

### **5.2 Vehicle and Pedestrian Operations**

Contractor vehicle and personnel access routes for construction must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the Aircraft Operations Area (AOA). The AOA includes the portion of airport that encompasses the landing, take off, taxiing, and parking areas for aircraft. The Airport Manager and Engineer will coordinate requirements for vehicle operations with the Contractor.

All construction vehicles and personnel will be restricted to the immediate work areas. These areas include the haul routes into the work area, designated construction staging area, and the work area currently under construction.

Haul routes used by the Contractor must be clearly marked to prevent inadvertent entry to areas open to airport operations, this includes using flaggers when the haul route crosses the Runway 10 approach surface. Construction traffic must remain on these clearly designated routes and never stray from the approved paths. Improvement and maintenance of the haul routes is the responsibility of the Contractor. The Contractor will provide a proposed haul route plan as part of the SPCD for approval by the Engineer. The Contractor will restore roads and haul routes to original or better condition upon completion of work.

Aircraft will have right-of-way over construction equipment at all times.

All vehicles operating on airport property must be marked with a flashing yellow light and an orange and white checkered flag. Lights and flags must be maintained to meet standards and be in good working

condition at all times. Lights must be located on the uppermost part of the vehicle structure, be visible from any direction, and flash 75 +/- 15 flashes per minute. Flags will be 3' x 3' with alternating 1' x 1' international orange and white squares. In the event that flags become faded, they will be replaced immediately by the Contractor. See the current version of AC 150/5210-5 *Painting, Marking, and Lighting of Vehicles Used on an Airport* for more information.

The Contractor must perform all service on construction vehicles and equipment offsite or within the limits of the staging area. Parked construction vehicles and equipment must be outside the AOA.

In addition to these provisions, the following provisions from Palmer Municipal Code Title 7 also apply:

- No person shall operate a motor vehicle of any kind on the airport in a reckless manner or in excess of the speed limits prescribed by posted signs. In the absence of a posted sign, the speed limit shall be 15 miles per hour in all apron, aircraft parking, and hangar areas, and 25 miles per hour in all other portions of the airport.
- The driver of any vehicle operated in the field area must at all times comply with the lawful orders, signals, and directives of the Airport Manager or a police officer.
- The existence of emergency conditions on the field area will not suspend or cancel any existing regulations. During an emergency in the field area, no motor vehicle shall be moved in any direction unless it is an emergency response vehicle.
- No vehicle shall be operated on the airport if, in the judgment of the Airport Manager, it is so constructed, equipped, or loaded as to endanger persons or property.

### **5.3 Two-Way Radio Communications**

The Contractor's foreman will be present at all times that personnel and equipment are working on the project. The foreman and flaggers (when used) are required to monitor CTAF 123.6 at all times to be aware of incoming aircraft and aircraft preparing to take off. The Contractor's foreman and flaggers will not communicate with construction crew on the CTAF frequency. The Contractor will provide a list of crew foremen and flaggers to the Airport Manager. The Airport Manager will provide training on acceptable radio protocol. If radio communication is disabled, the Contractor will vacate the AOA and contact the Airport Manager immediately for further instructions.

### **5.4 Airport Security**

There is no formal airport security system at this airport. Construction vehicles and personnel should be clearly identifiable to avoid any misconceptions about their reason for being within the AOA. Contractor access to the airport is limited to the entrances indicated on the plans.

## **Section 6. Wildlife Management**

Contractor must control and continuously remove waste or loose materials that have the potential to attract wildlife. These items include, but are not limited to:

- Trash – Food scraps from construction personnel must be collected and removed on a daily basis.
- Standing water – Water will not be allowed to collect/pool for more than a 24-hour period.
- Tall grass and seeds – Areas on the airport are hayed twice each summer.
- Poorly maintained fencing and gates.
- Disruption of existing wildlife habitat

Any sighting of wildlife such as moose within in the AOA will be reported immediately by the Contractor to the Engineer who will notify airport operations.

## **Section 7. Foreign Object Debris (FOD) Management**

Special care and measures will be taken to prevent FOD when working in an airport environment. The Contractor will be held responsible for implementing an approved FOD Management Plan as a part of the SPCD. The FOD Management Plan will have procedures for prevention, regular cleanup, and containment of construction material and debris. The Contractor will ensure all vehicles related to the construction project in the AOA will be free of any debris that could create a FOD hazard. All open taxiways, aprons, or runways must be clean. Waste containers with attached lids are required on construction sites. Special attention should be given to securing lightweight construction material. Runways, taxiways, and portions of aprons that have been closed for construction activities will be swept clean of all FOD and approved by Engineer prior to opening the surface to aircraft traffic. Contractors must provide their own equipment for vehicle and equipment washing and clean up.

## **Section 8. Hazardous Materials (HAZMAT) Management**

Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel, hydraulic fluid, or other chemical fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. The Contractor will develop and implement spill prevention and response procedures for vehicle operations. The Contractor will incorporate these procedures into the SPCD. This includes maintenance of appropriate Safety Data Sheets (SDS) data and appropriate prevention and response equipment on-site.

The Contractor will develop a Hazardous Materials Control Plan (HMCP), and a Spill Prevention, Control and Countermeasure (SPCC) plan in accordance with Section P-641 of the construction specifications.

## **Section 9. Notification of Construction Activities**

### **9.1 Responsible Representatives / Points of Contact**

The below contacts will be the points of contact throughout construction activities. In the event that a contact is to be revised during construction, the Engineer will be responsible for notification.

<b>Name</b>	<b>Title</b>	<b>Telephone Number</b>
Palmer Fire & Rescue		(907) 745-3854
Palmer Police Department		(907) 745-4811
National Poison Control Hotline		(800) 222-1222
	Airport Manager	(907) 761-1334
Jude Bilafer	Public Works Director	(907) 745-3400
HDL Engineering Consultants LLC	Engineer	(907) 746-5230

The Contractor will designate a Superintendent or foreman of the company to act as Safety Manager for this project. The Safety Manager will have full authority to direct all the Contractor's activities, including stopping work, to ensure a safe worksite. The Safety Manager will be involved with all phases of construction including preconstruction conference, training of personnel, weekly meetings, daily



construction status reports, and final inspections. The Safety Manager will have an understanding of airport airspace and the local traffic control procedures. The Safety Manager will be available 24 hours a day during the construction phase to respond to all safety needs. The following information will be provided:

Safety Manager's Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Residence Address: \_\_\_\_\_  
Day Telephone: \_\_\_\_\_  
Day Fax: \_\_\_\_\_  
Evening Telephone: \_\_\_\_\_  
Backup Contact's Name \_\_\_\_\_  
Backup Contact's Telephone: \_\_\_\_\_

The Contractor will provide, as a backup point of contact, one additional person and phone numbers where they can be reached by the Engineer at any time, day or night. The listed person will have access to and be capable of installing new batteries, flashers, cones, or other items required to keep the airport marking system operational.

## **9.2 Operational Safety Emergencies**

In the event of an occurrence that might adversely affect the operational safety of the airport, such as interrupted NAVAID service, the Contractor will contact the Engineer, who will advise appropriate action and notify the Airport Manager to issue a NOTAM.

In the event of an aircraft emergency, severe weather conditions, or any issue as determined by the Airport that may affect aircraft operations, the Contractor's personnel and/or equipment may be required to immediately vacate the area(s) affected. Points of contact for the various parties involved with the project will be identified and shared at the pre-construction conference. Specific emergency notification procedures will be incorporated into the Contractor's SPCD.

## **9.3 Notices to Airmen (NOTAMs)**

The Airport Manager, or his designated representative, is the operating authority of the airport and has the sole authority to close a runway or the airport to aircraft operations until, in the opinion of the Airport Manager, the safety hazards no longer exists. The Airport Manager, or his designated representative, has the sole authority to file NOTAMs with the FAA.

The Airport Manager, or his designated representative, will issue any required NOTAMs for the airport. The Contractor will coordinate the duration, requirements, and cancellations of NOTAMs with the Engineer.

## **9.4 Emergency Notification Procedures**

In the event of an emergency, the Contractor will notify the Airport Manager and Engineer. If necessary, the Contractor will contact emergency services by calling 911.

In the event the airport needs to contact the Contractor, the contact information provided by Contractor in 9.1 will be used.

#### **9.5 Notification to the FAA**

Contractor will provide the following notifications to the FAA through the Engineer at least 45 days prior to the start of construction.

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. This notification can be made electronically at: <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>, or by submitting FAA Form 7460-1, Notice of Proposed Construction or Alteration to the Alaskan Region FAA, Airports Division, 222 West 7th Ave, #14, Anchorage, AK 99513-7587.

The weather reporting system located at the airport is owned by FAA. Notify Turnagain System Support Center (SSC) manager and coordinator a minimum of 45 days prior to construction. Points of contact are:

SSC Manager, at 907-271-2216 (office) or 907-250-8629 (cell);

SSC Coordinator at, 907-271-6785 (office).

### **Section 10. Inspection Requirements**

#### **10.1 Daily (Or More Frequent) Inspections**

The Contractor's Safety Manager will inspect daily, or more frequently if necessary, all areas of construction to ensure conformance with this document. The daily safety inspection checklist provided in the current version of AC 150/5370-2 will be used and completed by the Contractor's Safety Manager. Records of inspection will be maintained by the contractor and made available to the Engineer or Airport Manager upon request. The Contractor will immediately remedy any deficiencies identified.

#### **10.2 Final Inspections**

Final inspections will be conducted after construction is complete. The daily safety inspection checklist provided in the current version of AC 150/5370-2 will be completed by the Contractor to the Airport's satisfaction.

