SECTION IV

GENERAL CONSTRUCTION ITEMS

ITEM E-020 GENERAL REQUIREMENTS

020-1.1 This item shall consist of preparatory work, furnishing submittals, and other operations, including, but not limited to, work necessary to set up barricades, complete utility locates; set up and dismantle all temporary offices, buildings, facilities, and utilities; and perform site restoration and cleanup. This item shall also include all items required for construction phasing and safety during construction of this project, whether specified on the drawings or not. In addition, included shall be all costs associated with shutdowns outlined on the drawings or shown in the specifications. No additional compensation shall be due Contractor for planned shutdowns.

020-1.2 This item shall also include all work required for construction survey and staking, as well as location or identification of existing utilities.

020-2.1 LOCATION AND DRAWINGS.

a. Location. The location of the work is at the Albany Municipal Airport, Albany, Oregon. A vicinity map is shown on Sheet 1 of the Drawings.

b. Drawings. The Drawings for the construction of "**Install Runway 16-34 PAPI; Install Taxiway A Lighting**" Airport Improvements Program, AIP Project No. **3-41-0001-022-2024**, consist of 28 sheets, and dated June 2024.

020-3.1 DISPOSAL. All materials shall be disposed of offsite, unless otherwise shown on the drawings. Arrangements for the disposal of all other materials shall be made by the Contractor. No direct payment will be made for disposal of unused materials.

020-4.1 SITE INVESTIGATION AND REPRESENTATION. The Contractor acknowledges that they have satisfied themselves as to the nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, disposal, handling, and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

a. The Contractor further acknowledges that they have satisfied themselves as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site, all exploratory work done by the Owner, as well as from information presented by the Drawings and Specifications made a part of this Contract. Any failure by the Contractor to acquaint themselves with all the available information will not relieve them from the responsibility for properly estimating the difficulty or cost of successfully performing the work.

b. The Contractor warrants that as a result of their examination and investigation of all the aforesaid data, they can perform the work in a good and workmanlike manner and to the satisfaction of the Owner. The Owner assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the Owner. Representations for which liability is not expressly assumed by the Owner in the Contract shall be deemed only for the information of the Contractor.

c. Dewatering. It is anticipated that dewatering may be required to lower the water table, remove standing water, or lower the moisture content of soils encountered to achieve workability and compaction. In addition, dewatering may be required to properly lay conduit or cable in trenches, or for making foundations suitable for embankment or base materials. Soft or yielding materials which can be stabilized by dewatering shall not be classified as unsuitable foundation. No direct payment for dewatering shall be made and all costs incurred shall be considered as incidental to the appropriate bid items.

020-5.1 FIRE PREVENTION AND PROTECTION. The Contractor shall perform all work in a fire-safe manner. They shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable local and state fire prevention regulations and where the regulations do not cover, with applicable parts of the National Fire Prevention Standard for "Safeguarding Building Construction Operations," (NFPA No. 241).

020-6.1 GENERAL CONSTRUCTION RESPONSIBILITIES AND PROCEDURES.

a. Haul Routes and Maintenance. Any haul roads and access roads shall be constructed by the Contractor at their expense. The Contractor shall perform all necessary maintenance of haul routes during construction and shall perform all work as necessary to restore the routes used by their equipment to their original condition at the conclusion of construction. New roadways shall be obliterated and original vegetation reestablished. Existing roadways, runways, taxiways, and aprons shall be patched or overlaid as necessary to restore them to original condition.

Haul routes shall be sprinkled with water as necessary to prevent dust diffusion during the course of the work. Should soil conditions require gravel placement to maintain a satisfactory haul road, it shall be done at the Contractor's expense.

Turfed areas surrounding roadways, runways, taxiways, and aprons that are disturbed as a result of the Contractor's operations shall be restored to their original condition.

All maintenance and restoration work shall be completed to the RPR's satisfaction before final payment is awarded. No direct payment will be made for this work.

b. Responsibility for damage to existing structures. Where any existing structures or facilities which are intended to remain are damaged by the Contractor during demolition or construction, the Contractor shall promptly repair or replace the damaged portion or facility at their expense.

MATERIALS

020-7.1 SUBMITTALS AND CERTIFICATIONS. As required by the Specifications or shown on the Drawings, the Contractor shall submit material submittals, furnish shop drawings, and furnish material certifications.

a. The date when the Contractor provides the submittal(s) to the RPR shall be included in the Contractor's project schedule. All submittals shall have assigned due dates that correspond with approved schedule start dates for related activities allowing a minimum fifteen (15) calendar days, or otherwise specified in the Specifications, for the RPR's review as well as adequate time for fabrication and delivery of the material. The RPR shall not be held responsible for late or inadequate submittals provided by the Contractor. Materials shall not be incorporated into the work without the submittal, shop drawing, or material certification reviewed by the RPR.

b. Prior to submission, the Contractor shall review each submittal and indicate with signature on an original letter that they have reviewed and approved the submittal and that it conforms to the Contract Documents. If this original letter is not included, the submittal and/or shop drawing will be returned without any action by the RPR.

Submittal data shall be presented in a clear, precise, and thorough manner. Original catalog sheets are preferred, however, photocopies are acceptable provided they are of good quality and legible. The Contractor shall clearly and boldly mark each copy to identify pertinent products or models applicable to the project. At the time of each submittal, the Contractor shall identify any proposed deviations or substitutions from the Contract Documents.

Review by the RPR is only for conformance with the Contract Documents. Review does not cover dimensions, quantities, accuracy, fit, compatibility or any assembly for which the item under review may be a component. Review action does not authorize deviation from Contract Documents or substitution of materials.

c. The RPR will complete the review within a reasonable period of time depending upon the size, complexity and number of submittals received. Every effort will be made to review submittals within ten (10) calendar days of receipt by the RPR, however, the RPR will not be responsible for any project impacts should the review period exceed the ten (10) calendar days.

020-7.2 TEMPORARY FACILITIES. The Contractor shall provide all temporary facilities as required for performing the work.

020-7.3 TEMPORARY WATER. The Contractor shall make all arrangements for obtaining water and pay all costs for same. Water shall be potable water obtained from a municipal source or well. The use of reclaimed water is not allowed. The use of additives, such as chemicals, abrasive materials, detergents, or salt water is not allowed.

020-7.4 TEMPORARY ELECTRIC POWER. The Contractor shall make all arrangements for electric power for use during the construction period until final acceptance by the Owner, and pay all costs for same.

020-7.5 SECURITY FENCING. Construct a temporary security fence around the Contractor's staging area. Maintain the fence during construction period and provide security for the Contractor's existing materials and facilities.

020-7.6 PARKING FACILITIES. Provide parking facilities for personnel working on the project. Employee or equipment parking will be permitted only in areas specifically designated for the Contractor's use. No employee-owned vehicles shall be permitted within the airside area of the airport.

020-7.7 RECORD DRAWINGS. The Contractor shall maintain a set of full size drawings on site noting changes in project layout, details, and other information shown on the drawings. Record drawings shall contain the names, addresses, and phone numbers of the Prime Contractor and Subcontractors used.

020-7.8 CONSTRUCTION SURVEY AND STAKING. The Contractor shall perform all survey activities necessary to control the many phases of work required to construct the Project to the lines and grades as shown, established, or specified in the Specifications or shown on the Drawings. The survey shall be conducted by a surveyor licensed in the State of Oregon and conducted under the supervision of a PLS.

020-7.9 CONTRACTOR'S STAGING AREA. An area has been set aside on the Owner's property for the Contractor's use as a staging area for personnel, equipment, and materials. The approximate site location is shown on the Drawings. The RPR will define the actual location in the field. In the event additional space is required for the Contractor's operations, the Contractor shall make arrangements with the Owner. The staging area shall be kept in a neat and orderly condition. The area shall be restored to its original condition at the conclusion of the work.

020-7.10 SAFETY PLAN COMPLIANCE DOCUMENT. The Contractor shall submit and comply with a Safety Plan Compliance Document (SPCD) as required in the Construction Safety and Phasing Plan. The SPCD shall incorporate the requirements of the Construction Safety and Phasing Plan (CSPP).

020-7.11 RADIO. The Contractor shall provide a minimum of two radios, one carried by the safety officer and the other by the Superintendent, unless otherwise agreed to with the RPR and Owner. The radios shall have dual power source; i.e., battery and a car/truck plug in, and be capable of communication on the airport VHF frequency (See CSPP). Radio checks shall be made daily as coordinated with the RPR and Owner.

CONSTRUCTION METHODS

020-8.1 LAYOUT OF TEMPORARY FACILITIES. Set up construction facilities in a neat and orderly manner within designated area. Accomplish all required work in accordance with applicable portions of these Specifications, or as approved. Confine operations to work area shown.

020-8.2 OBSTRUCTIONS. Some obstructions may not be shown. Bidders are advised to carefully inspect the existing facilities before preparing their bids (proposals). The removal of minor obstructions such as rocks and other debris shall be anticipated and accomplished, even though not shown or specifically mentioned.

020-8.3 TEMPORARY SHUTDOWN. The Contractor shall cease operations during periods indicated on the drawings. During this time, the Contractor shall secure all materials within the staging area, set up barricades, cones, or other safety measures as specified or as directed by the RPR.

020-8.4 RECORD DRAWINGS, TEST RESULTS, SURVEY NOTES AND QUANTITY COMPUTATIONS. At the conclusion of the work, the Contractor shall furnish the RPR with one set of record drawings. This shall be a full-size set of Contract drawing prints accurately marked to reflect current conditions or any changes in geometric layout of project items, changes in details, drainage structure grade and invert elevations, and changes in work that occurred during the course of the project. The Contractor shall provide a report containing all test results, separated by material type as required by the specifications and a copy of all survey notes and computations made in connection with the work to the RPR.

The Contractor shall furnish the RPR with survey notes of "finish grades" for all improvement in this project. The data shall include as a minimum:

1. Location, taxiway edge lights, electrical structures, and PAPIs.

2. Elevation and location of all survey reference points or any new disturbed, or replaced, benchmark or control point.

3. Any work performed by change order that can be reflected in the Drawings.

The Contractor shall provide a complete summary of all drawings, diagrams, notes, calculations and computations used to determine measurement for pay quantities and submit them to the RPR with each payment request.

Final payment will not be made until the "record drawings", survey data, test results, and all other items under this specification have been submitted.

METHOD OF MEASUREMENT

020-9.1 No direct measurement for work specified under Section GENERAL REQUIREMENTS shall be made with the exception of Construction Survey and Staking.

020-9.2 The measurement for the quantity of Construction Survey and Staking shall be partial payments and will be allowed as follows;

a. With first pay request, 25%.

b. When 25% or more of the original contract is earned, an additional 25%.

c. When 50% or more of the original contract is earned, an additional 40%.

d. After Final Inspection, delivery of all Project Closeout materials as required by GP 90-11, the final 10%.

BASIS OF PAYMENT

020-11.1 No direct payment for work specified under Section GENERAL REQUIREMENTS shall be made with the exception of Construction Survey and Staking. Payment for work specified under Section GENERAL REQUIREMENTS, with the exception of Construction Survey and Staking, shall be considered incidental to the Contract price.

020-11.2 Payment shall be made at the Contract lump sum for Construction Survey and Staking. This price shall be full compensation for all construction surveying, for furnishing all materials, labor, equipment, tools, submittal of all required documentation, and incidentals necessary to complete the item.

Payment will be made under:

Bid Item No. 1	Construction Survey and Staking - Per Lump Sum
Bid Item No. A1	Construction Survey and Staking - Per Lump Sum

CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

INSTALL RUNWAY 16-34 PAPI; INSTALL TAXIWAY A LIGHTING

AIRPORT IMPROVEMENT PROGRAM
AIP NO. 3-41-0001-022-2024

ALBANY MUNICIPAL AIRPORT

Albany, Oregon

Prepared by:

PRECISION APPROACH ENGINEERING, INC.
5125 SW Hout Street
Corvallis, OR 97333

JUNE 2024

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CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

2.1 OVERVIEW. Aviation safety is the primary consideration at airports, especially during construction. The Airport Operator's Construction Safety and Phasing Plan (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 aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. Aviation safety provisions included within the project drawings, contract specifications, and other related documents are included in the CSPP and SPCD by reference.

The following sections are numbered to correlate with the main paragraphs in the Construction Safety and Phasing Plan AC 150/5370-2G, Chapter Two.

1. **Project Description.** The purpose of this project is to replace the existing Runway 16 and Runway 34 VASIs with new PAPI units and install taxiway edge lighting. Major elements of work include but are not limited to:
    - Base Bid – Installation of a new Runway 16 and Runway 34 PAPI. The existing Runway 16 and Runway 34 VASI units will be decommissioned and removed. The Runway 16 VASI is currently under FAA ownership, the Runway 34 VASI is currently owed by the City of Albany. Following completion of the project, the City of Albany will take over the ownership responsibilities of both the Runway 16 and 34 PAPIs. Work includes installation of pilot control and miscellaneous electrical improvements.
    - Additive Bid A - Installation of LED medium intensity taxiway lighting (MITL) along the edge of Taxiway A, A1, A2, and A3. The new MITL will replace existing taxiway edge retroreflective markers. Existing taxiway edge retroreflective markers will be removed and disposed of offsite. Work includes installation of a new constant current regulator and miscellaneous electrical improvements.