### **Section 11. Underground Utilities**

Special attention will be given to preventing unscheduled interruption of utility services and facilities. Where required due to construction purposes, the FAA and the City of Palmer will locate their respective underground cables. All requests for locates shall be coordinated through the Engineer with no less than 24 hours notice. The Contractor will locate and/or arrange for the location of all the underground utilities. The Contractor will be responsible for the protection of all existing utilities, cables, wires, pipelines, and other underground facilities throughout project construction. When an underground cable or utility is damaged due to the Contractor's negligence, the Contractor will immediately notify the Engineer and repair the cable at his/her own expense. The Contractor will coordinate with the City of Palmer and the

Engineer to verify the location of known airport power and control cables prior to the commencement of construction activities.

The City of Palmer recommends that utility locates are coordinated, through the Engineer, to the City of Palmer Public Works department at 907-745-3400, the Alaska Dig Line at 907-278-3121, and FAA, prior to commencing construction. Note that it is possible that neither can locate underground utilities that are airport specific such as runway lighting circuits.

## **Section 12. Penalties**

The Contractor will be responsible for payment of any fines assessed to the City of Palmer due to the Contractor's violation of FAA operation, safety, or security requirements. Failure on the part of the Contractor to adhere to prescribed requirements may have consequences that jeopardize the health, safety, or lives of community members. The City of Palmer may issue warnings on the first offense based upon the circumstances of the incident. Individuals involved in non-compliance violations may be prohibited from working at the airport, pending an investigation of the matter. Penalties for violations related to airport safety and security procedures will be established by the City of Palmer. Suspension of Work or misdemeanor citation may be issued on a first offense. When construction operations are suspended, activity will not resume until all deficiencies are rectified.

## **Section 13. Special Conditions**

In the event of an emergency, Contractor personnel and/or equipment may be required to immediately vacate the work area. The Contractor will receive notification from the Engineer and/or Airport Operations when a special condition requires vacation of the work area as applicable. In any event, construction personnel must be aware at all times and give right of way as required to any emergency vehicles moving toward work areas with emergency lights displayed during construction as this generally will indicate an emergency situation is imminent. See Section 9 for notification information.

Alaska Department of Natural Resources, Forestry Division provides fixed wing wildfire response from the airport for South Central Alaska. In the event of a significant wildfire response operating at the airport, the Contractor will be directed to vacate their work areas and open any closed runways or taxiways as required for the safety and expediency of wildfire response operations.

There is occasional Life Flight air traffic for emergency medical evacuation. In the event of a medical emergency evacuation, the Contractor will be directed to vacate their work areas and open any closed runways or taxiways as required for the safety and expediency of the medical emergency evacuation.

## **Section 14. Runway and Taxiway Lighting and Signs**

### **14.1 General**

During construction, partial electrical outages are necessary to ensure runway lighting is off when runways are closed. These outages will not affect the FAA AWOS systems. Taxiway lighting will be affected during installation and removal of lighting for the new taxiway configurations. Outside of these occurrences, there will be no disturbances to the visual aids. Upon completion of the temporary closures, the Contractor will ensure that airfield lighting and visual aids are fully operational. All temporary markers,

lighting, signs, and visual NAVAIDs must be clearly visible and secured in place to prevent movement and constructed of materials that would minimize damage to an aircraft in the event of inadvertent contact. Items used to secure markings must be of a color similar to the marking.

#### **14.2 Markings**

Taxiway markings will be applied for the new taxiway configurations. Temporary markings will be applied prior to opening taxiways to aircraft operations. The airfield compass rose will also be relocated on the Large Aircraft Apron. Pavement markings will conform to the current version of AC 150/5340-1 *Standards for Airport Markings*.

#### **14.3 Lighting and Visual Aids**

The City of Palmer owns the visual aids at PAQ, including PAPI's and REIL's. Prior to construction, the Contractor, Airport Manager, and Engineer will inspect the existing lighting and visual aid systems to document their original state. The Airport Manager or the Engineer will issue a NOTAM to communicate all outages to airport users. During the temporary electrical outage, the City of Palmer Public Works or its designee will disconnect the lighting circuits or secure switches to prevent inadvertent activation of the affected circuits. See the electrical drawings for disconnecting and reconnecting portions of lighting circuits. The Contractor will comply with the current versions of AC 150/5340-30 *Design and Installation Details for Airport Visual Aids* and AC 150/5345-44 *Specification for Runway and Taxiway Signs*. Upon completion of the temporary outage, the Contractor will ensure that the lighting and visual aid systems are operational. Construction will have no effect on FAA AWOS systems. Only the runway and taxiway lighting circuits will be impacted by construction.

### **Section 15. Marking and Signs for Access Routes**

Markings and signs for construction personnel will conform to the current version of AC 150/5340-18 *Standards for Airport Sign Systems* and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD). Markings and signs within the AOA must not exceed 3 inches in height above existing grade or they must meet the frangibility requirements in the current version of AC 150/5220-23 *Frangible Connections*.

### **Section 16. Hazard Marking and Lighting**

Temporary edge markers consisting of weighted cones with reflective tape will be used to delineate the limits of construction on the apron and taxiways as shown on the plans. Low profile barricades with flashers will be used to prevent entry onto closed taxiways. Lighted runway closure markers will be placed at both ends of the closed runway. All other closure delineations will be clearly marked using temporary edge markers. Low profile barricades and temporary edge markers will be marked with steady burning or flashing red lights outside daylight hours.

### **Section 17. Work Zone Lighting for Nighttime Construction**

Lighting equipment must adequately illuminate the work area when construction is performed during nighttime hours. Refer to the current version of AC 150/5370-10 *Standard Specifications for Construction of Airports* for minimum illumination levels during night work. 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. Light towers should be positioned and adjusted to aim away from active runways to prevent blinding effects. Shielding may be necessary. Light towers should be removed from the construction site prior to the area being reopened to aircraft operations.

## Section 18. Protection of Runway and Taxiway Safety Areas

Table 1 provides taxiway and runway dimensional information.

**Table 1: Runway and Taxiway Data Table**

Item	Pavement Width	Safety Area Width*	Obstacle Free Zone Width*	Object Free Area Width*
Runway 10/28	75'	150'	250'	500'
Taxiway B	40'	79'	-	124'
Taxiway H, J, L	35'	79'	-	124'
Taxiway N	50'	118'	-	171'
Runway 16/34	100'	300'	400'	**
Taxiway A	50'	118'	-	171'
Taxiway C,D,E, G	60'	118'	-	171'

\* Dimensions are centered on the runway or taxiway centerline.

\*\* 400' west of the Runway 16/34 centerline and matching the perimeter fence east of Runway 16/34.

### 18.1 Runway Safety Area (RSA)

Work will only occur inside of the RSA when the runway has been closed by issuance of a NOTAM and marked in accordance with Section 16 above. Follow the runway and taxiway status change procedures shown on the plans for closure of a runway. The Contractor may only stage materials immediately worked on inside the safety area. All work in the safety area will be coordinated with the Engineer not less than 48 hours prior to start of work to ensure proper issuance of a NOTAM as described in Section 9.3.

Construction activities within the existing RSA are subject to the following conditions:

- Open trenches or excavations are not permitted within the RSA while the runway is open. If possible, back-fill trenches before the runway is opened. If the runway must be opened before excavations are backfilled, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft.
- Soil erosion must be controlled to maintain RSA standards. The RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and passage of aircraft without causing structural damage to the aircraft.

### 18.2 Runway Object Free Area (ROFA)

The ROFA will be maintained for this project. Materials and equipment will not be stored within the ROFA unless they are actively being used for construction.

### 18.3 Taxiway Safety Area (TSA)

No work will occur inside the TSA except when the taxiway has been closed by issuance of a NOTAM and marked in accordance with Section 16 above. Follow the runway and taxiway status change procedures shown on the plans for closure of a taxiway. The Contractor may only stage materials immediately worked on inside the TSA. All work in the TSA will be coordinated with the Engineer no less than 48 hours prior to start of work to ensure proper issuance of a NOTAM as described in Section 9.3.

### 18.4 Taxiway Object Free Area (TOFA)

The TOFA will be maintained for this project. No work will occur inside the TOFA except when the taxiway has been closed by issuance of a NOTAM and marked in accordance with Section 16 above. Follow the runway and taxiway status change procedures shown on the plans for closure of a taxiway. Materials and equipment will not be stored within the TOFA unless they are actively being used for construction.

### 18.5 Obstacle Free Zone (OFZ)

No work will occur inside the OFZ except when the runway or taxiway has been closed by issuance of a NOTAM and marked in accordance with Section 16 above. Follow the runway and taxiway status change procedures shown on the plans for closure of a runway or taxiway.

### 18.6 Runway Approach/Departure Surfaces

No work will occur inside of the runway approach and departure surfaces except when the runway has been closed by issuance of a NOTAM and marked in accordance with Section 16 above. Follow the runway and taxiway status change procedures shown on the plans for closure of a runway. An airport flagger will be used when vehicles using a haul route will penetrate the approach or a departure surface of an active runway. See the plans for additional details on height restrictions and haul routes.

**Table 2: Runway Approach/Departure Surfaces**

Work Area	Runway	Approach Surface	Departure Surface
2	10/28	34:1	N/A
4	16/34	20:1	40:1

## Section 19. Other Limitations on Construction

No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment. It is the Contractor's responsibility to seek 7460-1 determinations from FAA. No use of open flame welding torches unless fire safety precautions are provided and the airport operator has approved their use. No use of electrical blasting caps or explosives of any kind on or within 1,000 feet of the airport property. No use of flare pots within the AOA.

**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**III**

**SUBMITTAL LIST**





# CITY OF PALMER

## CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, & CONSTRUCT APRON E

### SUBMITTAL LIST

Job #: \_\_\_\_\_

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

Submittal Number	Rev.	Description
1		DOL Notice of Public Work
2		Proposed Disposal Sites
3		List of Construction Equipment
4		Construction Schedule and updates
5		Safety Plan Compliance Document
6		List of Substitutions
7		Application for Payment – Progress and Final
8		Bi-weekly Certified Payroll
9		DBE Documentation
10		Traffic Control Plans
11		Record Drawings
12		DOL Notice of Completion of Public Work
13		Release of Liens, Statement Concerning Claims
14		Certificate of Compliance (Section 10.07, Article 7.7)
15		Consent of Surety to Final Payment
16		Debarment and Suspension Certification
17		Prohibition of Segregated Facilities Certification
18		Trade Restrictions Certification
19		Buy American Certification
20		Tax Delinquency and Felony Conviction Certification
21		Material, testing, and other submittals as required by the technical specifications
22		
23		
24		

NOTE: The above list of submittals is not all inclusive. In addition to the above, the Contractor is required to comply with all submittal requirements as required or identified in the plans, specifications, CPSS, or as directed by the Engineer.



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**IV**

**TEMPORARY CONSTRUCTION PERMITS AND EASEMENTS**

**(NOT USED)**



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**V**

**DBE REQUIREMENTS**



# DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM REQUIREMENTS

## 1.1 DESCRIPTION

- A. The work consists of providing Disadvantaged Business Enterprises (DBEs), as defined in Title 49, CFR (Code of Federal Regulations), Part 26, with the opportunity to participate on an equitable basis with other contractors in the performance of contracts financed in whole, or in part, with funding through the United States Department of Transportation (USDOT). This project is funded wholly or in part with financial assistance from USDOT through the Federal Aviation Administration. The Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in accordance with the City's DBE Plan in the award and administration of USDOT-assisted contracts.

## 1.2 INTERPRETATION

- A. It is the intent of this section to implement the requirements of 49 CFR, Part 26, and the City's federally-approved DBE Program.

## 1.3 ESSENTIAL CONTRACT PROVISION

- A. Failure to comply with the provisions of this section will be considered a material breach of contract, which may result in the termination of this contract or such other remedy as the City deems appropriate. The City also considers failure to comply with this section to be so serious as to justify debarment action as provided in AS 36.30.640(4).

## 1.4 DEFINITIONS AND TERMS. The following definitions will apply.

- A. **Broker.** A DBE certified by the Unified Certification Program (UCP) administered by the State of Alaska (State) that arranges for the delivery or provision of creditable materials, supplies, equipment, transportation/hauling, insurance, bonding, etc., within its certified category, that is necessary for the completion of the project. A broker of materials certified in a supply category must be responsible for scheduling the delivery of materials and fully responsible for ensuring that the materials meet specifications before credit will be given.
- B. **Commercially Useful Function (CUF).** The execution of the work of the Contract by a DBE carrying out its responsibilities by actually performing, managing, and supervising the work involved using its own employees and equipment. The DBE shall be responsible, with respect to materials and supplies used on the Contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, an evaluation of the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work. Other relevant factors will be considered. The determination of CUF is made by the Engineer after evaluating the way in which the work was performed during the execution of the Contract.
- C. **Disadvantaged Business Enterprise (DBE).** An enterprise which is a for-profit small business concern:

- (1) that is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals;
  - (2) whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it; and
  - (3) has been certified by the State in accordance with 49 CFR, Part 26.
- D. DBE Key Employee. Permanent employees identified by the DBE owner in its certification file in the State's Civil Rights Office (CRO).
- E. DBE Utilization Goal. The percent of work to be performed by certified DBEs that is established by the City and specified in the Contract.
- F. Good Faith Efforts. Efforts by the bidder or Contractor to achieve a DBE goal or other requirement of 49 CFR Part 26, by their scope, intensity, and appropriateness to the objective, that can reasonably be expected to fulfill the program requirement.
- G. Manufacturer. A DBE certified by the State in a supply category that changes the shape, form, or composition of original material in some way and then provides that altered material to the project and to the general public or the construction industry at large on a regular basis.
- H. Notification. For purposes of soliciting DBE participation on a project and to count toward a contractor's Good Faith Efforts, notification shall be by letter, email, or fax transmission, with a return receipt requested, return email confirming receipt, or successful transmission report, respectively. Telephonic contact with a DBE may be allowed, however it shall be based on the ability of the Owner to independently verify this contact.
- I. Regular Dealer. A DBE certified by the State in a supply category that
- (1) maintains an in-house inventory on a regular basis of the particular product provided to this project; and
  - (2) keeps an inventory in an amount appropriate for the type of work using that product; and
  - (3) offers that inventory for sale to the general public or construction industry at large (private and public sectors), not just supplied as needed on a project by project basis during the construction season, except where the product requires special or heavy equipment for delivery and the DBE possesses and operates this equipment on a regular basis throughout the construction season in order to deliver the product to the general public or construction industry at large. If the distribution equipment is rented or leased, it must be on a repetitive, seasonal basis; and may additionally
  - (4) fabricate (assembles large components) for use on a construction project, consistent with standard industry practice, for delivery to the project.

## 2.1 UTILIZATION GOAL



- A. **The DBE Utilization Goal for this contract is shown in Division 10, Article 2.5 as modified by the Special Provisions as a percentage of the total basic bid amount.** A DBE may be considered creditable towards meeting the DBE Utilization Goal at time of Contract award, if the DBE is certified by the State in a category covering the CUF to be performed at the time of listing on the DBE Utilization Report Form.
- B. If a goal has been established, a bidder shall demonstrate the ability to meet the DBE Utilization Goal or perform and document all of the required Good Faith Efforts under Subsection 3.2 in order to be eligible for award of this Contract.
- C. If a goal has been established, and the quantity of work of a bid item involving a DBE firm is reduced by the City, the DBE Utilization Goal will be reduced proportionately.

### 3.1 DETERMINATION OF COMPLIANCE

- A. Phase I - Bid. Each bidder must register with the State annually in accordance with §§26.11 & 26.53(b)(2)(iv) of 49 CFR, Part 26. No contract may be awarded to a bidder that has not registered.
- B. Phase II - Award. If a goal has been established, the apparent low bidder will provide the following within 5 days of receipt of being notified that they are the apparently successful bidder, but before the contract is executed:
  - (1) Written DBE Commitment. Written commitments from DBEs to be used on the project. Written commitments shall provided on the Letter of Intent form and contain the following information:
    - 1. The name and address of each DBE firm that will participate.
    - 2. A description of the work that each DBE will perform (to be count toward meeting a goal, each DBE firm must be certified in a NAICS code applicable to the kind of work the firm would perform on the contract);
    - 3. The dollar amount of participation of each DBE firm participating;
    - 4. Written and signed documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet a contract goal; and
    - 5. Written and signed confirmation from each DBE that it is participating in the contract as provided in the prime Contractor's commitment.
  - (2) Good Faith Effort Documentation. Summary of Good Faith Effort Documentation with attachments, and DBE Contact Reports if he submits less DBE utilization than is required to meet the DBE Utilization Goal. If the contract goal is not met, Contractor shall submit evidence of good faith efforts. The documentation of good faith efforts much 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. If accepted by the City, this lower DBE utilization becomes the new DBE Utilization Goal. If the bidder cannot demonstrate the ability to meet the DBE Utilization Goal, and cannot document the minimum

required Good Faith Efforts (as outlined in Subsection 3.2 below), the City will determine the bidder to be not responsible.

C. Phase III - Construction.

- (1) Designation of DBE/EEO Officer. At the preconstruction conference, the Contractor shall submit, in writing, the designation of a DBE/EEO officer.
- (2) DBE Creditable Work. The CUF work items and creditable dollar amounts shown for a DBE on the DBE Utilization Report shall be included in any subcontract, purchase order or service agreement with that DBE.
- (3) DBE Replacement. If a goal has been established and a DBE replacement is approved by the Engineer, the Contractor shall replace the DBE with another DBE for the same work in order to fulfill its commitment under the DBE Utilization Goal. In the event that the Contractor cannot obtain replacement DBE participation, the Engineer may adjust the DBE Utilization Goal if, in the opinion of the Engineer and the City, both of the following criteria have been met:
  - a. The Contractor has not committed any discriminatory practice in its exercise of good business judgment to replace a DBE, and
  - b. If the Contractor is unable to find replacement DBE participation and has adequately performed and documented the Good Faith Effort expended in accordance with Subsection 3.2.
  - c. DBE Utilization Goal. The DBE Utilization Goal will be adjusted to reflect only that amount of the DBE's work that cannot be replaced.
- (4) DBE Participation Report. Submit a monthly summary of DBE Participation on a DBE Utilization Report. At contract closeout, submit a final DBE Utilization Report summarizing the entire contract DBE utilization.

### 3.2 GOOD FAITH EFFORT

- A. Good Faith Effort Criteria. If a goal has been established, the City will use the following criteria to judge if the bidder, who has not met the DBE Utilization Goal, has demonstrated sufficient Good Faith Effort to be eligible for award of the contract. Failure by the bidder to perform and document all of the following actions constitutes insufficient Good Faith Effort.
- (1) Consideration of all subcontractable items. The bidder shall, at a minimum and prior to bid opening, seek DBE participation for each of the subcontractable items for which DBE firms are registered on the State list. It is the bidder's responsibility to make the work listed on the Subcontractable Items list available to DBE firms to facilitate DBE participation.
  - (2) If the bidder cannot achieve the DBE Utilization Goal using the list of available DBE firms based on the Subcontractable Items list, then the bidder may consider other items that could be subcontracted to DBEs.