2.2 ASSUME RESPONSIBILITY. The Airport Operator has submitted this CSPP for Federal Aviation Administration (FAA) approval. It is the Contractor's responsibility to apply the requirements of the FAA approved CSPP. The Contractor must revise the CSPP when conditions warrant changes prior to implementing any changes. Revisions to the CSPP must be submitted to the Airport Operator for FAA approval prior to implementing any changes.

This CSPP ASN #2024-ANM-TBD-NRA.

2.3 SAFETY PLAN COMPLIANCE DOCUMENT (SPCD).

1. **Not Used**

2. **Not Used**

3. **Submit a Safety Plan Compliance Document (SPCD)**. The Contractor shall submit the SPCD to the Airport Operator and Engineer for review prior to the Notice to Proceed unless otherwise approved by the Engineer. The plan must be acceptable to the Owner prior to beginning work.

4. Submit CSPP and SPCD Revisions. All revisions to the CSPP or SPCD shall be submitted by the Contractor to the Airport Operator and Engineer to coordinate FAA approval as soon as required changes are identified and prior to implementing any changes. The revisions must be acceptable to the FAA prior to implementing any changes.

2.4 SPCD COMPLIANCE STATEMENTS AND SUPPLEMENTAL INFORMATION.

1. Not Used

2. Safety Plan Compliance Document (SPCD). The SPCD **s**hould include a statement by the 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 contract award. The contractor statement should include the name of the contractor, the title of the project, the FAA Study (ASN) Number and approval date of the CSPP, and a reference to any supplemental information. 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 "No supplemental information," should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP.

2.5 COORDINATION. Airport operational safety during construction will be discussed during the pre-bid and preconstruction conferences. In addition:

1. Contractor Progress Meetings. Operational safety shall be a standing agenda item for discussion during progress meetings throughout the project.

2. Scope or Schedule Changes. Changes in the scope or duration of the project may necessitate revisions to the CSPP. All changes will be reviewed and approved by the airport operator and the FAA prior to implementing any changes.

3. FAA Air Traffic Organization (ATO), Airports District Office (ADO), and NAVAID Impacts. Coordination with FAA ATO is required to schedule navigational aid shutdowns and restarts during construction. The project has been coordinated with Chelsea Branchcomb, Project Manager, Seattle ADO and Matthew Josel, Lead Planner with the NAS planning team. The project includes the following NAVAID impacts:

- Shutdown, demolition and decommissioning of the Runway 16 VASI (FAA Owned).
- Shutdown, demolition and decommissioning of the Runway 34 VASI (Sponsor Owned).
- Installation of new Runway 16 PAPI (Sponsor Owned).
- Installation of new Runway 34 PAPI (Sponsor Owned).
- A Flight Check is Required for commissioning of new PAPIs.

2.6 PHASING. The sequence of construction has been phased to gain maximum safety while allowing for the required operations. The construction phases have been coordinated with airport users and have been incorporated into the project design, contract drawings, and specifications, and are reflected in this CSPP.

1. Phase Elements. For each phase, the CSPP includes:

- Areas closed to aircraft operations
- Duration of closures
- Taxi routes

- ARFF access routes – N/A
- Construction staging, disposal and cleanout areas
- Construction access and haul routes
- Impacts to NAVAIDs
- Lighting marking and signing changes
- Available runway length including changes to safety areas and object free areas – N/A
- Declared distances – N/A
- Hazard marking, lighting and signing
- Lead times for required notifications

The project will include two phases to complete base bid schedule project work. If additive bid schedule A is selected, the project will include four phases to complete all project work.

Phase 1 Scope: PAPI foundation, conduit, and wire installation (base bid). Taxiway edge lighting improvements (additive bid).

- Areas closed to aircraft: Runway 16-34, Taxiway A, A1, A2, and A3.
- Taxi routes affected: Taxiway A, A1, A2, A3, and southern taxilanes.
- Duration: 8 calendar days (15 calendar days if additive bid A is selected).
- Construction Access: Construction access will occur across the northern portion of the main apron.
- Construction staging – Contractor's staging area is south of the FBO building and will be blocked off by barriers.

Phase 2 Scope: Install new PAPI equipment and associated appurtenances (base bid). Demolition of VASI units (base bid). Taxiway edge lighting improvements (additive bid).

- Areas closed to aircraft: Runway 16-34, Taxiway A, A1, A2, and A3.
- Taxi routes affected: Taxiway A, A1, A2, A3, and southern taxilanes.
- Duration: 2 calendar days.
- Construction Access: Construction access will occur across the northern portion of the main apron.
- Construction staging – Contractor's staging area is south of the FBO building and will be blocked off by barriers.

Phase 3 Scope: Taxiway edge lighting improvements and demolition (additive bid).

- Areas closed to aircraft: South half of Taxiway A and A3.
- Taxi routes affected: South half of Taxiway A and southern taxilanes. Taxiway A3 is closed during this phase, aircraft landing or departing may be required to back taxi on Runway 16-34.
- Duration: 16 calendar days.
- Construction Access: Construction access will occur across a taxilane in the southern t-hangar development.

- Construction staging – Contractor's staging area is south of the FBO building and will be blocked off by barriers.

Phase 4 Scope: Taxiway edge lighting improvements and demolition (additive bid).

- Areas closed to aircraft: North portion of Taxiway A.
- Taxi routes affected: Taxiway A is closed between Taxiway A1 and A2. Aircraft will be required to taxi around the closed area via the main apron and adjacent taxilane.
- Duration: 14 calendar days.
- Construction Access: Construction access will occur across the northern portion of the main apron.
- Construction staging – Contractor's staging area is south of the FBO building and will be blocked off by barriers.

2. CSPP Drawings. Drawings indicating operational safety procedures and methods in affected areas have been developed for each construction phase. See CSPP drawings included in this document.

2.7 AREAS AND OPERATIONS AFFECTED BY CONSTRUCTION ACTIVITY. The CSPP has been developed to allow runways and taxiways to remain in use to the maximum extent possible without compromising safety. The plan was coordinated with airport users and the FAA during project design.

1. **Identification of Affected Areas.** Areas and operations affected by construction are identified in the CSPP drawings included in this document. The following items are addressed:
   (1) Closing, or partial closing, of runways and taxiways.
   (2) Construction areas, storage areas, and access routes near runways, taxiways, and aprons.
2. **Mitigation of Effects. S**pecific procedures necessary to maintain the safety and efficiency of airport operations are identified in the CSPP drawings. The following items are addressed:
   (1) Temporary changes to runway and/or taxi operations.
   (2) Detours for airport vehicles.

2.8 NAVIGATION AID (NAVAID) PROTECTION. This project includes impacts to FAA owned equipment and has been coordinated with the FAA ATO/Technical Operations office. Project impacts on NAVAIDS, including NAVAID critical areas are:

- The Runway 16 VASI will be decommissioned as part of the project (FAA owned). The project will install a Runway 16 PAPI that will be owned by the Sponsor. The new PAPI will be constructed within the AWOS critical area (Sponsor owned). Impact to AWOS sensors is not anticipated to occur during construction but will be monitored for the duration of construction activities,
- The Runway 34 VASI will be decommissioned as part of the project (Sponsor owned). The project will install a Runway 34 PAPI that will be owned by the Sponsor.

Construction Activities near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. Unanticipated interference from construction equipment and activities may require NAVAID shutdown. Construction activities near a NAVAID shall not obstruct access to the equipment and instruments for maintenance. Any damage or interruption in service to NAVAIDs during construction caused by the Contractor's equipment or personnel, whether by negligence or accident, shall immediately be brought to the RPR's attention and will require the

Contractor to promptly repair or replace the damaged facilities to FAA requirements. The Contractor shall bear the cost to repair the damage.

Contractor shall coordinate temporary shutdown of NAVAIDs with the RPR. The contractor shall give the Airport Operator or Engineer advance notice of this activity to allow coordination. Stockpiling material, as well as movement and parking of equipment is not allowed in NAVAID critical areas. NOTAMs must be filed for certain construction activities. This project is being coordinated with the Seattle ADO. Approval of a Form 7460-1 for construction activities is required (See paragraphs 2.13.5 and 2.23.1(1) for additional requirements prior to construction).

2.9 CONTRACTOR ACCESS. The CSPP drawings show the areas to which the contractor has access, and how contractor personnel will access those areas. Specifically addressed are:

1. Location of Stockpiled Construction Materials. Stockpiled materials and equipment storage are not permitted within the Runway Safety Area (RSA), Obstacle Free Zones (OFZ) or Object Free Area (OFA) of an operational runway. Stockpiled materials and equipment adjacent to these areas shall be prominently marked and lighted during hours of restricted visibility or darkness. 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.

2. Vehicle Operations. Vehicle access routes are shown on the project drawings and are designed to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. These routes have been coordinated with airport tenants. The following is included:

(1) Construction Site Parking. Construction site parking for Contractor's personal vehicles shall be confined to the staging areas. These areas provide reasonable contractor employee access to the job site.

(2) Construction Equipment Parking. Contractor employees shall park and service all construction vehicles in an area outside the OFZ and OFA, and never in the safety area of an active runway or taxiway. Inactive equipment shall not be parked on a closed taxiway or runway unless a complex setup procedure makes movement of specialized equipment infeasible. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lit. Employees shall park construction vehicles outside the OFAs when not in use.

(3) Access and Haul Roads. The construction contractor shall not use any access or haul roads other than those approved. Where able, access routes used by Contractor vehicles shall be clearly marked to prevent inadvertent entry to areas open to airport operations. The Engineer will have the final authority regarding marking requirements for access routes. Contractor shall not block vehicle access roads or gates at any time.

(4) Marking and Lighting of Vehicles. Contractor vehicles shall be marked and lighted in accordance with AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport. To operate in the AOA during daylight hours, the vehicle must have a flag or amber-flashing beacon attached to it. Any vehicle operating in the AOA during hours of darkness or reduced visibility must be equipped with an amber-flashing beacon.

(5) Description of Proper Vehicle Operations on various areas under normal, lost communications, and emergency conditions:

Vehicles operating within or crossing the AOA must have prior approval from the airport Owner. If a vehicle becomes lost or has a radio failure, the operator should vacate the runway or taxiway

as quickly and safely as possible and advise the Contractor's safety office or superintendent of the situation and wait for further instruction. If an emergency condition occurs, the contractor's staff should meet at a location designated by the contractor's safety officer.

(6) Required Escorts. Vehicular traffic located in or crossing an AOA must have a working two-way radio or be escorted by a vehicle with a radio. All drivers shall confirm that no aircraft is approaching the vehicle position. Construction personnel may operate in an AOA without two-way radio communication provided a NOTAM is issued closing the area and the area is properly marked and barricaded to prevent incursions.

(7) Training Requirements for Vehicle Drivers. To ensure compliance with the airport's rules and regulations, the Contractor's Safety Officer will be responsible to ensure contractor's operations are in compliance with the airport's vehicle rules and regulations. The Contractor's Safety Officer will be trained on the rules and regulations by Airport Staff prior to beginning the project.

The Contractor shall ensure that all personal who will be driving vehicles thoroughly understand airport operations and the airport's vehicle rules and regulations. Emphasis shall be placed on the importance of Runway OFZ and OFA, Taxiway OFAs, and safety areas of taxiways and runway, hold lines, airfield markings, Notices to Air Missions (NOTAMs), radio operation, and understanding this CSPP.

(8) Situational Awareness. Vehicle drivers shall 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. No vehicles shall pass in front of pedestrians or moving aircraft. In addition, it is the responsibility of the escort vehicle driver to verify the movement and position of all escorted vehicles. At this non-towered airport, 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.

(9) Two-Way Radio Communication Procedures.

(1) General. Construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas must observe the proper procedures for communications, including using the appropriate radio frequency. When operating vehicles on or near open runways or taxiways, construction personnel must maintain radio contact at all times with:

- Announce their intensions and monitor aircraft operations on the Common Traffic Advisory Frequency (CTAF) at other times.
- Airport operations.

The Contractor shall conduct training sessions to assure that all personnel who will be performing radio contact on the CTAF or with airport operations personnel thoroughly understand airport operations. Emphasis shall be placed on the importance of Runway OFZ and OFA, Taxiway OFAs, and safety areas of taxiways and the runway, hold lines, airfield markings, Notices to Air Missions (NOTAMs), radio operation, and understanding this CSPP.

The contractor shall provide a minimum of 2 radios capable of communication with the CTAF and designate an individual to monitor aircraft operations during all construction

activities. The individual operating the radio shall be trained in aviation radio communications.

Vehicle traffic located in or crossing an AOA must have a working two-way radio, be under the direction of contractor furnished flaggers, or be escorted by a vehicle with a radio. All drivers shall confirm that no aircraft is approaching the vehicle position.

(2) Areas Requiring Two-Way Radio Communication with the ATCT.

Not used.

(3) Frequencies to be Used. The contractor shall use and monitor the airport's Common Traffic Advisory Frequency (CTAF) 122.725 MHz.

(4) Radio Usage. Contractor shall adhere to proper radio usage protocol, including read back requirements. Per established procedures at the Albany Municipal Airport. Contractor's Safety Officer will be trained on the rules and regulations by Airport Staff prior to beginning the project.

(5) Phraseology. Radio operators shall use proper phraseology, including the International Phonetic Alphabet.

(6) Light gun signals. Not applicable.

(10) Maintenance of the Secured Area of the Airport, including:

(1) Fencing and Gates. Contractors shall maintain security during construction. There shall be no temporary openings in the existing fence to allow access to the AOA. Construction access shall be allowed through existing vehicle gates indicated on the drawings. If a gate needs to be open for numerous passages, a gate guard shall be provided by the contractor. Procedures shall 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.

(2) Badging Requirements. **Airports subject to 49 CFR Part 1542, Airport Security**. Individual badging is not required; however, the airport operator reserves the right to perform background checks on individuals before approving their access onto airport property.

(11) Flagging. Not used.

2.10 WILDLIFE MANAGEMENT. The airport does not have a Wildlife Hazard Management Plan. The Contractor shall carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel shall be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

1. **Trash.** Food scraps must be collected from construction personnel activity.
2. **Standing Water.**
3. **Tall Grass and Seeds.**
4. **Poorly Maintained Fencing and Gates.** See 2.9.2(10)(1) above.
5. **Disruption of Existing Wildlife Habitat.** Contractor personnel shall immediately notify the airport operator of wildlife sightings.

2.11 FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT. The Contractor shall not leave or place FOD on or near active aircraft movement areas. Materials tracked onto these areas must be removed immediately. Materials capable of creating FOD damage shall be continuously removed during the construction project. Fencing may be necessary to contain material that can be carried by wind into areas where aircraft operate.

2.12 HAZARDOUS MATERIALS (HAZMAT) MANAGEMENT. The contractor shall be prepared to expeditiously contain and clean-up spills resulting from fuel or hydraulic fluid leaks.

2.13 NOTIFICATION OF CONSTRUCTION ACTIVITIES. The contractor shall immediately notify the airport operator or Engineer of any conditions adversely affecting the operational safety of the airport.

1. List of Responsible Representatives/Points of Contact. The contractor shall prepare and maintain an emergency contact list for all involved parties, and procedures for contacting each party, including after hours.

- Medical, Firefighting, and Police Response - 911
- Owner's Representative – Robb Romeo – (541) 917-7605
- FAA Project Manager – Chelsea Branchcomb – (206) 231-4231
- Engineer's Representative – Geoff Vaughn – (541) 231-6645

2. NOTAMs. Before beginning any construction activity which may impact the normal operations at the airport the contractor must ensure that the activity has been reported using the FAA's Notice to Air Missions (NOTAM) system. Upon completion of work and return of areas to standard conditions, the contractor must verify the cancellation of all applicable NOTAMs. Only the airport operator may initiate or cancel NOTAMs, and is the only entity that can close or open a runway.

3. Emergency notification procedures for medical, firefighting, and police response. The Contractor shall call 911 first. Immediately after calling 911, the Contractor shall call the Owner's Representative, Robb Romeo at (541) 917-7605 to report the emergency. After reporting to the Owner, the Contractor shall report to Engineer's designated representative, Geoff Vaughn, at (541) 231-6645.

4. Coordination with ARFF. Not applicable.

5. Notification to the FAA. All communication with the FAA will be accomplished by the airport operator.

When construction operations require a shutdown of an airport-owned/FAA maintained NAVAID from service for more than 24 hours or in excess of 4 hours daily on consecutive days, a minimum 45-day notice prior to facility shutdown is required. Notice will be provided to FAA by the airport operator through submittal of an "Airport Sponsor Strategic Event Submission Form". Unanticipated utility outages and cable cuts that could impact FAA NAVAIDs must be reported to the Owner or Engineer immediately.

Construction/maintenance activity may not commence prior to issuance of a NOTAM. The Contractor shall advise the RPR 48 hours in advance of the planned commencement of construction/ maintenance activity so a NOTAM can be issued and shall not commence such activity until advised by the RPR. Upon completion of work to the satisfaction of the RPR, the issued NOTAM will be cancelled. No further work in affected areas will be permitted.

6. NAVAIDs.

For emergency (short-notice) notification about impacts to airport owned and FAA owned NAVAIDs, contact the FAA: 866-432-2622; Airport Owner: Robb Romeo, 541-917-7605; and project manager for Precision Approach Engineering, Geoff Vaughn, 541-231-6645. Planned impacts to NAVAIDs as detailed in this CSPP have been coordinated with the FAA where required (See Paragraph 2.5.3 for additional details).

2.14 INSPECTION REQUIREMENTS.

1. Daily Inspections. Inspections performed by the contractor will be conducted daily, or more frequently if necessary to ensure conformance with this CSPP. A Construction Progress Daily Safety (CPDS) checklist, enclosed as part of this document, shall be used.

2. Interim Inspections. Inspections shall be conducted by the contractor 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 shall conduct an inspection of the work area with airport operations personnel. The contractor shall 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 once all items on the list meet the airport operator's satisfaction shall the area be opened to aircraft operations. The contractor shall 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.

3. Final Inspection. A final inspection with the participation of the Owner, Engineer, Contractor and any Owner invited stakeholders will be performed.

2.15 UNDERGROUND UTILITIES. Known utilities and structures expected to be encountered in the work area shown on the Construction Drawings. There may be some discrepancies and omissions in the locations and quantities of utilities and structures shown. Those shown are for the convenience of the Contractor only, and no responsibility is assumed by either the airport or the Engineer for their accuracy or completeness.

Coordination among the FAA, airport management, utility companies, RPR, and contractors will be accomplished at the Preconstruction Conference. NAVAIDs, electric cables, and other utilities must be fully protected during the entire construction time.

The Contractor shall be responsible to locate and protect all utilities, cables, wires, pipelines and other underground facilities during this project. This shall include calling the Utility Notification Center to locate public utilities and hiring a private utility location service if required. The Contractor shall take all necessary precautions to protect utilities. The Contractor shall be responsible for any and all costs, fees, and penalties associated with the damage and repair of any utilities. Coordinate with RPR prior to excavation.

2.16 PENALTIES. Contractors are subject to suspension of work for noncompliance. Contractor Personnel who violate safety requirements may be removed from the project at the sole discretion of the Owner.

2.17 SPECIAL CONDITIONS. Not applicable.

2.18 RUNWAY AND TAXIWAY VISUAL AIDS. The contractor shall 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, the contractor shall 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.

1. General. Airport markings, lighting, signs, and visual NAVAIDs shall be clearly visible to pilots, and not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents and constructed of frangible materials that would 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. Markings. Markings shall be in compliance with the standards of AC 150/5340-1, Standards for Airport Markings. Where possible, any temporary markings on finish grade pavements shall be placed to mirror the dimensions of the final markings.

(1) Closed Runways and Taxiways. Marking delineating closure(s) is not required.

(1) **Temporarily Closed Taxiways.** Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place barricades outside of the Runway Object Free Area. A canvas taxiway closure cross shall be placed at the entrance to the closed taxiway from the runway, verify location with RPR prior to installation.

3. Lighting and Visual NAVAIDs. Lighting must be in conformance with AC 150/5340-30, Design and Installation Details for Airport Visual Aids, and 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. Precision Approach Path Indicators (PAPIs), Visual Approach Slope Indicators (VASIs), Runway End Identifier Lights (REILs) and lighting will require powering, depowering, activation, and deactivation during the project, see CSPP drawings for additional requirements. It is the contractor's responsibility to perform the work and coordinate all such changes with the Owner or RPR to ensure proper NOTAMs are issued. At the end of each day the contractor shall perform a check of temporary electrical facilities. A log of the daily checks shall be maintained onsite.

(1) Permanently Closed Runways and Taxiways. Not applicable.

(2) Temporarily Closed Runways. Use a fabric X, both at night and during the day, placed at each end of the runway facing the approach. During Runway 16-34 closures, VASIs, PAPIs, REILs and airfield lighting shall be turned off.

(3) Partially Closed Runways. Not applicable.

(4) Temporary Displaced Thresholds. Not applicable.

(5) Temporarily Closed Taxiways. Once the new taxiway edge lighting is active, any temporary closure of taxiways will require deactivation of the taxiway lighting circuit. When deactivation is not possible (for example other taxiways on the same circuit are to remain open), cover the light fixture in such a way as to prevent light leakage.

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 for the duration of a project. Any time a sign does not serve its normal function; it must be covered or removed to prevent misdirecting pilots. Runway exit signs are to be covered for closed runway exits. Outbound destination signs are to be covered for closed runways. Maintain mandatory hold signs to operate normally in any situation where pilots or vehicle drivers could mistakenly be in that location.

   During Phase 3, Taxiway A3 guidance signs (two in total) shall be screened by the contractor. Contractor shall submit method of screening to the RPR prior to installation.

5. **Temporary Signs**. Not applicable.

2.19 MARKING AND SIGNS FOR ACCESS ROUTES. Pavement markings and signs will conform to AC 150/5340-18 and with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) or State highway specifications. Signs adjacent to areas used by aircraft will comply with the frangibility requirements of AC 150/5220-23, Frangible Connections.

2.20 HAZARD MARKING, LIGHTING AND SIGNING.

1. Hazard Marking and Lighting. Hazardous areas in the AOA, including any area affected by construction that is normally accessible to aircraft, personnel, or vehicles, open manholes, areas under repair, stockpiled material, waste areas, open trenches and excavations and areas subject to jet blast, shall be marked with barricades. During periods of low visibility and at night, red flashing lights shall be operational on the barricades. The hazardous area marking and lighting shall be furnished and maintained by the contractor.

2. **Equipment.**

   (1) Barricades. Low profile barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods to identify and define the limits of construction and hazardous areas. 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. 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) Lights. Lights shall be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Lights shall be mounted on barricades and spaced at no more than 10 ft. Lights shall be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations.

   (3) Signs. The contractor shall supplement barricades with signs (for example “No Entry,” “No Vehicles”) as necessary.

   (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, the contractor shall 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 in square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway safety area, or apron must be as low as possible to the ground, and no more than 18 in high, exclusive of supplementary lights and flags. Barricades shall be of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. If affixed to the surface, they shall be frangible within 3 inches of the ground.

(5) Air Operations Area - Runway/Taxiway Intersections. The contractor shall use highly reflective "low profile" barricades with lights to close taxiways leading to closed runways.

(6) Air Operations Area - Other. Beyond runway and taxiway object free areas and aprons, the contractor may use various materials, including railroad ties, sawhorses, jersey barriers, or barrels as barricades intended for construction vehicles and personnel.

(7) Maintenance. The construction specifications include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor shall file the contact person's information with the airport operator. Lighting shall 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. Light towers should be positioned and adjusted to aim away from the active runway. Shielding may be necessary.

2.22 PROTECTION OF RUNWAY AND TAXIWAY SAFETY AREAS, OBSTACLE FREE ZONES, OBJECT FREE AREAS, AND RUNWAY APPROACH/DEPARTURE AREAS. Runway and taxiway safety areas, obstacle free zones (OFZ), object free areas (OFA), and approach/departure surfaces shall be protected at all times by the contractor. This project is being coordinated with the Seattle ADO. Approval of a separate Form 7460-1 for construction activities is required (See paragraph 2.23.1(1) for additional requirements prior to construction). The CSPP drawings show safety areas, object free areas, obstacle free zones affected by construction.

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. Construction activities within the existing RSA are subject to the following conditions:

(1) No construction may occur within the RSA while the runway is open for aircraft operations.

(2) Excavations

(1) Open trenches or excavations are not permitted within the RSA while the runway is open. If the runway must be opened before excavations are backfilled, the contractor shall cover the excavations appropriately. Covering for open excavations shall be designed to

allow the safe operation of the heaviest aircraft operating on the runway without damage to the aircraft.

(2) The contractor shall 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.

(3) 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 be capable, under dry conditions, of supporting emergency response equipment, airport operations equipment and the occasional passage of aircraft without causing structural damage to the aircraft.

6. Runway Object Free Area (ROFA). Construction, including excavations, is not permitted in the ROFA. Equipment and material shall not be stored or stockpiled in the ROFA.

7. Taxiway Safety Area (TSA). 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. Construction activities within the TSA are subject to the following conditions:

(1) No construction may occur within the TSA while the taxiway is open for aircraft operations.

(2) Excavations.

(1) Curves. Open trenches or excavations are not permitted within the TSA while the taxiway is open. If the taxiway must be opened before excavations are backfilled, the contractor shall cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway without damage to the aircraft.

(2) Straight Sections. Open trenches or excavations are not permitted within the TSA while the taxiway is open. If the taxiway must be opened before excavations are backfilled, the contractor shall cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway without damage to the aircraft.

(3) The contractor shall 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.

(3) 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 be capable, under dry conditions, of supporting emergency response equipment, airport operations equipment and the occasional passage of aircraft without causing structural damage to the aircraft.

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. No construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

5. Obstacle Free Zone (OFZ). Personnel, material, or equipment may not penetrate the OFZ while the runway is open for aircraft operations.

6. Runway Approach/Departure Areas and Clearways. Personnel, materials, and equipment shall remain clear of the applicable approach and departure surfaces.

(1) Construction activity in a runway approach/departure area. Runways will be closed if work is to be accomplished in these areas.

(2) Caution regarding partial runway closures. Not applicable.

(3) Caution regarding displaced thresholds. Not applicable.

2.23 OTHER LIMITATIONS ON CONSTRUCTION:

1. Prohibitions.

(1) The use of tall equipment is prohibited unless a Form 7460-1 determination letter has been issued by FAA. The Contractor shall submit a Form 7460-1 for the use of temporary tall equipment.