- (3) Notification to all active DBEs listed for a given region in the State's most current DBE Directory at least 7 calendar days prior to bid opening. The bidder must give the DBEs no less than five days to respond. The bidder may reject DBE quotes received after the deadline. Such a deadline for bid submission by DBEs will be consistently applied. DBEs certified to perform relevant work and who are on the State DBE register must be contacted to solicit their interest in participating in the execution of work with the Contractor. Each contact with a DBE firm will be logged on a Contact Report Form.
  - (4) Non-competitive DBE quotes may be rejected by the bidder. Allegations of non-competitive DBE quotes must be documented and verifiable. A DBE quote that is more than 10.0% higher than the accepted non-DBE quote will be deemed non-competitive, provided the DBE and non-DBE subcontractor quotes are for the exact same work or service. Bidders must have a non-DBE subcontractor quote for comparison purposes. Such evidence shall be provided in support of the bidder's allegation. Where the bidder rejects a DBE quote as being non-competitive under this condition, the work must be performed by the non-DBE subcontractor and payments received by the non-DBE subcontractor during the execution of the Contract shall be consistent with the non-DBE's accepted quote. This does not preclude increases as a result of Change documents issued by the City.
  - (5) Provision of assistance to DBEs who need help in obtaining information about bonding or insurance required by the bidder.
  - (6) Provision of assistance to DBEs who need help in obtaining information about securing equipment, supplies, materials, or related assistance or services.
  - (7) Providing prospective DBEs with adequate information about the requirements of the Contract regarding the specific item of work or service sought from the DBE.
  - (8) Follow-up of initial notifications by contacting DBEs to determine whether or not they will be bidding. Failure to submit a bid by the project bid opening or deadline by the bidder is de facto evidence of the DBE's lack of interest in bidding. Documentation of follow-up contacts shall be logged on the Contact Report.
  - (9) Items (3) through (8) will be utilized to evaluate any request from the Contractor for a reduction in the DBE Utilization Goal due to the default or decertification of a DBE and the Contractor's subsequent inability to obtain additional DBE participation.
- B. Administrative Reconsideration. Under the provisions of 49 CFR. Part 26.53(d), if it is determined that the apparent successful bidder has failed to meet the requirements of this subsection, the bidder must indicate whether they would like an opportunity for administrative reconsideration. Such an opportunity must be exercised by the bidder within 3 business days of notification it has failed to meet the requirements of this subsection. As part of this reconsideration, the bidder must provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so.

- (1) The decision on reconsideration will be made by the City Manager.
- (2) The bidder will have the opportunity to meet in person with the City Manager to discuss the issue of whether it met the goal or made adequate good faith efforts to do so. If a meeting is desired, the bidder must be ready, willing and able to meet with the City Manager within 4 days of notification that it has failed to meet the requirements of this subsection.
- (3) The City Manager will render a written decision on reconsideration and provide notification to the bidder. The written decision will explain the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so.
- (4) The result of the reconsideration process is not administratively appealable to USDOT.

### 3.3 TERMINATION OF DBE

- A. If a goal has been established, a DBE subcontractor listed for the project (or an approved substitute DBE firm) may not be terminated without prior written consent. This includes, but is not limited to, instances in which a 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.
- B. The City of Palmer will provide such written consent only if the City of Palmer 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 following circumstances:
  1. The listed DBE subcontractor fails or refuses to execute a written contract;
  2. The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
  3. The listed DBE subcontractor fails or refuses to meet the prime contractor's reasonable, non-discriminatory bond requirements;
  4. The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
  5. The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
  6. The City of Palmer has determined that the listed DBE subcontractor is not a responsible contractor;

7. The listed DBE subcontractor voluntarily withdraws from the project and provides to the City of Palmer written notice of its withdrawal;
  8. The listed DBE is ineligible to receive DBE credit for the type of work required;
  9. A DBE owner dies or becomes disabled with the result that the listed DBE contractor is unable to complete its work on the contract; or
  10. Other documented good cause that the City of Palmer has determined compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a DBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the DBE contractor was engaged or so that the prime contractor can substitute another DBE or non-DBE contractor after contract award.
- C. Before transmitting to the City of Palmer 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 City, of its intent to request to terminate and/or substitute, and the reason for the request.
- D. The prime contractor must give the DBE five (5) days to respond to the prime contractor's notice and advise the City of Palmer and the contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the City of Palmer should not approve the prime contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), the City of Palmer may provide a response period shorter than five (5) days.

### 3.4 DEFAULT OF DBE

- A. If a goal has been established, and in the event that a DBE firm under contract or to whom a purchase order or similar agreement has been issued defaults on their work for whatever reason, the Contractor shall immediately notify the Engineer of the default and the circumstances surrounding the default.
- B. The Contractor shall take immediate steps, without any order or direction from the Engineer, to retain the services of other DBEs to perform the defaulted work in at least the same amount of work under the contract as the DBE that defaulted, to the extent needed to meet the contract goal, if any, established for the contract.. In the event that the Contractor cannot obtain replacement DBE participation, the Engineer may adjust the DBE Utilization Goal if, in the opinion of the Engineer, the following criteria have been met:
- (1) The Contractor was not at fault or negligent in the default and that the circumstances surrounding the default were beyond the control of the Contractor; and
  - (2) The Contractor is unable to find replacement DBE participation at the same level of DBE commitment and has adequately performed and documented the Good Faith Effort expended in accordance with items (3) through (8) of Subsection 3.2 for the defaulted work; or

(3) It is too late in the project to provide any real subcontracting opportunities remaining for DBEs.

- C. If the City of Palmer requests documentation of Good Faith Efforts, the contractor shall submit the documentation within 7 days, which may be extended for an additional 7 days if necessary at the request of the contractor, and the City of Palmer shall provide a written determination to the contractor stating whether or not good faith efforts have been demonstrated.
- D. The DBE Utilization Goal will be adjusted to reflect only that amount of the defaulted DBE's work that cannot be replaced.

### 3.5 REQUIRED CONTRACT CLAUSES

- A. The following clause shall be placed into and is hereby incorporated into every contract and subcontract associated with the project:

The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of 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 City of Palmer 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.

- B. The following clause is hereby incorporated into the prime contract:

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than eight (8) working days from the receipt of each payment the prime contractor receives from the City of Palmer for the subcontractor's work. Additionally, if retainage is withheld from any subcontractor payments, the Contractor shall return the retainage within eight (8) working days after payment is received for the subcontractor's work that is satisfactorily completed. Failure of the Contractor to make payments within the timeframe specified above may cause the City of Palmer to withhold the amount due from the contractor's future progress payments, future requests for payment by the Contractor may be required to be accompanied by signed statements from all subcontractors stating they have been paid for satisfactory work previously performed, and the contractor may be deemed non-responsible. Any delay or postponement of payment from the above referenced timeframe may occur only for good cause following written approval of the City of Palmer. This clause applies to both DBE and non-DBE subcontractors.

### 4.1 METHOD OF MEASUREMENT

- A. The City of Palmer will count DBE participation toward overall and contract goals as provided in 49 CFR 26.55. Participation of a DBE subcontract toward a contractor's final compliance with its DBE obligations on a contract will not be counted until payment has actually been made to the DBE. Documentation of payment will be provided by contractors

on a DBE Utilization Report. When a DBE participates in a contract, only the value of the work actually performed by the DBE will count towards the DBE goal. Specifically:

1. Count the entire amount of the portion of a construction contract that is performed by the DBE's own forces. Include the cost of supplies and materials obtained by the DBE for the work of the contract, including supplies purchased or equipment leased by the DBE (except supplies and equipment the DBE subcontractor purchases or leases from the prime contractor or its affiliate).
2. Count the entire amount of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract toward the DBE goal, provided that the fee is reasonable and not excessive as compared with fees customarily allowed for similar services.
3. When a DBE subcontracts part of the work of its contract to another firm, the value of the subcontracted work may be counted toward the DBE goal only if the DBE's subcontractor is itself a DBE. Work that a DBE subcontracts to a non-DBE firm does not count toward a DBE goal.
4. When a DBE performs as a participant in a joint venture, count the portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the DBE performs with its own forces toward a DBE goal.
5. Count expenditures to a DBE contractor toward the DBE goal only if the DBE is performing a commercially useful function on the contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved.
6. Count materials or supplies obtained from a DBE manufacturer at 100% of the cost towards the DBE goal.
7. Count materials or supplies obtained from a DBE regular dealer at 60% of the cost towards the DBE goal.
8. With respect to materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site, towards the DBE goal, provided the fees are reasonable and not excessive as compared with fees customarily allowed for similar services. Do not count any portion of the cost of the materials and supplies themselves toward the DBE goal.
9. For trucking, the DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract. The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract. The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs. The DBE may lease trucks from another DBE firm,

including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract. The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement.

10. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE. For purposes of this, a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.
11. The DBE must perform work on the project in the category(s) of work for which certification is issued. While the DBE may perform work in other categories for which certification is not issued, only that work performed in the certified categories will count toward the DBE goal.
12. If a firm is not currently certified as a DBE in accordance with this regulation at the time of the execution of the bid opening or due date of the proposal, the firm's participation toward any goals will not count.

#### 5.1 BASIS OF PAYMENT

- A. Work under this item is subsidiary to other contract items and no payment will be made for meeting or exceeding the DBE Utilization Goal.
- B. If the Contractor fails to utilize the DBEs listed on his DBE Utilization Report or fails to submit required documentation to verify proof of payment or documentation requested by the City, the City will consider this to be unsatisfactory work. If the Contractor fails to utilize Good Faith Efforts to replace a DBE, regardless of fault, except for Subsection 3.4, paragraph B(3), the City will also consider this unsatisfactory work. Unsatisfactory work may result in disqualification of the Contractor from future bidding under Standard Specifications Division 10, Article 3.3 and withholding of progress payments consistent with Division 10, Article 7.5.