(2) Open flame welding or torches are not permitted unless fire safety precautions are provided and the airport operator has approved their use.

(3) The use of electrical blasting caps on the airport is prohibited.

(4) The use of flare pots within the AOA is prohibited.

2. Restrictions.

(1) Construction suspension required during specific airport operations. The airport owner shall have the authority to suspend the work wholly, or in part, for such period as necessary, due to conditions considered unfavorable for the prosecution of the work, or due to the failure of the Contractor to carry out orders given or perform provisions of the contract.

(2) Areas that cannot be worked on simultaneously. The contractor shall refer to the CSPP Drawings for a description of areas that cannot be worked on simultaneously.

(3) Day or night construction restrictions. The contractor shall refer to the CSPP drawings for a description of day or night construction restrictions.

(4) Seasonal construction restrictions. None are anticipated.

3. Temporary signs not approved by the airport operator. Not applicable.

4. Grade changes that could result in unplanned effects on NAVAIDs. None anticipated.

Appendices:

Appendix A: Construction Project Daily Safety (CPDS)

Appendix B: International Phonetic Alphabet

Appendix C: Construction Safety and Phasing Plan (CSPP) Drawings

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Appendix A

Construction Project Daily Safety (CPDS)

APPENDIX A
CONSTRUCTION PROJECT DAILY SAFETY (CPDS) 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.

Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) - cranes, drills, and similar objects - located in critical areas, such as OFZ and 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, and 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		

Item	Action Required (Describe)	No Action Required (Check)
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.		
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).		
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 B

International Phonetic Alphabet

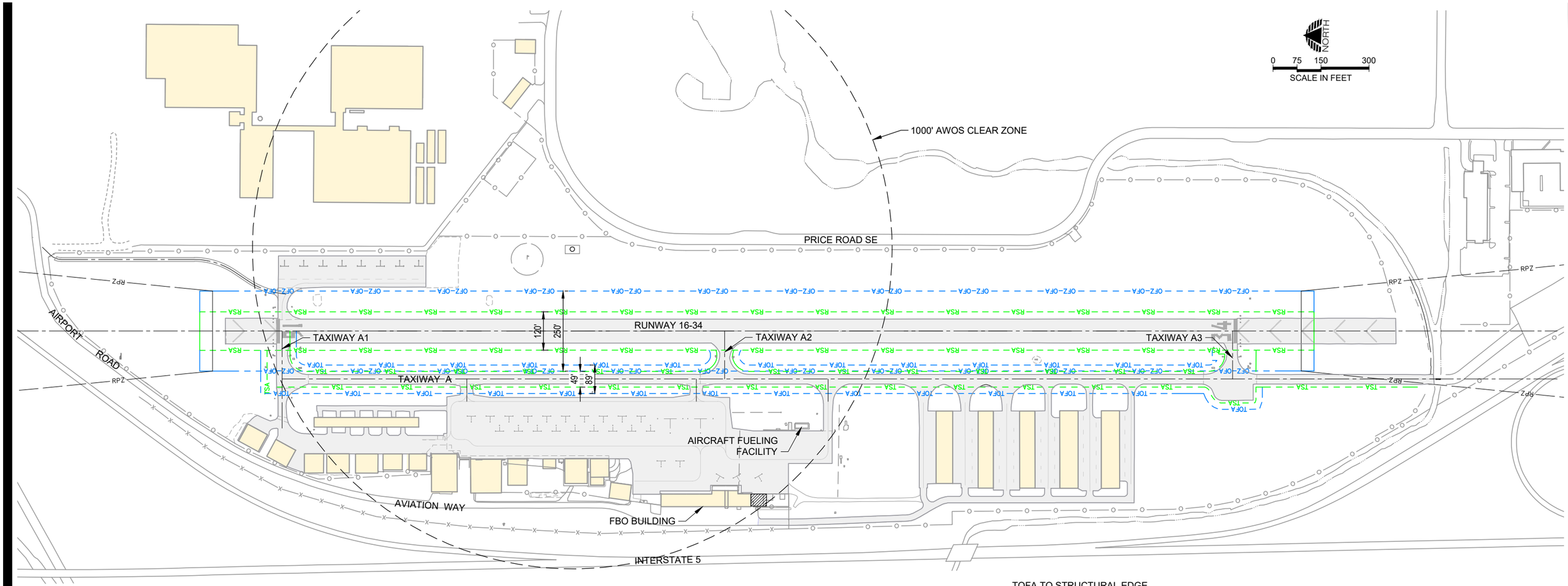
APPENDIX B
INTERNATIONAL PHONETIC ALPHABET

Letter	Word	Pronunciation
A	Alfa (ICAO, ITU, FAA) Alpha (ANSI)	**AL** FAH
B	Bravo	**BRAH** VOH
C	Charlie	**CHAR** LEE or **SHAR** LEE (ICAO, ITU)
D	Delta	**DELL** TAH
E	Echo	**ECK** OH
F	Foxtrot	**FOKS** TROT
G	Golf	GOLF
H	Hotel	HO **TELL** (ICAO) HOH **TELL** (ITU, FAA)
I	India	**IN** DEE AH
J	Juliett (ICAO, ITU, FAA) Juliet (ANSI)	**JEW** LEE **ETT**
K	Kilo	**KEY** LOH
L	Lima	**LEE** MAH
M	Mike	MIKE
N	November	NO **VEM** BER
O	Oscar	**OSS** CAH
P	Papa	PAH **PAH**
Q	Quebec	KEH **BECK**
R	Romeo	**ROW** ME OH

S	Sierra	SEE **AIR** RAH (ICAO, ITU) SEE **AIR** AH (FAA)
T	Tango	**TANG** GO
U	Uniform	**YOU** NEE FORM or **OO** NEE FORM (ICAO, ITU)
V	Victor	**VIK** TAH
W	Whiskey	**WISS** KEY
X	X-ray	**ECKS RAY** (ICAO, ITU) **ECKS** RAY (FAA)
Y	Yankee	**YANG** KEY
Z	Zulu	**ZOO** LOO
0	Zero (ICAO, FAA) Nadazero (ITU)	ZE RO (ICAO, FAA) NAH-DAH-ZAY-ROH (ITU)
1	One (ICAO, FAA) Unaone (ITU)	WUN (ICAO, FAA) OO-NAH-WUN (ITU)
2	Two (ICAO, FAA) Bissotwo (ITU)	TOO (ICAO, FAA) BEES-SOH-TOO (ITU)
3	Three (ICAO, FAA) Terrathree (ITU)	TREE (ICAO, FAA) TAY-RAH-TREE (ITU)
4	Four (ICAO, FAA) Kartefour (ITU)	**FOW** ER (ICAO, FAA) KAR-TAY-FOWER (ITU)
5	Five (ICAO, FAA) Pantafive (ITU)	FIFE (ICAO, FAA) PAN-TAH-FIVE (ITU)
6	Six (ICAO, FAA) Soxisix (ITU)	SIX (ICAO, FAA) SOK-SEE-SIX (ITU)
7	Seven (ICAO, FAA) Setteseven (ITU)	**SEV** EN (ICAO, FAA) SAY-TAY-SEVEN (ITU)
8	Eight (ICAO, FAA) Oktoeight (ITU)	AIT (ICAO, FAA) OK-TOH-AIT (ITU)
9	Nine (ICAO, FAA) Novenine (ITU)	**NIN** ER (ICAO, FAA) NO-VAY-NINER (ITU)

Appendix C

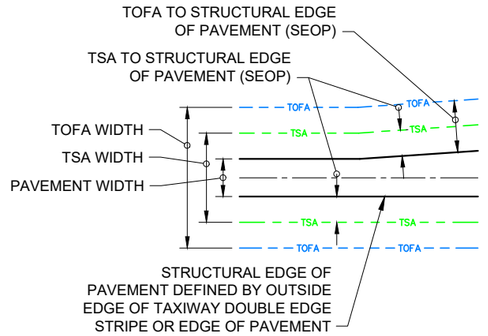
Construction Safety and Phase Plan (CSPP) Drawings



CRITICAL AREA DIMENSIONS TABLE

AREA	PAVEMENT WIDTH	RSA/TSA WIDTH	RSA/TSA TO SEOP	OFA/TOFA WIDTH	OFA/TOFA TO SEOP	OFZ WIDTH	OFZ TO SEOP	LENGTH BEYOND RUNWAY END RSA	LENGTH BEYOND RUNWAY END OFA	LENGTH BEYOND RUNWAY END OFZ
RUNWAYS										
16-34	75'	120'	37.5'	250'	212.5'	250'	162.5'	80'	80'	80'
TAXIWAYS										
A,A1-A3	30'	49'	22'	89'	48'	N/A	N/A	N/A	N/A	N/A

NOTES
1. ACRONYMS:
   - RSA RUNWAY SAFETY AREA
   - ROFA RUNWAY OBJECT FREE AREA
   - TSA TAXIWAY/TAXILANE SAFETY AREA
   - TOFA TAXIWAY/TAXILANE OBJECT FREE AREA
   - SEOP STRUCTURAL EDGE OF PAVEMENT
2. SEE CRITICAL AREA DETAIL 1/1 FOR DEFINITION OF WIDTHS



CRITICAL AREA DETAIL 1/1
NTS

PRINT IN COLOR

THIS DRAWING IS INTENDED TO BE PRINTED IN COLOR. PRINTING IN BLACK AND WHITE MAY REDUCE READABILITY AND ALTER ENTITY DEFINITION OR REPRESENTATION.

PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043

ALBANY MUNICIPAL AIRPORT
INSTALL RUNWAY 16-34 PAPI; INSTALL TAXIWAY A LIGHTING

CONSTRUCTION SAFETY AND PHASING PLAN

CRITICAL AREAS

SHEET 1 JUN 2024

PROJECT CONSTRUCTION TIME

WORK ELEMENTS TO COINCIDE WITH CLOSURE AREAS IDENTIFIED IN CONSTRUCTION PLANS

ALL ELEMENTS OF WORK TO BE COMPLETED WITHIN THE TOTAL PROJECT CALENDAR DAY COUNT.

PHASE	AIR OPERATIONS AREA (AOA) IMPACT, SEE GENERAL NOTE 3, SHEET 6	NAVAID LIGHTING IMPACT	ALLOWABLE DAILY WORK PERIOD, (LOCAL TIME), SEE NOTE A	MAXIMUM NUMBER OF CALENDAR DAYS ALLOWED, SEE NOTE B
1	RUNWAY 16-34 CLOSED, TAXIWAY A1, A2, AND A3 CLOSED, PARTIAL TAXIWAY A CLOSURE	RUNWAY 16- REIL, RUNWAY 16 VASI, RUNWAY 34 VASI, RUNWAY 16-34 EDGE LIGHTING	07:00 - 19:00	8, SEE NOTE D
2	RUNWAY 16-34 CLOSED, TAXIWAY A1, A2, AND A3 CLOSED, PARTIAL TAXIWAY A CLOSURE	RUNWAY 16- REIL, RUNWAY 16 VASI, RUNWAY 34 VASI, RUNWAY 16-34 EDGE LIGHTING	07:00 - 19:00	2, SEE NOTE E
3	PARTIAL TAXIWAY A CLOSURE, TAXIWAY A3 CLOSED	NONE	07:00 - 19:00	16, SEE NOTE F
4	PARTIAL TAXIWAY A CLOSURE	NONE	07:00 - 19:00	14, SEE NOTE F

NOTES:

A. UNLESS OTHERWISE APPROVED BY THE ENGINEER.
B. RUNWAY, TAXIWAYS, AND AIR OPERATIONS AREA (AOA) IMPACTS WILL BE FOR THE NUMBER OF DAYS INDICATED.
C. IF THE CONTRACTOR FAILS TO COMPLETE ANY OF THE PHASES WITHIN THE SPECIFIED TIME PERIOD, LIQUIDATED DAMAGES WILL BE ASSESSED. SEE SPECIFICATIONS.
D. CONTRACTOR REQUIRED TO CLOSE RUNWAY 16-34, TAXIWAY A, A1, A2, A3 EACH MORNING AND RE-OPEN EACH EVENING FOR THIS PHASE. IF ADDITIVE A IS SELECTED FOR CONSTRUCTION, AN ADDITIONAL 7 CALENDAR DAYS WILL BE ALLOWED WITHIN PHASE 1 FOR ADDITIVE WORK ELEMENTS.
E. FOLLOWING PHASE 1 COMPLETION, WORK WILL BE SUSPENDED UNTIL PHASE 2 CAN START. PHASE 2 WILL BE BEGIN ONCE PAPI FOUNDATIONS ARE SUFFICIENTLY CURED TO ALLOW FOR INSTALLATION OF THE NEW PAPI UNITS.
F. IF ADDITIVE A IS SELECTED FOR CONSTRUCTION, PHASES 3 AND 4 WILL BE UTILIZED FOR THE ADDITIVE IMPROVEMENTS. WITH PRIOR OWNER APPROVAL, PHASES 3 OR 4 MAY BE CONSTRUCTED PRIOR TO OR CONCURRENTLY WITH PHASES 1 OR 2.

PHASING NOTES

1. SEE CONSTRUCTION PLAN GENERAL NOTES, SHEET 6, FOR ADDITIONAL REQUIREMENTS.
2. VEHICLES LOCATED IN OR CROSSING ACTIVE AREAS MUST HAVE A WORKING TWO-WAY RADIO, BE UNDER THE SUPERVISION OF CONTRACTOR FURNISHED FLAGGERS, OR BE ESCORTED BY A VEHICLE WITH A RADIO. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
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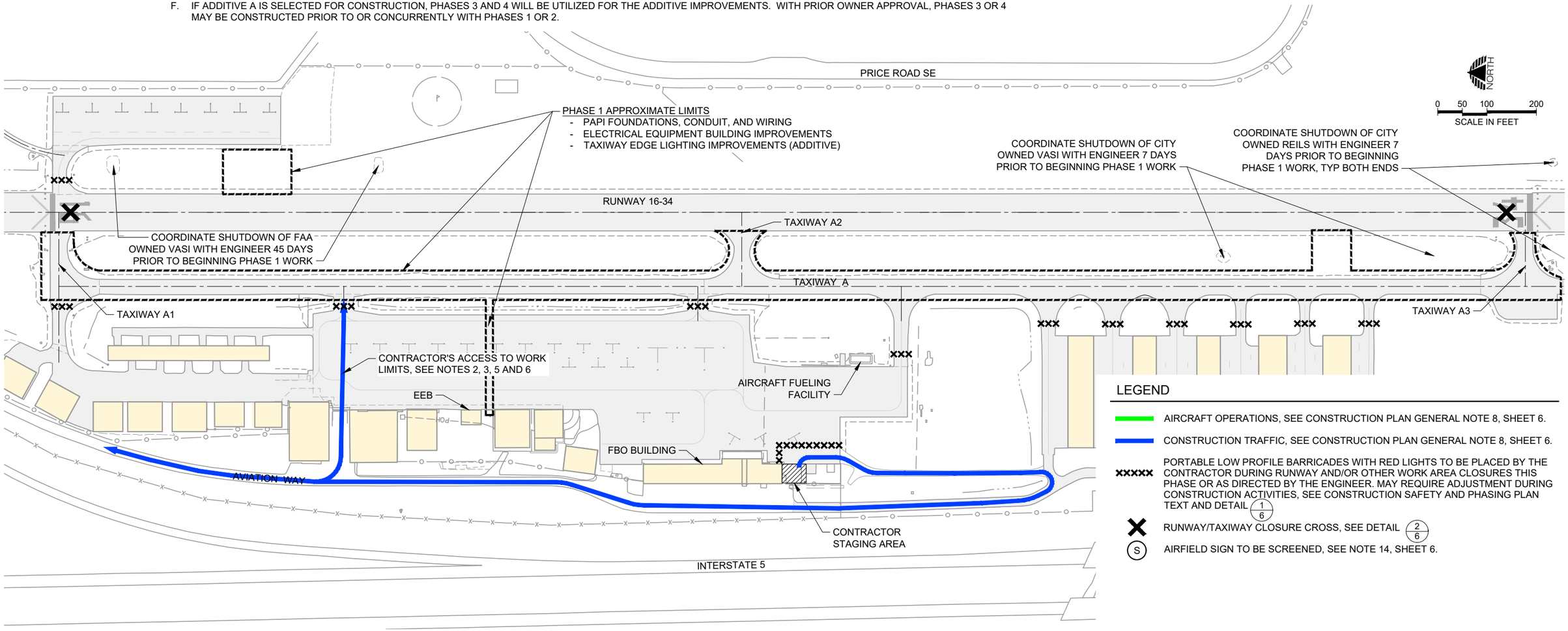
7. TRENCHES WITHIN THE RSA OR TSA SHALL BE BACKFILLED PRIOR TO OPENING THE RUNWAY OR TAXIWAY TO AIRCRAFT, SEE NOTE 7 ON SHEET 9.



LEGEND

- AIRCRAFT OPERATIONS, SEE CONSTRUCTION PLAN GENERAL NOTE 8, SHEET 6.
- CONSTRUCTION TRAFFIC, SEE CONSTRUCTION PLAN GENERAL NOTE 8, SHEET 6.
- XXXXX PORTABLE LOW PROFILE BARRICADES WITH RED LIGHTS TO BE PLACED BY THE CONTRACTOR DURING RUNWAY AND/OR OTHER WORK AREA CLOSURES THIS PHASE OR AS DIRECTED BY THE ENGINEER. MAY REQUIRE ADJUSTMENT DURING CONSTRUCTION ACTIVITIES, SEE CONSTRUCTION SAFETY AND PHASING PLAN TEXT AND DETAIL 1/6
- RUNWAY/TAXIWAY CLOSURE CROSS, SEE DETAIL 2/6
- (S) AIRFIELD SIGN TO BE SCREENED, SEE NOTE 14, SHEET 6.

PRINT IN COLOR

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PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043

ALBANY MUNICIPAL AIRPORT
INSTALL RUNWAY 16-34 PAPI; INSTALL TAXIWAY A LIGHTING

CONSTRUCTION SAFETY AND PHASING PLAN
PHASE 1

SHEET 2 JUN 2024

PROJECT CONSTRUCTION TIME

WORK ELEMENTS TO COINCIDE WITH CLOSURE AREAS IDENTIFIED IN CONSTRUCTION PLANS

ALL ELEMENTS OF WORK TO BE COMPLETED WITHIN THE TOTAL PROJECT CALENDAR DAY COUNT.

PHASE	AIR OPERATIONS AREA (AOA) IMPACT, SEE GENERAL NOTE 3, SHEET 6	NAVAID LIGHTING IMPACT	ALLOWABLE DAILY WORK PERIOD, (LOCAL TIME), SEE NOTE A	MAXIMUM NUMBER OF CALENDAR DAYS ALLOWED, SEE NOTE B
1	RUNWAY 16-34 CLOSED, TAXIWAY A1, A2, AND A3 CLOSED, PARTIAL TAXIWAY A CLOSURE	RUNWAY 16- REIL, RUNWAY 16 VASI, RUNWAY 34 VASI, RUNWAY 16-34 EDGE LIGHTING	07:00 - 19:00	8, SEE NOTE D
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3	PARTIAL TAXIWAY A CLOSURE, TAXIWAY A3 CLOSED	NONE	07:00 - 19:00	16, SEE NOTE F
4	PARTIAL TAXIWAY A CLOSURE	NONE	07:00 - 19:00	14, SEE NOTE F

NOTES:

A. UNLESS OTHERWISE APPROVED BY THE ENGINEER.
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F. IF ADDITIVE A IS SELECTED FOR CONSTRUCTION, PHASES 3 AND 4 WILL BE UTILIZED FOR THE ADDITIVE IMPROVEMENTS. WITH PRIOR OWNER APPROVAL, PHASES 3 OR 4 MAY BE CONSTRUCTED PRIOR TO OR CONCURRENTLY WITH PHASES 1 OR 2.

PHASING NOTES

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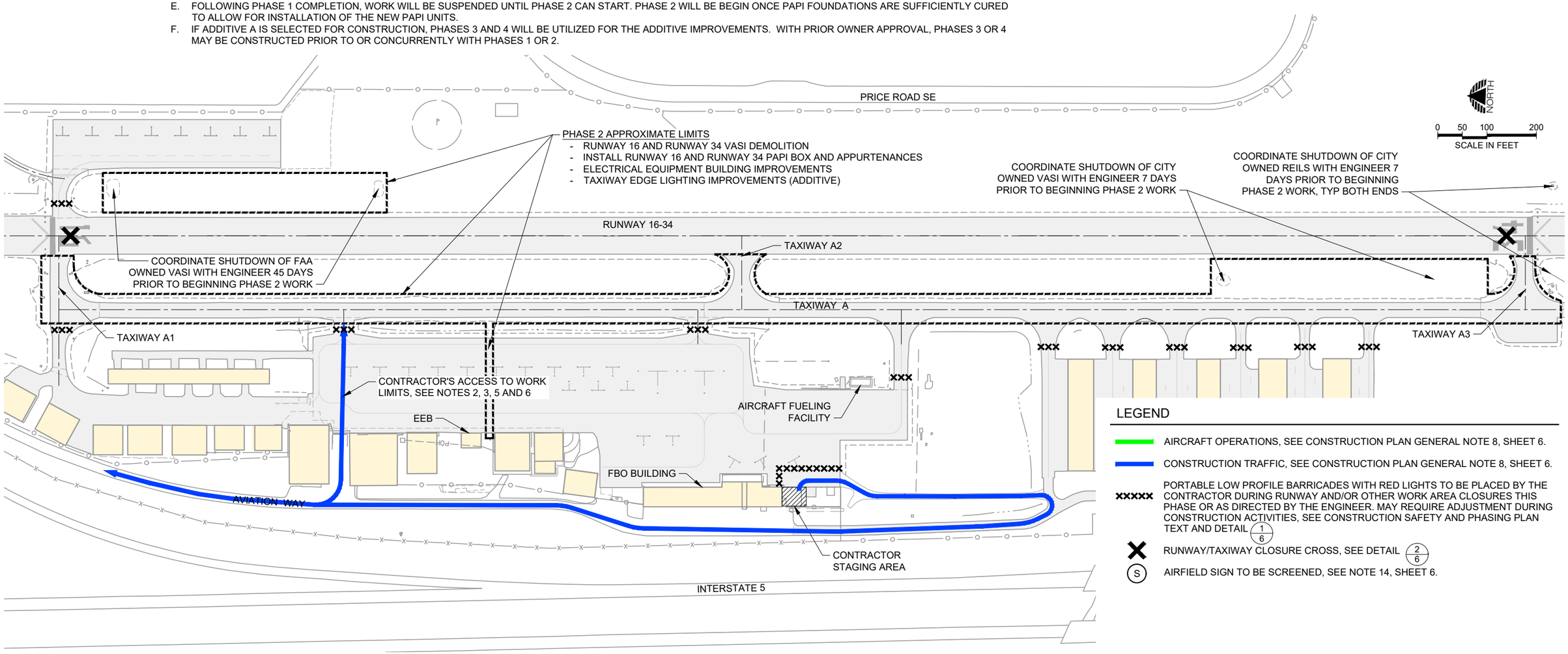

LEGEND

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PRINT IN COLOR

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PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043

ALBANY MUNICIPAL AIRPORT
INSTALL RUNWAY 16-34 PAPI; INSTALL TAXIWAY A LIGHTING

CONSTRUCTION SAFETY AND PHASING PLAN
PHASE 2

SHEET 3 JUN 2024

PROJECT CONSTRUCTION TIME

WORK ELEMENTS TO COINCIDE WITH CLOSURE AREAS IDENTIFIED IN CONSTRUCTION PLANS

ALL ELEMENTS OF WORK TO BE COMPLETED WITHIN THE TOTAL PROJECT CALENDAR DAY COUNT.

PHASE	AIR OPERATIONS AREA (AOA) IMPACT, SEE GENERAL NOTE 3, SHEET 6	NAVAID LIGHTING IMPACT	ALLOWABLE DAILY WORK PERIOD, (LOCAL TIME), SEE NOTE A	MAXIMUM NUMBER OF CALENDAR DAYS ALLOWED, SEE NOTE B
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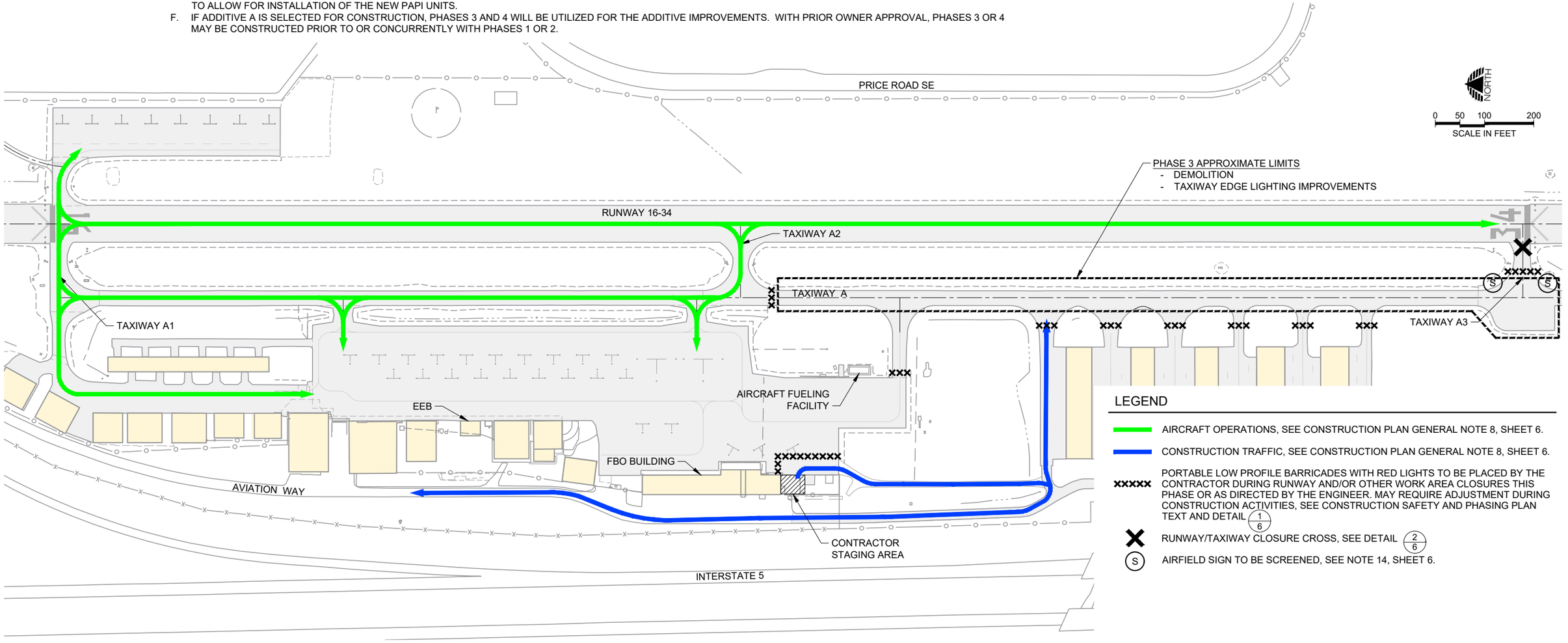