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**VI**

**MINIMUM RATES OF PAY**



# Laborers' & Mechanics' Minimum Rates of Pay

## State of Alaska Title 36 Wage Rates

State wage rates can be obtained at:

<http://www.labor.state.ak.us/lss/pamp600.htm>

Use the State wage rates that are in effect 10 days before Bid Opening. A paper copy of the state wage rates will be included in the executed Contract.

## Federal Davis-Bacon Wage Rates

Federal wage rates for the State of Alaska can be obtained at:

<http://www.wdol.gov/dba.aspx>

Use the federal wage rates that are in effect 10 days before Bid Opening. A paper copy of the federal wage rates will be included in the executed Contract.



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**VII**

**CONTRACT**



CITY OF PALMER

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE,  
& CONSTRUCT APRON E**

CONSTRUCTION CONTRACT

THIS CONTRACT, between the **City of Palmer**, herein called the **Owner**, and:

\_\_\_\_\_, an Individual, Partnership, Joint Venture, Sole Proprietorship, Corporation, incorporated under the laws of the State of Alaska, its successors and assigns, hereinafter called the Contractor, is effective the date of the signature of the Owner on this document.

WITNESSETH: That the Contractor, for and in consideration of the payment or payments herein specified and agreed to by the City, hereby covenants and agrees to furnish and deliver all materials and to do and perform all the work and labor required in the construction of the **Construct Taxiway N, Improve Drainage Improvements, & Construct Apron E** project at the prices bid by the Contractor for the respective estimated quantities aggregating approximately the sum of:

\_\_\_\_\_ Dollars (\$\_\_\_\_\_), and such other items as are mentioned in the original Proposal, which Proposal and prices named, together with the Contract Documents, and City of Palmer Standard Specifications, dated **2018** are made a part of this Contract and accepted as such, the project being situated as follows:

**Warren “Bud” Woods Palmer Municipal Airport located in Palmer, Alaska.**

It is distinctly understood and agreed that no claim for additional work or materials, done or furnished by the Contractor and not specifically herein provided for, will be allowed by the Owner, nor shall the Contractor do any work or furnish any material not covered by this Contract, unless such work is ordered in writing by the Owner. In no event shall the Owner be liable for any materials furnished or used, or for any work or labor done, unless the materials, work or labor are required by the Contract or on written order furnished by the Owner. Any such work or materials which may be done or furnished by the Contractor without written order first being given shall be at the Contractor's own risk, cost and expense and the Contractor hereby covenants and agrees to make no claim for compensation for work or materials done or furnished without such written order.

The Contractor further covenants and agrees that all materials shall be furnished and delivered and all labor shall be done and performed, in every respect, to the satisfaction of the Owner, on or before: **June 30, 2024**. It is expressly understood and agreed that in case of the failure on the part of the Contractor, for any reason, except with the written consent of the Owner, to complete the furnishing and delivery of materials and the doing and performance of the work before the aforesaid date, the Owner shall have the right to deduct from any money due or which may become due the Contractor, or if no money shall be due, the Owner shall have the right to recover

\_\_\_\_\_dollars  
(\$\_\_\_\_\_) per day for each calendar day elapsing between the time stipulated for the completion and the actual date of completion in accordance with the terms hereof; such deduction to be made, or sum to be recovered, not as a penalty but as liquidated damages.

The bonds given by the Contractor in the sum of \$\_\_\_\_\_ Payment Bond, and \$\_\_\_\_\_ Performance Bond, to secure the proper compliance with the terms and provisions of this contract, are submitted herewith and made a part hereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contract and hereby agree to its terms and conditions

**CONTRACTOR**

\_\_\_\_\_  
Name of Contractor

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

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

(Corporate Seal)

**CITY OF PALMER**

\_\_\_\_\_  
CITY MANAGER (Signature)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Typed Name



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**VIII**

**CONTRACT PERFORMANCE AND PAYMENT BOND**





## INSTRUCTIONS

1. This form, shall be used whenever a performance bond is required. There shall be no deviation from this form without approval from the Owner.
2. The full legal name and business address of the Principal and Surety shall be inserted on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety, the amount of obligation shall be entered in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Owner.
5. The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g. an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.

CITY OF PALMER

CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, & CONSTRUCT APRON E

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That \_\_\_\_\_ of \_\_\_\_\_, \_\_\_\_\_ as Principal, and \_\_\_\_\_ of \_\_\_\_\_, \_\_\_\_\_ as Surety, firmly bound and held unto the City of Palmer in the penal sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), good and lawful money of the United States of America for the payment whereof, well and truly to be paid to the City of Palmer, we bind ourselves, our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has entered into written contract with said City of Palmer, on the \_\_\_\_\_ of \_\_\_\_\_ A.D. 20\_\_\_\_, for construction of: Construct Taxiway N, Improve Airport Drainage, & Construct Apron E said work to be done according to the terms of said contract.

Now, THEREFORE, the conditions of the foregoing obligations is such that if the said Principal shall comply with all requirements of law and pay, as they become due, all just claims for labor performed and materials and supplies furnished upon or for the work under said contract, whether said labor be performed and said materials and supplies be furnished under the original contract, any subcontract, or any and all duly authorized modifications thereto, then these presents shall become null and void; otherwise they shall remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals at \_\_\_\_\_, \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_ A.D., 20\_\_\_\_.

Principal:

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

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

Surety:

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

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

The offered bond has been checked for adequacy under the applicable statutes and regulations:

Authorized Representative – City of Palmer Date

## INSTRUCTIONS

1. This form, for the protection of persons supplying labor and material, shall be used whenever a payment bond is required. There shall be no deviation from this form without approval from the Owner.
2. The full legal name and business address of the Principal and Surety shall be inserted on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety, the amount of obligation shall be entered in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Owner.
5. The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g. an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.

**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**IX**

**CERTIFICATE OF INSURANCE**

**(submit original certificate)**





**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**X**

**BID BOND**



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE,  
& CONSTRUCT APRON E**

**BID BOND**  
(See Instructions on Reverse)

				DATE BOND EXECUTED
PRINCIPAL (Legal name and business address)			TYPE OF ORGANIZATION	
			<input type="radio"/> INDIVIDUAL <input type="radio"/> PARTNERSHIP <input type="radio"/> JOINT VENTURE <input type="radio"/> CORPORATION	
			STATE OF INCORPORATION	
SURETY(IES) (Name and Business Address)				
A.		B.		C.
PENAL SUM OF BOND			DATE OF BID	
<p>We, the PRINCIPAL and SURETY above named, are held and firmly bound to the City of Palmer, in the penal sum of the amount stated above, for the payment of which sum will be made, we bind ourselves and our legal representatives and successors, jointly and severally, by this instrument.</p> <p>THE CONDITION OF THE FOREGOING OBLIGATION is that the Principal has submitted the accompanying bid or proposal in writing, date as shown above, on <b>PROJECT: <u>Construct Taxiway N, Improve Airport Drainage, &amp; Construct Apron E</u></b> in accordance with contract documents filled in the office of the Contracting Officer, and under the Invitation for Bids therefore, and is required to furnish a bond in the amount stated above.</p> <p>If the Principal's bid is accepted and he is offered the proposed contract for award, and if Principal fails to enter into the contract, then the obligation to the City created by this bond shall be in full force and effect.</p> <p>If the Principal enters into the contract, then the foregoing obligation is null and void.</p>				
PRINCIPAL				
Signature(s)	1.	2.	3.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	3.	
CORPORATE SURETY(IES)				
S U R E T Y  A	Name of Corporation		State of Incorporation	Liability Limit \$
	Signature(s)	1.	2.	Corporate Seal
	Name(s) & Titles (Typed)	1.	2.	

CORPORATE SURETY(IES) (Continued)				
S U R E T Y  B	Name of Corporation		State of Incorporation	Liability Limit \$
	Signature(s)	1.	2.	Corporate Seal
	Name(s) & Titles (Typed)	1.	2.	
CORPORATE SURETY(IES) (Continued)				
S U R E T Y  C	Name of Corporation		State of Incorporation	Liability Limit \$
	Signature(s)	1.	2.	Corporate Seal
	Name(s) & Titles (Typed)	1.	2.	

### INSTRUCTIONS

1. This form shall be used whenever a bid bond is submitted.
2. Insert the full legal name and business address of the Principal in the space designated. If the Principal is a partnership or joint venture, the names of all principal parties must be included (e.g. "Smith Construction, Inc. and Jones Contracting, Inc. DBA Smith/Jones Builders, a joint venture"). If the Principal is a corporation, the name of the state in which incorporated shall be inserted in the space provided.
3. Insert the full legal name and business address of the Surety in the space designated. The Surety on the bond may be any corporation or partnership authorized to do business in Alaska as an insurer under AS.21.09. Individual sureties will not be accepted.
4. The penal amount of the bond may be shown either as an amount (in words and figures) or as a percent of the contract bid price (a not-to-exceed amount may be included).
5. The scheduled bid opening date shall be entered in the space marked Date of Bid.
6. The bond shall be executed by authorized representatives of the Principal and Surety. Corporations executing the bond shall also affix their corporate seal.
7. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.
8. The states of incorporation and the limits of liability of each surety shall be indicated in the spaces provided.
9. The date that bond is executed must not be later than the bid opening date.

**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**XI**

**BIDDER'S CHECKLIST**



**BIDDER'S CHECKLIST**  
**INSTRUCTIONS TO BIDDER**

I. GENERAL

Bidders are advised that, notwithstanding any instructions or implications elsewhere in this Invitation to Bid, only the documents shown and detailed on this sheet need be submitted with and made part of their bid. Other documents may be required to be submitted after bid time, but prior to award. Bidders are hereby advised that failure to submit the documents shown and detailed on this sheet shall be justification for rendering the bid nonresponsive. Evaluation of bids for responsiveness shall be accomplished in accordance with Palmer Municipal Code.

II. REQUIRED DOCUMENTS FOR BID

**NOTE:** Only the following listed items as marked with an "X" are required to be completely filled out and submitted with the bid.

- Bid proposal consisting of pages BP-1 through BP-10. BP-1 must be manually signed.
- Erasures or other changes made to the Bid Proposal Sheet must be initialed by the person signing the bid.
- Two identical sets of descriptive literature, brochures, and/or data must accompany the bid where specifically requested or when in support of an "or equal" offer.
- Bid bond, certified check, cashier's check, money order or cash shall be submitted with the bid in the amounts indicated.
- All Addenda issued shall be acknowledged in the space provided on the Bid Proposal sheet or by manually signing the Addenda sheet and submitting it prior to the bid opening in accordance with Palmer Municipal Code.
- Bidder Qualification Form
- Interested Bidders List Collection Form
- B1 Debarment and Suspension Certification
- B2 Prohibition of Segregated Facilities Certification
- B3 Trade Restrictions Certification
- B4 Buy American Certification
- B5 Tax Delinquency and Felony Conviction Certification





**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**XII**

**BID PROPOSAL**



**BID PROPOSAL  
(CERTIFICATION)**

TO: CITY OF PALMER  
CITY HALL  
231 WEST EVERGREEN AVENUE  
PALMER, ALASKA 99645

SUBJECT: Invitation to Bid No. \_\_\_\_\_

PROJECT TITLE: **Construct Taxiway N, Improve Airport Drainage, & Construct Apron E**

Pursuant to and in compliance with subject Invitation to Bid, and other Contract documents relating thereto, the bidder hereby proposes to furnish all labor and materials and to perform all Work for the construction of the above-referenced project in strict accordance with the Contract documents at the prices established in the Bid Proposal, Pages BP-1 through BP-10 submitted herewith.

The bidder agrees, if awarded the Contract, to commence and complete the Work within the time specified in the Contract documents.

The bidder acknowledges receipt of the following Addenda:

Addendum No. & Date _____	Addendum No. & Date _____
Addendum No. & Date _____	Addendum No. & Date _____
Addendum No. & Date _____	Addendum No. & Date _____

Enclosed is a Bid Bond in the amount of:

\_\_\_\_\_

\$ amount or (Percentage of Bid)

Type of Business Organization

The bidder, by checking the applicable box, represents that it operates as:

- |   |   |
|---|---|
| <input type="checkbox"/> a corporation incorporated under the laws of the State of Alaska | <input type="checkbox"/> an individual            |
| <input type="checkbox"/> a joint venture  | <input type="checkbox"/> a nonprofit organization |
| <input type="checkbox"/> a partnership  |   |

If a partnership or joint venture, identify all parties on a separate page.

Bidder/Company Name: _____	Alaska Contractor's License Number: _____
----------------------------	--

Address of Bidder: _____	Employer's Tax Identification Number: _____
--------------------------	--

_____	_____ Signature
-------	--------------------

Phone _____	_____ Printed Name & Title
-------------	-------------------------------



**CITY OF PALMER  
CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, AND CONSTRUCT APRON E  
BID FORM**

**Summary**

**Bid Amount**

Schedule A: Construct Taxiway N \_\_\_\_\_

Schedule B: Drainage Improvements \_\_\_\_\_

Schedule C: Construct Apron E \_\_\_\_\_

**Total Base Bid** \_\_\_\_\_

Schedule D: Replace Taxiway J Pavement - Additive Alternate 1 \_\_\_\_\_

Schedule E: Apron E Headbolt Heater Outlets - Additive Alternate 2 \_\_\_\_\_

**Total All Schedules** \_\_\_\_\_



**CITY OF PALMER**  
**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, AND CONSTRUCT APRON E**  
**BID FORM**

**Schedule A: Construct Taxiway N**

<u>Item No.</u>	<u>Pay Item No.</u>	<u>Work Description</u>	<u>Pay Unit</u>	<u>Estimated Quantity</u>	<u>Bid Unit Price</u>	<u>Total Bid Price</u>
A-1	D701.010.0018	CS PIPE, 18-INCH	Linear Foot	40		
A-2	D701.010.0024	CS PIPE, 24-INCH	Linear Foot	320		
A-3	D751.010.0072	MANHOLE, TYPE 2, 72-INCH	Each	2		
A-4	D751.100.0000	ADJUST MANHOLE TO FINISHED GRADE	Each	1		
A-5	D785.010.0001	SUBGRADE INFILTRATION SYSTEM	Lump Sum	All Req'd	All Req'd	
A-6	F174.010.0020	SINGLE POLE SWING GATE, 20-FEET WIDE	Each	1		
A-7	G100.010.0000	MOBILIZATION AND DEMOBILIZATION	Lump Sum	All Req'd	All Req'd	
A-8	G105.010.0000	INTERIM WORK AUTHORIZATION	Contingent Sum	All Req'd	All Req'd	140,000
A-9	G110.010.0000	AIRPORT SAFETY REQUIREMENTS	Lump Sum	All Req'd	All Req'd	
A-10	G135.010.0000	CONSTRUCTION SURVEYING BY THE CONTRACTOR	Lump Sum	All Req'd	All Req'd	
A-11	G135.020.0000	EXTRA THREE PERSON SURVEY PARTY	Hour	25		
A-12	G300.010.0000	CPM SCHEDULING	Lump Sum	All Req'd	All Req'd	
A-13	G710.010.0000	HIGHWAY TRAFFIC MAINTENANCE	Lump Sum	All Req'd	All Req'd	
A-14	L108.010.2008	UNDERGROUND CABLE #8 AWG, COPPER, 5KV FAA TYPE C, L-824	LF	15066		
A-15	L108.030.0006	#6 BARE COPPER GROUND CONDUCTOR	LF	21680		
A-16	L108.050.1006	UNDERGROUND CABLE #6 AWG, COPPER, 600V TYPE C, L-824	LF	3464		
A-17	L108.050.1010	UNDERGROUND CABLE #10 AWG, COPPER, 600V TYPE C, L-824	LF	1383		
A-18	L108.070.0000	GROUND ROD	Each	37		
A-19	L108.080.0014	UNDERGROUND CABLE #14 AWG, 2-CONDUCTOR, COPPER, 600V, TYPE "SOOW-A/SOOW"	LF	175		
A-20	L108.180.0000	TEMPORARY JUMPER	LF	17100		
A-21	L109.050.0000	INSTALLATION OF ELECTRICAL EQUIPMENT IN NEW OR EXISTING STRUCTURE	LS	All Req'd	All Req'd	
A-22	L110.050.1004	RIGID STEEL CONDUIT, 4-INCH	LF	596		
A-23	L110.080.1002	HDPE CONDUIT, 2-INCH	LF	9783		
A-24	L125.040.0000	TAXIWAY EDGE LIGHT, L-861T	Each	121		





**CITY OF PALMER**  
**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, AND CONSTRUCT APRON E**  
**BID FORM**

<u>Item No.</u>	<u>Pay Item No.</u>	<u>Work Description</u>	<u>Pay Unit</u>	<u>Estimated Quantity</u>	<u>Bid Unit Price</u>	<u>Total Bid Price</u>
A-25	L125.070.0000	REMOVE RUNWAY AND TAXIWAY LIGHT	Each	96		
A-26	L125.110.0000	RELOCATE EXISTING AIRPORT SIGN, L-858	Each	1		
A-27	L125.130.0000	AIRPORT SIGN, L-858	Each	4		
A-28	L125.150.0000	HANDHOLE, L-867, SIZE B	Each	3		
A-29	L125.170.0000	SPARE PARTS	Contingent Sum	All Req'd	All Req'd	10,000
A-30	L125.250.0000	REMOVE AIRPORT SIGN	Each	2		
A-31	P151.010.0000	CLEARING	Acre	3.4		
A-32	P152.010.0000	UNCLASSIFIED EXCAVATION	Cubic Yard	54100		
A-33	P152.200.0000	BORROW	Ton	54000		
A-34	P154.020.0000	SUBBASE COURSE	Ton	10400		
A-35	P161.010.0000	RECYCLED ASPHALT PAVEMENT	Square Yard	16850		
A-36	P161.040.0000	RECYCLED ASPHALT PAVEMENT PLACEMENT	Square Yard	13200		
A-37	P209.020.0000	CRUSHED AGGREGATE BASE COURSE	Ton	7150		
A-38	P401.010.0030	HOT MIX ASPHALT TYPE II, CLASS A	Ton	3500		
A-39	P401.010.0040	HOT MIX ASPHALT TYPE II, CLASS B	Ton	950		
A-40	P401.020.5828	ASPHALT BINDER (PG 58-28)	Ton	264		
A-41	P401.130.0000	HMA COMBINED PRICE ADJUSTMENT	Contingent Sum	All Req'd	All Req'd	0.00
A-42	P602.010.0010	PRIME COAT, CSS-1	Ton	23.5		
A-43	P603.010.0010	TACK COAT, STE-1	Ton	7.6		
A-44	P608.210.0000	ASPHALT SURFACE TREATMENT, RAPID CURE	Square Yard	15000		
A-45	P620.020.0000	RUNWAY AND TAXIWAY PAINTING	Lump Sum	All Req'd	All Req'd	
A-46	P641.010.0000	EROSION, SEDIMENT AND POLLUTION CONTROL ADMINISTRATION	Lump Sum	All Req'd	All Req'd	
A-47	P641.030.0000	TEMPORARY EROSION, SEDIMENT AND POLLUTION CONTROL	Lump Sum	All Req'd	All Req'd	
A-48	P641.060.0000	WITHHOLDING	Contingent Sum	All Req'd	All Req'd	0.00
A-49	P681.010.0000	GEOTEXTILE, SEPARATION	Square Yard	32000		
A-50	T901.020.0000	SEEDING	Pound	3700		