LEGEND

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PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
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541•754•0043

ALBANY MUNICIPAL AIRPORT
INSTALL RUNWAY 16-34 PAPI; INSTALL TAXIWAY A LIGHTING

CONSTRUCTION SAFETY AND PHASING PLAN
PHASE 3

SHEET 4 JUN 2024

PROJECT CONSTRUCTION TIME

WORK ELEMENTS TO COINCIDE WITH CLOSURE AREAS IDENTIFIED IN CONSTRUCTION PLANS

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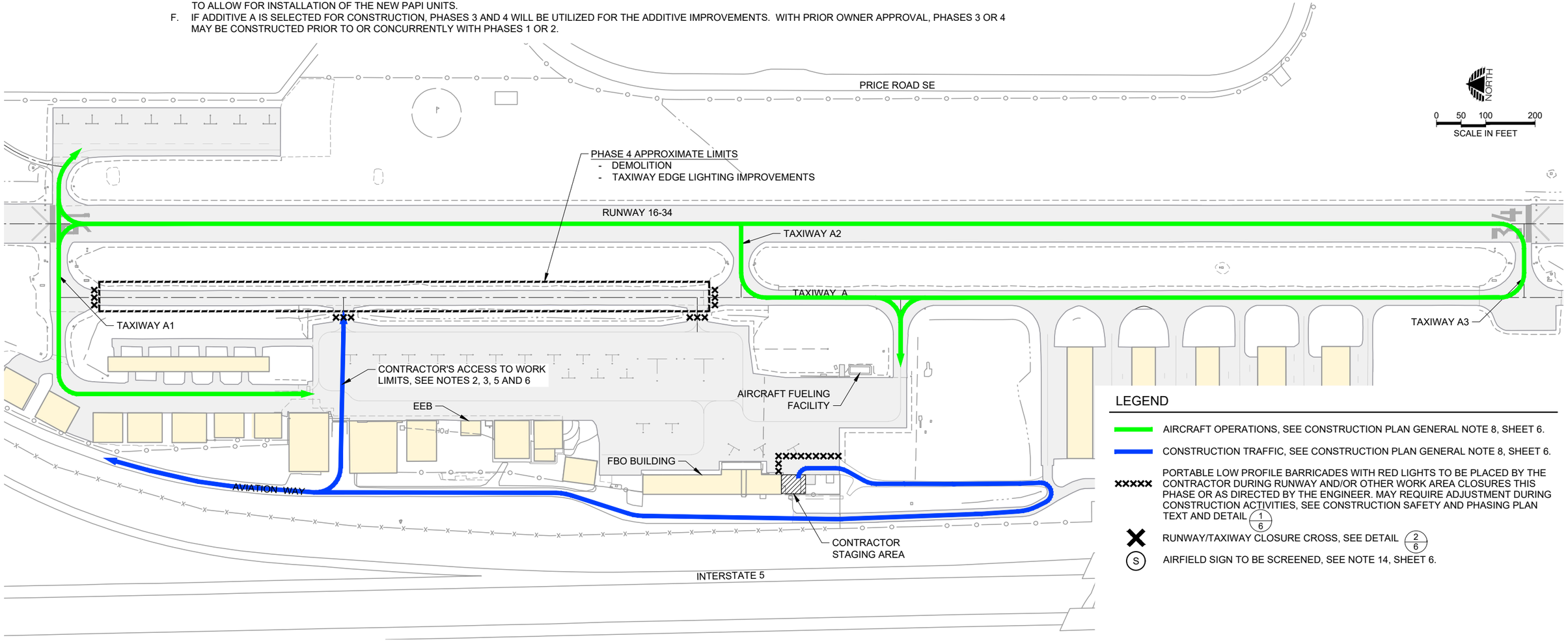

LEGEND

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PRECISION APPROACH ENGINEERING
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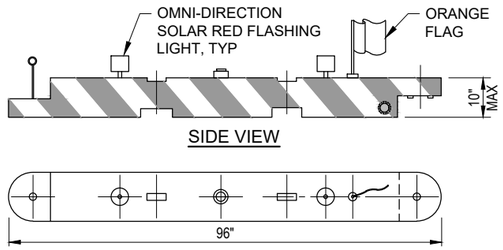
ALBANY MUNICIPAL AIRPORT
INSTALL RUNWAY 16-34 PAPI; INSTALL TAXIWAY A LIGHTING

CONSTRUCTION SAFETY AND PHASING PLAN
PHASE 4

SHEET 5 JUN 2024

CONSTRUCTION PLAN GENERAL NOTES

1. EXCEPT FOR CLOSURES NOTED, AIRPORT AND AIR OPERATIONS AREAS (AOAS) TO REMAIN OPEN TO AIRCRAFT OPERATIONS DURING ENTIRE COURSE OF WORK. SEE SPECIFICATIONS AND CONSTRUCTION SAFETY AND PHASING PLAN (CSPP) TEXT FOR ADDITIONAL REQUIREMENTS. CONTRACTOR SHALL COORDINATE WORK TO ASSURE MINIMUM INCONVENIENCE TO AIRPORT OPERATIONS. IN ALL CIRCUMSTANCES SAFETY SHALL TAKE PRECEDENCE.
2. AIRCRAFT ACCESS TO THE APRON AREAS AND HANGARS TO BE MAINTAINED TO THE MAXIMUM EXTENT POSSIBLE.
3. WORK WITHIN THE RUNWAY OBSTACLE FREE ZONE (ROFZ) OR TAXIWAY OBJECT FREE AREA (TOFA) WILL REQUIRE CLOSURE OF IMPACTED RUNWAY OR TAXIWAY. SEE AIRFIELD CRITICAL AREAS DRAWING FOR LIMITS. SEE CSPP TEXT FOR ADDITIONAL REQUIREMENTS.
4. THE CONTRACTOR SHALL PROVIDE SUFFICIENT LEAD TIME FOR REQUIRED NOTIFICATIONS WITH PROJECT STAKEHOLDERS AND THE FEDERAL AVIATION ADMINISTRATION. THIS WILL REQUIRE SUBMITTAL OF A PRELIMINARY SCHEDULE TO INCLUDE START DATES FOR INDIVIDUAL PHASES AND DATES FOR AIRPORT FACILITIES IMPACTS WITHIN 10 CALENDAR DAYS AFTER NOTICE OF CONTRACT AWARD. A REVISED "CONSTRUCTION SCHEDULE" WILL BE PREPARED IN CONJUNCTION WITH THE PRE-CONSTRUCTION MEETING. THE CONTRACTOR SHALL NOTIFY THE OWNER WITH REQUESTS FOR NOTICES TO AIRMEN (NOTAMS) 48 HOURS PRIOR TO IMPLEMENTATION. CONTRACTOR SHALL COORDINATE WITH ENGINEER FOR CONSTRUCTION RELATED AOA CLOSURES. CLOSURES ARE SUBJECT TO APPROVAL BY THE OWNER. SEE CSPP TEXT FOR ADDITIONAL REQUIREMENTS.
5. CONTRACTOR SHALL DELINEATE LOCATION OF ROFZ AND TOFA AT TRAFFIC ACCESS POINTS, AND PROVIDE OTHER FIELD DELINEATION TO SEPARATE CONSTRUCTION ACTIVITIES FROM AIRPORT OPERATIONS AS DIRECTED BY THE ENGINEER. DELINEATION WITHIN THE ROFZ AND TOFA SHALL BE LOW PROFILE AND SHALL NOT PRESENT A HAZARD TO AIRCRAFT. CONES, STAKES, OR OTHER METHODS AS APPROVED BY THE ENGINEER MAY BE USED OUTSIDE THE ROFA AND TOFA.
6. BARRICADES, LIGHTS, AND OTHER CONSTRUCTION CONTROL DEVICES FURNISHED, PLACED, AND MAINTAINED BY THE CONTRACTOR SHALL BE PROVIDED AT VARIOUS LOCATIONS, AS NECESSARY TO ADEQUATELY SEPARATE CONSTRUCTION ACTIVITIES FROM THE AOA. BARRICADES SHOWN ON THE DRAWINGS ARE FOR REFERENCE AND THE NUMBER AND LOCATION OF BARRICADES MAY CHANGE TO MEET SAFETY REQUIREMENTS.
7. PRIOR TO REOPENING A CLOSED RUNWAY OR TAXIWAY FOR OPERATIONS THE CONTRACTOR SHALL PROVIDE ADEQUATE TIME FOR THE ENGINEER OR OWNER TO INSPECT FOR CLEANLINESS AND CONFORMANCE TO REGULATIONS INCLUDING GRADING REQUIREMENTS OF THE RUNWAY SAFETY AREA (RSA) OR TAXIWAY SAFETY AREA (TSA). THE TIME NEEDED FOR INSPECTION AND POSSIBLE NECESSARY CORRECTIVE ACTION SHALL BE INCLUDED WITHIN THE ALLOWED CLOSURE PERIOD.
8. WORK AREAS SHOWN IN PHASING PLANS ARE APPROXIMATE. SEE APPROPRIATE DRAWINGS FOR SPECIFIC WORK LIMITS. CONTRACTOR SHALL COORDINATE ALL WORK ELEMENTS COMPATIBLE WITH INTENDED PHASE UNLESS OTHERWISE APPROVED BY THE ENGINEER OR OWNER. AIRCRAFT OPERATIONS ROUTES SHOWN ARE APPROXIMATE AND ARE NOT LIMITED TO LOCATIONS SHOWN. CONTRACTOR SHALL REMAIN CLEAR OF AIRCRAFT OPERATIONS AT ALL TIMES.
9. CONTRACTOR SHALL NOT BLOCK VEHICLE ACCESS ROADS OR GATES AT ANY TIME.
10. LOCATION OF THE CONTRACTOR'S STAGING AREAS ARE APPROXIMATE. VERIFY LIMITS AND LOCATIONS WITH ENGINEER PRIOR TO MOBILIZATION.
11. ALL VEHICLES NOT ESSENTIAL FOR CONSTRUCTION, INCLUDING CONTRACTOR-EMPLOYEE VEHICLES SHALL REMAIN OUTSIDE OF AIR OPERATIONS AREA. PARKING SHALL BE CONFINED TO THE CONTRACTOR'S STAGING AREA.
12. ALL PORTIONS OF WORK NOT COVERED BY PAYMENT UNDER A SPECIFIC BID ITEM OR LISTED AS INCIDENTAL TO A BID ITEM SHALL BE CONSIDERED INCIDENTAL TO THE MOBILIZATION BID ITEM.
13. THE CONTRACTOR SHALL USE AND MONITOR THE AIRPORT'S COMMON TRAFFIC ADVISORY FREQUENCY (CTAF), 122.725 MHZ. SEE CSPP TEXT FOR ADDITIONAL REQUIREMENTS.
14. CONTRACTOR SHALL SCREEN EXISTING GUIDANCE SIGNS LEADING TO CLOSED AREAS USING METHODS APPROVED BY ENGINEER. CONTRACTOR SHALL SUBMIT GUIDANCE SIGN SCREENING PLAN FOR ENGINEER REVIEW AND APPROVAL PRIOR TO IMPLEMENTATION.
15. ALL CONSTRUCTION EQUIPMENT MUST BE MARKED WITH A 3 FEET BY 3 FEET ORANGE AND WHITE CHECKERED FLAG AND/OR AMBER BEACON. ALL CONSTRUCTION VEHICLES MUST BE CLEARLY MARKED WITH THE COMPANY LOGO AT ALL TIMES.
16. AIRFIELD LIGHTING TO BE OPERATIONAL AT ALL TIMES FROM SUNSET TO SUNRISE FOR AREAS OPEN TO AIRCRAFT OPERATIONS.



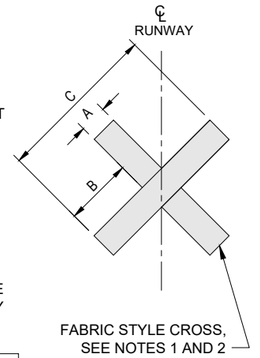
NOTES:

1. PROVIDE BARRICADE CAPABLE OF BEING FILLED WITH WATER OR SAND. IF ALTERNATE METHOD OF ANCHORING IS USED IT SHALL NOT CAUSE DAMAGE TO PAVEMENT.
2. BARRICADE TO BE CAPABLE OF BEING DEPLOYED BY ONE PERSON WHEN EMPTY.
3. CONTRACTOR SHALL MAINTAIN ALL LIGHTS IN WORKING ORDER FOR THE DURATION OF THE PROJECT. CONTRACTOR SHALL REPLACE FLAGS AS NECESSARY OR AS DIRECTED BY THE ENGINEER DUE TO DETERIORATION.
4. BARRICADES TO BE PROVIDED BY THE CONTRACTOR ARE INCIDENTAL TO THE MOBILIZATION BID ITEM AND ARE PROPERTY OF THE CONTRACTOR UPON COMPLETION OF THE PROJECT.
5. NO CONSTRUCTION SHALL BEGIN UNTIL BARRICADES HAVE BEEN PLACED AND APPROVED BY THE ENGINEER.

PORTABLE PLASTIC BARRICADE DETAIL — 1/6
NTS

CLOSURE CROSS NOTES:

1. TWO FAA APPROVED FABRIC STYLE TEMPORARY CLOSURE CROSSES SHALL BE PROVIDED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLACEMENT AND MAINTAINING THE CONDITION OF THE CROSSES. CROSSES MUST BE PROPERLY CONFIGURED AND SECURED TO PREVENT MOVEMENT BY PROP WASH, JET BLAST, OR OTHER WIND CURRENTS AS REQUIRED OR DIRECTED BY THE RPR. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. PLACE CLOSURE CROSSES AT THE RUNWAY NUMERALS OR AS INDICATED ON THE DRAWINGS ANYTIME RUNWAY 16-34 OR CONNECTOR TAXIWAY IS CLOSED TO OPERATIONS.
3. CLOSURE CROSSES TO BE PROVIDED BY THE CONTRACTOR ARE INCIDENTAL TO THE MOBILIZATION BID ITEM AND ARE PROPERTY OF THE CONTRACTOR UPON COMPLETION OF THE PROJECT.



SYMBOL TYPE	A	B	C
CLOSED RUNWAY	10'	25'	60'
CLOSED TAXIWAY	5'	12.5'	30'

CLOSURE CROSS DETAIL — 2/6
NTS

PRECISION APPROACH ENGINEERING
5125 Southwest Hout Street
Corvallis, OR 97333
541•754•0043

ALBANY MUNICIPAL AIRPORT
INSTALL RUNWAY 16-34 PAPI; INSTALL TAXIWAY A LIGHTING

CONSTRUCTION SAFETY AND PHASING PLAN
NOTES AND DETAILS

SHEET 6 JUN 2024

ITEM C-102 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL

DESCRIPTION

102-1. This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, *Operational Safety on Airports During Construction*. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

MATERIALS

102-2.1 GRASS. Not Used.

102-2.2 MULCHES. Not Used.

102-2.3 FERTILIZER. Not Used.

102-2.4 SLOPE DRAINS. Not Used.

102-2.5 SILT FENCE. Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

102-2.6 OTHER. All other materials shall meet commercial grade standards and shall be approved by the RPR before being incorporated into the project.

CONSTRUCTION REQUIREMENTS

102-3.1 GENERAL. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

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

102-3.2 SCHEDULE. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

102-3.3 CONSTRUCTION DETAILS. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

102-3.4 INSTALLATION, MAINTENANCE AND REMOVAL OF SILT FENCE. Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR.

METHOD OF MEASUREMENT

102-4.1 Temporary erosion and pollution control work required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

a. Measurement for all other temporary erosion control work required which is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls will be performed as scheduled, in compliance with local, state, and national laws and permits, as shown on the plans, or as ordered by the RPR. Completed and accepted work, not otherwise identified for separate measurement and payment, will be measured as lump sum.

102-4.2 Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

BASIS OF PAYMENT

102-5.1 Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the RPR and measured as provided in paragraph 102-4.1 will be paid for under:

Bid Item No. 2	Temporary Erosion Control – Per Lump Sum
Bid Item No. A2	Temporary Erosion Control – Per Lump Sum

Where other directed work falls within the specifications for a work item that has a contract price, the units of work shall be measured and paid for at the contract unit price bid for the various items.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33 *Hazardous Wildlife Attractants on or Near Airports*

AC 150/5370-2 *Operational Safety on Airports During Construction*

ASTM International (ASTM)

ASTM D6461 *Standard Specification for Silt Fence Materials*

United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM C-102

ITEM C-105 MOBILIZATION

105-1 DESCRIPTION. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site and other facilities necessary for work on the project except as provided in the contract as separate pay items.

105-2 MOBILIZATION LIMIT. Mobilization shall be limited to 10 percent of the total project cost.

105-3 POSTED NOTICES. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. Contractor shall also post all notices required by the State the work is being performed in. These notices must remain posted until final acceptance of the work by the Owner.

105-4 ENGINEER/RPR FIELD OFFICE. An Engineer/RPR field office is not required.

METHOD OF MEASUREMENT

105-5 BASIS OF MEASUREMENT AND PAYMENT. Based upon the contract lump sum price for "Mobilization" partial payments will be allowed as follows:

- **a.** With first pay request, 25%.
- **b.** When 25% or more of the original contract is earned, an additional 25%.
- **c.** When 50% or more of the original contract is earned, an additional 40%.
- **d.** After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation,* the final 10%.

BASIS OF PAYMENT

105-6 PAYMENT WILL BE MADE UNDER:

Bid Item No. 3	Mobilization - Per Lump Sum
Bid Item No. A3	Mobilization - Per Lump Sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

SECTION V

TECHNICAL SPECIFICATIONS

ITEM E-110 DEMOLITION

DESCRIPTION

110-1.1 This item covers the labor and materials necessary for demolition and disposal of all items shown on the plans, including: Runway 34 VASI units and foundations, Runway 16 VASI foundations, electrical fixtures, conduit and cables, duct markers, buried cable, and backfilling and re-compaction of disturbed areas. This item includes removal from the site of all demolition materials except those items specifically identified by the RPR or shown on the drawings to be salvaged, reused, provided to the owner, and placed in the stored location identified by the Owner or Engineer.

Removal of conduit, wire, and other structures not specifically identified for payment herein or on the drawings shall be considered incidental to this Specification.

CONSTRUCTION METHODS

110-2.1 UTILITIES. The Contractor shall be responsible for determining specific locations for all existing utilities in the area of demolition prior to beginning demolition. All utilities not identified on the drawings for removal are to be protected. The Contractor shall be responsible for coordinating and meeting the requirements of the utility companies and FAA.

110-2.2 REMOVAL OF STRUCTURES. All electrical structures, fixtures, conduit, cable, and other facilities identified for removal or encountered in excavation shall be removed in their entirety including foundations, pipes, and all other appurtenances. Underground circuiting, including existing wire, conduit, and duct banks shall be removed and disposed of offsite when encountered, unless otherwise directed by the RPR or shown on the drawings.

Locations of structures shown for removal are approximate and shall be field verified by the Contractor. Additional structures, not shown on the drawings, may require removal as directed by the RPR.

All materials and piping, except as specified for salvage, within the limits of the demolition, shall be removed from the site and become the property of the Contractor unless otherwise shown on the drawings or identified herein.

110-2.3 CONCRETE REMOVAL. The contractor shall remove the concrete features identified on the drawings. All material removed from the demolition areas shall be disposed off-site. Concrete removal is included in the lump sum unit cost for work covered under this Specification.

110-2.4 BACKFILLING. The contractor shall backfill all demolition areas approximately to the level of adjacent surfaces, as applicable.

Unless otherwise specified, backfill material and compaction of items removed from non-paved areas shall meet the requirements specified in Section P-152. Demolition debris shall not be used as backfill material. In all areas not backfilled to ground level, the Contractor shall erect safety barriers around the excavation.

In paved areas, backfilling of trenches where pipe, conduit, or electrical structures have been removed shall conform to the trench backfill requirements as shown on the drawings. All costs of labor, equipment, and materials required to complete this item shall be considered incidental to this Specification.

MEASUREMENT

110-3.1 The quantity of Demolition shall be one item, complete. Measurement shall include all items identified or required to be removed or altered that are not covered by, or incidental to, other bid items. This measurement

includes the removal and storage of electrical or other items to be salvaged if shown on the Drawings. No separate measurement or payment will be made for salvage. All measurements shall be subject to verification by the RPR.

BASIS OF PAYMENT

110-4.1 Payment shall be made under the Lump Sum unit price for Demolition. This price shall be full compensation for furnishing all materials; for all preparation, saw cutting, trenching, excavation, re-compacting, hauling, salvage and storage, removal and disposal of materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Bid Item No. 4	Demolition - Per Lump Sum
Bid Item No. A4	Demolition - Per Lump Sum

END OF ITEM E-110

ITEM E-180 GEOTEXTILE FABRIC

DESCRIPTION

180-1.1 This item shall consist of furnishing and placing geotextile fabric as shown on the drawings or as directed by the RPR.

EQUIPMENT AND MATERIALS

180-2.1 GEOTEXTILE FABRIC. Non-Woven separation geotextile fabric shall meet the requirements of 2024 Oregon Department of Transportation (ODOT) Section 02320 and Table 1 below.

180-2.2 FIELD SEAM STITCHING EQUIPMENT. Use field seam stitching equipment that provides an acceptable lock-type stitch as recommended by the geotextile manufacturer and approved by the RPR.

180-2.3 CERTIFICATION. The Contractor shall furnish the vendor's certified test reports for each lot of geotextile fabric shipped to the project. The report shall be delivered to the RPR before permission is granted for use of the geotextile fabric. The furnishing of the vendor's certified test report for the material shall not be interpreted as a basis for final acceptance. All such test reports shall be subject to verification by testing samples of geotextile fabric received for use in the project.

Table 1
GEOTEXTILE PROPERTY VALUES [1]

Geotextile Property	ASTM Test Method	Unit	Minimum Values	
			Woven	Non-Woven
Grab Tensile Strength (minimum) Machine & Cross Machine Directions	D 4632	lb	N/A	113
Grab Failure Strain (minimum) Machine and Cross Machine Directions	D 4632.	%	N/A	≥ 50
Tear strength (minimum)	D 4533	lb	N/A	41
Puncture strength (minimum)	D 6241	lb	N/A	223
Apparent Opening Size (AOS) (maximum) U.S. Standard Sieve	D 4751	--	N/A	30
Permittivity (minimum)	D 4491	sec-1	N/A	0.05
Ultraviolet Stability Retained Strength (minimum)	D 4355 (at 500 hours)	%	N/A	50

[1] All geotextile properties are Minimum Average Roll Values (MARV). The test results for any sampled roll in a lot shall meet or exceed the values shown in the table.

CONSTRUCTION METHODS

180-3.1 ACQUISITION AND STORAGE. Provide complete rolls of geotextile as furnished by the manufacturer and protect against damage and deterioration. Store all geotextile rolls in a dry place and off the ground at all times according to ASTM D 4873. Cover all rolls and partial rolls with a dark protective covering when received. The geotextile will be rejected for use if the RPR determines it has defects, deterioration, or has been damaged.

180-3.2 PLACEMENT. Prepare the surface receiving the geotextile to a smooth condition free of obstructions, depressions, and debris unless otherwise directed. Do not drag the geotextile on the ground or mishandle in any way.

Loosely place the geotextile without wrinkles so placement of the overlying material will not tear the geotextile. Lap or sew the geotextile at the ends and sides of adjoining sheets as specified.

Correct geotextile failures, as evidenced by soil pumping or roadbed distortion, by removing any covering material in the affected area and placing a geotextile patch on the exposed geotextile according to specifications for repair of the geotextile. Cover the patch with the specified cover material and compact before proceeding.

180-3.3 OVERLAPS. Minimum overlap requirement is 24 inches.

180-3.4 FIELD SEAMS. Field seams shall conform to ODOT Section 00350.41.

180-3.5 PROTECTION OF GEOTEXTILE. Protect the geotextile at all times from ultraviolet (UV) rays, contamination by surface runoff, and construction activities.

Traffic or construction equipment will not be permitted directly on the geotextile. When placed for construction, cover the geotextile with specified cover material as soon as possible. Do not leave in uncovered condition for more than 5 days.

Place cover material on the geotextile in a manner that the geotextile is not torn, punctured, or shifted. Use a minimum 6-inch-thick cover layer, or twice the maximum aggregate size, whichever is thicker. End-dumping cover material directly on the geotextile will not be permitted.

180-3.6 REPAIR OF GEOTEXTILE. Repair or replace all torn, punctured, or contaminated geotextiles during construction at no cost to the Owner. Repair by placing a patch of the specified geotextile over the affected area. Overlap the existing geotextile with the patch according to overlap specifications. Where geotextile seams are required to be sewn, repair any damaged sheet by sewing unless otherwise indicated on the drawings, or as directed by the RPR.

METHOD OF MEASUREMENT

180-4.1 No separate measurement for payment shall be made for separation geotextile fabric. Separation geotextile fabric shall be considered subsidiary to the applicable bid item.

BASIS OF PAYMENT

180-5.1 No payment will be made directly for separation geotextile fabric. Separation geotextile fabric shall be considered subsidiary to the applicable bid item.

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 D 3405	Specification for Joint Sealants, Hot Poured, for Concrete and Asphalt Pavement
ASTM D 4632	Breaking Load and Elongation of Geotextiles (Grab Method)
ASTM D 276	Identification of Fibers in Textiles
ASTM D 4354	Sampling of Geotextiles for Testing

END OF ITEM E-180

ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

The Contractor shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations; and all pumping or other approved measures for the removal or exclusion of water, including storm water, reaching the site from any source so as to prevent damage to the site. Slopes on the sides of temporary excavations shall be such as to ensure safe execution of the work in accordance with applicable governmental requirements and regulations.