**CITY OF PALMER**  
**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, AND CONSTRUCT APRON E**  
**BID FORM**

<u>Item No.</u>	<u>Pay Item No.</u>	<u>Work Description</u>	<u>Pay Unit</u>	<u>Estimated Quantity</u>	<u>Bid Unit Price</u>	<u>Total Bid Price</u>
A-51	T905.010.0020	TOPSOILING, CLASS B	Square Yard	81236	_____	_____
					SUBTOTAL SCHEDULE A	_____



**CITY OF PALMER  
CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, AND CONSTRUCT APRON E  
BID FORM**

**Schedule B: Drainage Improvements**

<u>Item No.</u>	<u>Pay Item No.</u>	<u>Work Description</u>	<u>Pay Unit</u>	<u>Estimated Quantity</u>	<u>Bid Unit Price</u>	<u>Total Bid Price</u>
B-1	D751.010.0072	MANHOLE, TYPE 2, 72-inch	Each	2		
B-2	D785.010.0002	SUBGRADE INFILTRATION SYSTEM	Lump Sum	All Req'd	All Req'd	
B-3	G100.010.0000	MOBILIZATION AND DEMOBILIZATION	Lump Sum	All Req'd	All Req'd	
B-4	G105.010.0000	INTERIM WORK AUTHORIZATION	Contingent Sum	All Req'd	All Req'd	20,000
B-5	G110.010.0000	AIRPORT SAFETY REQUIREMENTS	Lump Sum	All Req'd	All Req'd	
B-6	G135.010.0000	CONSTRUCTION SURVEYING BY THE CONTRACTOR	Lump Sum	All Req'd	All Req'd	
B-7	G135.020.0000	EXTRA THREE PERSON SURVEY PARTY	Hour	10		
B-8	G300.010.0000	CPM SCHEDULING	Lump Sum	All Req'd	All Req'd	
B-9	G710.010.0000	HIGHWAY TRAFFIC MAINTENANCE	Lump Sum	All Req'd	All Req'd	
B-10	P152.010.0000	UNCLASSIFIED EXCAVATION	Cubic Yard	11890		
B-11	P641.010.0000	EROSION, SEDIMENT AND POLLUTION CONTROL ADMINISTRATION	Lump Sum	All Req'd	All Req'd	
B-12	P641.030.0000	TEMPORARY EROSION, SEDIMENT AND POLLUTION CONTROL	Lump Sum	All Req'd	All Req'd	
B-13	P641.060.0000	WITHHOLDING	Contingent Sum	All Req'd	All Req'd	0.00
B-14	T901.020.0000	SEEDING	Pound	600		
B-15	T905.010.0010	TOPSOILING, CLASS A	Square Yard	12600		
					SUBTOTAL SCHEDULE B	



**CITY OF PALMER**  
**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, AND CONSTRUCT APRON E**  
**BID FORM**

**Schedule C: Construct Apron E**

<u>Item No.</u>	<u>Pay Item No.</u>	<u>Work Description</u>	<u>Pay Unit</u>	<u>Estimated Quantity</u>	<u>Bid Unit Price</u>	<u>Total Bid Price</u>
C-1	D701.010.0024	CS PIPE, 24-INCH	Linear Foot	80		
C-2	F174.010.0020	SINGLE POLE SWING GATE, 20-FEET WIDE	Each	1		
C-3	G100.010.0000	MOBILIZATION AND DEMOBILIZATION	Lump Sum	All Req'd	All Req'd	
C-4	G105.010.0000	INTERIM WORK AUTHORIZATION	Contingent Sum	All Req'd	All Req'd	74,000
C-5	G110.010.0000	AIRPORT SAFETY REQUIREMENTS	Lump Sum	All Req'd	All Req'd	
C-6	G135.010.0000	CONSTRUCTION SURVEYING BY THE CONTRACTOR	Lump Sum	All Req'd	All Req'd	
C-7	G300.010.0000	CPM SCHEDULING	Lump Sum	All Req'd	All Req'd	
C-8	G710.010.0000	HIGHWAY TRAFFIC MAINTENANCE	Lump Sum	All Req'd	All Req'd	
C-9	L155.010.0000	FLOOD LIGHTING	Lump Sum	All Req'd	All Req'd	
C-10	L160.030.0000	LOAD CENTER, TYPE 2	Each	1		
C-11	P152.010.0000	UNCLASSIFIED EXCAVATION	Cubic Yard	28400		
C-12	P152.200.0000	BORROW	Ton	21900		
C-13	P154.020.0000	SUBBASE COURSE	Ton	4400		
C-14	P161.010.0000	RECYCLED ASPHALT PAVEMENT	Square Yard	4400		
C-15	P161.040.0000	RECYCLED ASPHALT PAVEMENT PLACEMENT	Square Yard	1117		
C-16	P165.010.0000	REMOVAL OF STRUCTURES	Lump Sum	All Req'd	All Req'd	
C-17	P209.020.0000	CRUSHED AGGREGATE BASE COURSE	Ton	2700		
C-18	P401.010.0040	HOT MIX ASPHALT TYPE II, CLASS B	Ton	2100		
C-19	P401.020.5828	ASPHALT BINDER (PG 58-28)	Ton	130		
C-20	P401.130.0000	HMA COMBINED PRICE ADJUSTMENT	Contingent Sum	All Req'd	All Req'd	0.00
C-21	P602.010.0010	PRIME COAT, CSS-1	Ton	13.9		
C-22	P608.210.0000	ASPHALT SURFACE TREATMENT, RAPID CURE	Square Yard	1250		
C-23	P620.020.0000	RUNWAY AND TAXIWAY PAINTING	Lump Sum	All Req'd	All Req'd	
C-24	P641.010.0000	EROSION, SEDIMENT AND POLLUTION CONTROL ADMINISTRATION	Lump Sum	All Req'd	All Req'd	
C-25	P641.030.0000	TEMPORARY EROSION, SEDIMENT AND POLLUTION CONTROL	Lump Sum	All Req'd	All Req'd	





**CITY OF PALMER**  
**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, AND CONSTRUCT APRON E**  
**BID FORM**

<u>Item No.</u>	<u>Pay Item No.</u>	<u>Work Description</u>	<u>Pay Unit</u>	<u>Estimated Quantity</u>	<u>Bid Unit Price</u>	<u>Total Bid Price</u>
C-26	P641.060.0000	WITHHOLDING	Contingent Sum	All Req'd	All Req'd	0.00
C-27	P650.020.0000	SOIL ANCHOR TIE-DOWN	Each	16		
C-28	P661.020.0000	STANDARD SIGN	Each	1		
C-29	P681.010.0000	GEOTEXTILE, SEPARATION	Square Yard	13500		
C-30	T901.020.0000	SEEDING	Pound	205		
C-31	T905.010.0020	TOPSOILING, CLASS B	Square Yard	4600		
SUBTOTAL SCHEDULE C						



**CITY OF PALMER**  
**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, AND CONSTRUCT APRON E**  
**BID FORM**

**Schedule D: Replace Taxiway J Pavement - Additive Alternate 1**

<u>Item No.</u>	<u>Pay Item No.</u>	<u>Work Description</u>	<u>Pay Unit</u>	<u>Estimated Quantity</u>	<u>Bid Unit Price</u>	<u>Total Bid Price</u>
D-1	G100.010.0000	MOBILIZATION AND DEMOBILIZATION	Lump Sum	All Req'd	All Req'd	
D-2	G105.010.0000	INTERIM WORK AUTHORIZATION	Contingent Sum	All Req'd	All Req'd	4,000
D-3	G110.010.0000	AIRPORT SAFETY REQUIREMENTS	Lump Sum	All Req'd	All Req'd	
D-4	G135.010.0000	CONSTRUCTION SURVEYING BY THE CONTRACTOR	Lump Sum	All Req'd	All Req'd	
D-5	G135.020.0000	EXTRA THREE PERSON SURVEY PARTY	Hour	10		
D-6	G300.010.0000	CPM SCHEDULING	Lump Sum	All Req'd	All Req'd	
D-7	G710.010.0000	HIGHWAY TRAFFIC MAINTENANCE	Lump Sum	All Req'd	All Req'd	
D-8	P161.010.0000	RECYCLED ASPHALT PAVEMENT	Square Yard	3550		
D-9	P209.020.0000	CRUSHED AGGREGATE BASE COURSE	Ton	120		
D-10	P401.010.0040	HOT MIX ASPHALT TYPE II, CLASS B	Ton	590		
D-11	P401.020.5828	ASPHALT BINDER (PG 58-28)	Ton	40		
D-12	P401.130.0000	HMA COMBINED PRICE ADJUSTMENT	Contingent Sum	All Req'd	All Req'd	0.00
D-13	P602.010.0010	PRIME COAT, CSS-1	Ton	4		
D-14	P620.020.0000	RUNWAY AND TAXIWAY PAINTING	Lump Sum	All Req'd	All Req'd	
					SUBTOTAL SCHEDULE D	



**CITY OF PALMER  
 CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, AND CONSTRUCT APRON E  
 BID FORM**

**Schedule E: Apron E Headbolt Heater Outlets - Additive Alternate 2**

<u>Item No.</u>	<u>Pay Item No.</u>	<u>Work Description</u>	<u>Pay Unit</u>	<u>Estimated Quantity</u>	<u>Bid Unit Price</u>	<u>Total Bid Price</u>
E-1	G135.010.0000	CONSTRUCTION SURVEYING BY THE CONTRACTOR	Lump Sum	All Req'd	All Req'd	<hr/>
E-2	L150.010.0000	WEATHERPROOF OUTLETS	Lump Sum	All Req'd	All Req'd	<hr/>
SUBTOTAL SCHEDULE E						<hr/>



## **CITY OF PALMER**

# **CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, & CONSTRUCT APRON E**

### **XIII**

#### **FORMS FOR BIDDING AND CONSTRUCTION**

1. BIDDER QUALIFICATION FORM
2. INTERESTED BIDDERS LIST COLLECTION FORM
3. LIST OF SUBCONTRACTORS AND SUPPLIERS
4. NOTICE TO PROCEED
5. DBE UTILIZATION REPORT





## BIDDER QUALIFICATION FORM

The Bidder shall submit the data requested below as part of the bid package.

Contractor Business Name: \_\_\_\_\_

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

Years in business as contractor under above business name: \_\_\_\_\_

List six or more important or similar construction projects completed by Bidder with date, approximate cost, and name and phone number of project engineer or owner (use additional pages as required):

Project: \_\_\_\_\_

Project: \_\_\_\_\_

Owner: \_\_\_\_\_

Owner: \_\_\_\_\_

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

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

Contact Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Contact Phone: \_\_\_\_\_

Contact Phone: \_\_\_\_\_

Project: \_\_\_\_\_

Project: \_\_\_\_\_

Owner: \_\_\_\_\_

Owner: \_\_\_\_\_

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

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

Contact Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Contact Phone: \_\_\_\_\_

Contact Phone: \_\_\_\_\_

List other construction projects your firm will be working on or anticipate working on between September 1, 2022 and October 1, 2023. \_\_\_\_\_

List major equipment to be used on this project and indicate if owned or rented: \_\_\_\_\_

Have you received firm quotes & delivery times for major materials for this project? \_\_\_\_\_

Have you ever failed in any material way to perform your obligations under any contract with the City or other government agency? \_\_\_\_\_ If so, provide details.

\_\_\_\_\_  
(signed) (title) (date)



## SUBCONTRACTORS & SUPPLIERS LIST

The Successful Bidder shall submit the data requested below by the end of the second business day following Bid opening. Use additional pages as required.

Contractor Business Name: \_\_\_\_\_

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

List all Subcontractors and Suppliers who will be performing more than ½ of 1% of the total cost of this project.

Business Name: \_\_\_\_\_ Trade: \_\_\_\_\_

Address: \_\_\_\_\_ Contractor's License #: \_\_\_\_\_

\_\_\_\_\_ Telephone: \_\_\_\_\_

Contact: \_\_\_\_\_ FAX: \_\_\_\_\_

Business Name: \_\_\_\_\_ Trade: \_\_\_\_\_

Address: \_\_\_\_\_ Contractor's License #: \_\_\_\_\_

\_\_\_\_\_ Telephone: \_\_\_\_\_

Contact: \_\_\_\_\_ FAX: \_\_\_\_\_

Business Name: \_\_\_\_\_ Trade: \_\_\_\_\_

Address: \_\_\_\_\_ Contractor's License #: \_\_\_\_\_

\_\_\_\_\_ Telephone: \_\_\_\_\_

Contact: \_\_\_\_\_ FAX: \_\_\_\_\_

Business Name: \_\_\_\_\_ Trade: \_\_\_\_\_

Address: \_\_\_\_\_ Contractor's License #: \_\_\_\_\_

\_\_\_\_\_ Telephone: \_\_\_\_\_

Contact: \_\_\_\_\_ FAX: \_\_\_\_\_

Business Name: \_\_\_\_\_ Trade: \_\_\_\_\_

Address: \_\_\_\_\_ Contractor's License #: \_\_\_\_\_

\_\_\_\_\_ Telephone: \_\_\_\_\_

Contact: \_\_\_\_\_ FAX: \_\_\_\_\_



**INTERESTED BIDDERS LIST COLLECTION FORM**

As required by 49 CFR § 26.11, please provide the following information about your company. Each prime bidder submitting a bid on this project shall complete and submit this form with their bid. The information is required for all prime contractors, subcontractors and suppliers providing quotes on this project, whether used in determining the bid price or not.

ITB # \_\_\_\_\_ or RFP # \_\_\_\_\_  
Project name: \_\_\_\_\_

- 1. Your firm's name: \_\_\_\_\_
- 2. Your firm's address: \_\_\_\_\_
- 3. Is your firm a  DBE  non-DBE DOT Cert. # \_\_\_\_\_
- 4. Your firm's age: \_\_\_\_\_
- 5. Size of Firm (Annual Gross Receipts):
  - Less than \$500,000
  - \$500,000-\$1,000,000
  - \$1,000,000-\$5,000,000
  - More than \$5,000,000

The same information is required for every subcontractor who bid to you on this project, even if you will not use that subcontractor. Copy this sheet as necessary.

- 1. Firm's name: \_\_\_\_\_
- 2. Firm's address: \_\_\_\_\_
- 3. Is this firm a  DBE  non-DBE DOT Cert. # \_\_\_\_\_
- 4. Firm's age: \_\_\_\_\_
- 5. Size of Firm (Annual Gross Receipts):
  - Less than \$500,000
  - \$500,000-\$1,000,000
  - \$1,000,000-\$5,000,000
  - More than \$5,000,000

- 1. Firm's name: \_\_\_\_\_
- 2. Firm's address: \_\_\_\_\_
- 3. Is this firm a  DBE  non-DBE DOT Cert. # \_\_\_\_\_
- 4. Firm's age: \_\_\_\_\_
- 5. Size of Firm (Annual Gross Receipts):
  - Less than \$500,000
  - \$500,000-\$1,000,000
  - \$1,000,000-\$5,000,000
  - More than \$5,000,000

- 1. Firm's name: \_\_\_\_\_
- 2. Firm's address: \_\_\_\_\_
- 3. Is this firm a  DBE  non-DBE DOT Cert. # \_\_\_\_\_
- 4. Firm's age: \_\_\_\_\_
- 5. Size of Firm (Annual Gross Receipts):
  - Less than \$500,000
  - \$500,000-\$1,000,000
  - \$1,000,000-\$5,000,000
  - More than \$5,000,000

The undersigned certifies that this Bidder/Proposer is aware of and shall comply with 49 CFR § 26, and all other applicable federal, state, and municipal laws and regulations concerning DBE participation in the City's program, which are incorporated by reference as if fully set forth herein. False statements are punishable under AS 11.56.210.

\_\_\_\_\_  
Principal's Signature

\_\_\_\_\_  
Principal's Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Company's Name





# NOTICE TO PROCEED

Project: \_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_ A/E Project Number \_\_\_\_\_  
 To: \_\_\_\_\_ Contract For: \_\_\_\_\_

You are hereby notified that the Contract Times stated for the Project will commence on \_\_\_\_\_ . On that date, start performing the obligations required by the Contract Documents.

Before commencing work at the Project Site, deliver the certificates of insurance to the owner as required by the Contract Documents.

Also, before commencing work at the Project Site, perform:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

SAMPLE

Authorized by: \_\_\_\_\_  
 Owner \_\_\_\_\_ Authorized Signature \_\_\_\_\_  
 \_\_\_\_\_  
 Title \_\_\_\_\_ Date \_\_\_\_\_

Accepted By: \_\_\_\_\_  
 Contractor \_\_\_\_\_ Authorized Signature \_\_\_\_\_  
 \_\_\_\_\_  
 Title \_\_\_\_\_ Date \_\_\_\_\_

Attachments

Copies:  Owner  A/E  
 Consultants





**DBE UTILIZATION REPORT**

To be submitted to the City of Palmer DBE Office by the 15<sup>th</sup> of every month for the previous month or with requests for progress payments, whichever is sooner, and with the final request for payment.

This report is a (circle one):                      30 day report  
    Request for progress payment  
    Final request for payment

ITB # \_\_\_\_\_ or RFP # \_\_\_\_\_

Project name: \_\_\_\_\_

Please circle the month covered by this report:

Jan Feb March April May June July Aug Sept Oct Nov Dec

Estimated completion date of contract: \_\_\_\_\_

DBE Subcontractor	Amount of Contract to DBE Subcontractor	Amount of Payment this Reporting Period	Date(s) Check(s) Mailed or Delivered	Total Amount Paid to Date

**For monitoring purposes, please attach a copy of your check(s) to the DBE subcontractor(s) listed for payment(s) made during this reporting period. You shall not receive credit toward your DBE goal until we have proof of payment to them, and you shall receive credit only in the amount you have actually paid them.**

The undersigned certifies that this Bidder/Proposer is aware of and shall comply with 49 CFR § 26, and all other applicable federal, state, and municipal laws and regulations concerning DBE participation in the City's program, which are incorporated by reference as if fully set forth herein. False statements are punishable under AS 11.56.210.

\_\_\_\_\_  
Principal's Signature

\_\_\_\_\_  
Principal's Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Company's Name



**CITY OF PALMER**

**CONSTRUCT TAXIWAY N, IMPROVE AIRPORT DRAINAGE, &  
CONSTRUCT APRON E**

**XIV**

**PLANS**