152-1.2 CLASSIFICATION. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature.

152-1.3 UNSUITABLE EXCAVATION. Unsuitable material shall be disposed of offsite. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

Unsuitable material is defined as material the Engineer determines to be incapable of being compacted to specified density using ordinary methods at optimum moisture.

Excessive moisture in the material is not, by itself, sufficient cause for determining that the material is unsuitable. In-place drying techniques shall be employed prior to defining the material as unsuitable. In-place drying methods shall consist of windrowing, discing, turning, and otherwise manipulating the material to achieve drying and compaction. Vibratory or steel drum compaction equipment and rubber-tired excavation equipment shall not be used in unstable areas unless approved by the Engineer. No separate measurement or payment will be made for in-place drying.

CONSTRUCTION METHODS

152-2.1 GENERAL. Before beginning excavation, grading, and embankment operations in any area, the area shall be completely stripped, approximately, 2 to 4 inches in depth, to remove all vegetation. Contractor shall verify depth of stripping with RPR prior to beginning work.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of offsite.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside of the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches, to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches in their greatest dimension will not be permitted in the top 6 inches of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

152-2.2 EXCAVATION. No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable or excess material shall be disposed of offsite.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. Selective grading. When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. Undercutting. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed off the airport. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard for unclassified excavation. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans.

c. Over-break. Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of as directed by the RPR. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. Removal of utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor as indicated on the plans. All existing foundations shall be excavated at least 2 feet below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the RPR. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 BORROW EXCAVATION. Borrow areas are not required.

152-2.4 DRAINAGE EXCAVATION. Not Used.

152-2.5 PREPARATION OF CUT AREAS OR AREAS WHERE EXISTING PAVEMENT HAS BEEN REMOVED. In those areas on which a subbase or base course is to be placed, the top 12 inches of subgrade shall be compacted to not less than 95 % of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 PREPARATION OF EMBANKMENT AREA. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 CONTROL STRIP. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

152-2.8 FORMATION OF EMBANKMENTS. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches nor more than 12 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due of rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within ±2% of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The Contractor will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D698. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the Contractor for every 500 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 95% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D698. Under all areas to be paved, the embankments shall be compacted to a depth of 12 inches and to a density of not less than 100 percent of the maximum density as determined by ASTM D698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, unless otherwise indicated on drawings or directed by the RPR, no compaction will be required on the top 4 inches which shall be prepared for a seedbed in accordance with. Item T-901.

The in-place field density shall be determined in accordance with ASTM D1556 or ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. Contractor's independent testing laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids with forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment materials shall not be disposed of except at places and in the manner designated on the plans or by the RPR.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lifts shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lifts shall not be constructed above an elevation 4 feet below the finished subgrade.

There will be no separate measurement of payment for compacted embankment.

152-2.9 PROOF ROLLING. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. Before start of embankment, and after compaction is completed, the subgrade area shall be proof rolled with a 20 ton Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 100 psi in the presence of the RPR. Apply a minimum of 1 coverage, or as specified by the

RPR, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item.

152-2.10 COMPACTION REQUIREMENTS. Compaction requirements apply equally to subgrade or soil preparation established by cutting or filling material. The subgrade under areas to be paved shall be compacted to a depth of 12 inches and to a density of not less than 100 percent of the maximum dry density as determined by ASTM D698. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D698.

The material to be compacted shall be within ±2% of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the ¾ inch (19.0 mm) sieve, follow the methods in ASTM D698. Tests for moisture content and compaction will be taken at a minimum of 500 S.Y. of subgrade. All quality assurance testing shall be done by the Contractor's independent testing laboratory in the presence of the RPR, and density test results shall be furnished upon completion to the RPR for acceptance determination.

The in-place field density shall be determined in accordance with ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

152-2.11 FINISHING AND PROTECTION OF SUBGRADE. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 HAUL. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 SURFACE TOLERANCES. In those areas on which a subbase or base course is to be placed, the surface shall be tested by the Contractor in the presence of the RPR for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/-0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 TOPSOIL. When topsoil is specified or required as shown on the plans, it shall be salvaged from stripping or other grading operations. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved Construction Safety and Phasing Plan (CSPP), and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed, but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means as determined by the RPR, shall be removed.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 Excavation will not be measured, but shall be considered subsidiary to the applicable bid item.

BASIS OF PAYMENT

152-4.1 Excavation will not be paid directly, but shall be considered subsidiary to the applicable bid item.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software

Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66	Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

ITEM P-153 CONTROLLED LOW-STRENGTH MATERIAL (CLSM)

DESCRIPTION

153-1.1 This item shall consist of furnishing, transporting, and placing a controlled low-strength material (CLSM) as flowable backfill in trenches or at other locations shown on the plans or as directed by the Resident Project Representative (RPR).

MATERIALS

153-2.1 MATERIALS.

a. Cement. Cement shall conform to the requirements of ASTM C150 Type I or II.

b. Fly ash. Fly ash shall conform to ASTM C618, Class C or F.

c. Fine aggregate (sand). Fine aggregate shall conform to the requirements of ASTM C33 except for aggregate gradation. Any aggregate gradation which produces the specified performance characteristics of the CLSM and meets the following requirements, will be accepted.

Sieve Size	Percent Passing by Weight
3/4 inch (19.0 mm)	100
No. 200 (75 μm)	0 - 12

d. Water. Water used in mixing or curing shall be potable water sources. Other substances shall be tested in accordance with ASTM C1602 prior to use.

MIX DESIGN

153-3.1 PROPORTIONS. The Contractor shall submit, to the RPR, a mix design including the proportions and source of aggregate, fly ash, cement, water, and approved admixtures. No CLSM mixture shall be produced until the RPR has given written approval of the proportions. The proportions shall be prepared by a laboratory and shall remain in effect for the duration of the project. The proportions shall establish a single percentage or weight for aggregate, fly ash, cement, water, and any admixtures proposed. Laboratory costs are incidental to this item.

a. Compressive strength. CLSM shall be designed to achieve a 28-day compressive strength of 100 to 200 psi (690 to 1379 kPa) when tested in accordance with ASTM D4832, with no significant strength gain after 28 days.

b. Consistency. Design CLSM to achieve a consistency that will produce an approximate 8-inch (200 mm) diameter circular-type spread without segregation. CLSM consistency shall be determined per ASTM D6103.

CONSTRUCTION METHODS

153-4.1 PLACEMENT.

a. Placement. CLSM may be placed by any reasonable means from the mixing unit into the space to be filled. Agitation is required during transportation and waiting time. Placement shall be performed so structures or pipes are not displaced from their final position and intrusion of CLSM into unwanted areas is avoided. The material shall be brought up uniformly to the fill line shown on the plans or as directed by the RPR. Each placement of CLSM shall be as continuous an operation as possible. If CLSM is placed in more than one lift, the base lift shall be free of surface water and loose foreign material prior to placement of the next lift.

b. Contractor Quality Control. The Contractor shall collect all batch tickets to verify the CLSM delivered to the project conforms to the mix design. The Contractor shall verify daily that the CLSM is consistent with 153-3.1a and

153-3.1b. Adjustments shall be made as necessary to the proportions and materials as needed. The Contractor shall provide all batch tickets to the RPR.

c. Limitations of placement. CLSM shall not be placed on frozen ground. Mixing and placing may begin when the air or ground temperature is at least 35°F (2°C) and rising. Mixing and placement shall stop when the air temperature is 40°F (4°C) and falling or when the anticipated air or ground temperature will be 35°F (2°C) or less in the 24-hour period following proposed placement. At the time of placement, CLSM shall have a temperature of at least 40°F (4°C).

153-4.2 CURING AND PROTECTION.

a. Curing. The air in contact with the CLSM shall be maintained at temperatures above freezing for a minimum of 72 hours. If the CLSM is subjected to temperatures below 32°F (0°C), the material may be rejected by the RPR if damage to the material is observed.

b. Protection. The CLSM shall not be subject to loads and shall remain undisturbed by construction activities for a period of 48 hours or until a compressive strength of 15 psi (105 kPa) is obtained. The Contractor shall be responsible for providing evidence to the RPR that the material has reached the desired strength. Acceptable evidence shall be based upon compressive tests made in accordance with paragraph 153-3.1a.

153-4.3 QUALITY ASSURANCE (QA) ACCEPTANCE. CLSM QA acceptance shall be based upon batch tickets provided by the Contractor to the RPR to confirm that the delivered material conforms to the mix design.

METHOD OF MEASUREMENT

153-5.1 MEASUREMENT.

No separate measurement for payment shall be made for controlled low-strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

BASIS OF PAYMENT

153-6.1 PAYMENT.

No payment will be made separately or directly for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C33	Standard Specification for Concrete Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D4832	Standard Test Method for Preparation and Testing of Controlled Low-Strength Material (CLSM) Test Cylinders
ASTM D6103	Flow Consistency of Controlled Low Strength Material (CLSM)

END OF ITEM P-153

ITEM P-605 JOINT SEALANTS FOR PAVEMENTS

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in concrete, pavement and joints between different types of pavements.

MATERIALS

605-2.1 JOINT SEALANTS. Joint sealant materials shall meet the requirements of ASTM D5893.

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.2 BACKER ROD. The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be 25% ± 5 % larger in diameter than the nominal width of the joint.

605-2.3 BOND BREAKING TAPES. Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive-backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

CONSTRUCTION METHODS

605-3.1 TIME OF APPLICATION. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint.

605-3.2 EQUIPMENT. Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, [___] days prior to use on the project.

a. Tractor-mounted routing tool. Provide a routing tool, used for removing old sealant from the joints, of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V-shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.

b. Sandblasting equipment. Sandblasting is not allowed.

c. Hand tools. Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.

d. Cold-applied, single-component sealing equipment. The equipment for installing ASTM D5893 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top.

Maintain the initially approved equipment in good working condition, serviced in accordance with the supplier's instructions, and unaltered in any way without obtaining prior approval. Small hand-held air-powered equipment (i.e., caulking guns) may be used for small applications.

605-3.3 PREPARATION OF JOINTS. Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

a. Sawing. All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.

b. Sealing. Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by sandblasting or tractor-mounted routing equipment as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be sandblasted clean. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

c. Backer Rod. When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

d. Bond-breaking tape. Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-sided adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

605-3.4 INSTALLATION OF SEALANTS. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/8 inch ±1/16 inch below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

605-3.5 INSPECTION. The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

605-3.6 CLEAN-UP. Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

METHOD OF MEASUREMENT

605-4.1 Joint sealing material will not be measured but shall be considered subsidiary to the applicable bid item.

BASIS OF PAYMENT

605-5.1 Joint sealing material will not be paid for directly but shall be considered subsidiary to the applicable bid item.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D5893	Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids

END ITEM P-605

ITEM P-610 CONCRETE FOR MISCELLANEOUS STRUCTURES

DESCRIPTION

610-1.1 This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

MATERIALS

610-2.1 GENERAL. Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Resident Project Representative (RPR) before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

a. Reactivity. Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the RPR. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

610-2.2 COARSE AGGREGATE. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
¾ inch (19 mm)	67
½ inch (12.5 mm)	7

610-2.2.1 COARSE AGGREGATE SUSCEPTIBILITY TO DURABILITY (D) CRACKING. Not Used.

610-2.3 FINE AGGREGATE. The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

610-2.4 CEMENT. Cement shall conform to the requirements of ASTM C150 Type IIA.

610-2.5 CEMENTITIOUS MATERIALS. If included in the JMF, the Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total available alkali content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the RPR.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

610-2.6 WATER. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

610-2.7 ADMIXTURES. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the RPR may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the RPR from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

b. Water-reducing admixtures. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

c. Other chemical admixtures. The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 PREMOLDED JOINT MATERIAL. Premolded joint material for expansion joints shall meet the requirements of ASTM D1751**.**

610-2.9 JOINT FILLER. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

610-2.10 STEEL REINFORCEMENT. Reinforcing shall conform to the requirements below**.**

Steel Reinforcement

Reinforcing Steel	ASTM A615, ASTM A706, ASTM A775, ASTM A934
Welded Steel Wire Fabric	ASTM A1064, ASTM A884

610-2.11 MATERIALS FOR CURING CONCRETE. Curing materials used shall conform to the following.

Materials for Curing

Waterproof paper	ASTM C171
Clear or white Polyethylene Sheeting	ASTM C171
White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B	ASTM C309

CONSTRUCTION METHODS

610-3.1 GENERAL. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

610-3.2 CONCRETE MIXTURE. The concrete shall develop a compressive strength of 4000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

610-3.3 MIXING. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the RPRs approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 FORMS. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the RPR. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

610-3.5 PLACING REINFORCEMENT. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

610-3.6 EMBEDDED ITEMS. Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items. The embedding of wood shall not be allowed.

610-3.7 CONCRETE CONSISTENCY. The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

610-3.8 PLACING CONCRETE. All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the RPR. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

610-3.9 VIBRATION. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 JOINTS. Joints shall be constructed as indicated on the plans.

610-3.11 FINISHING. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 CURING AND PROTECTION. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

610-3.13 COLD WEATHER PLACING. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 HOT WEATHER PLACING. When concrete is placed in hot weather greater than 85ºF (30 ºC), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

QUALITY ASSURANCE (QA)

610-4.1 QUALITY ASSURANCE SAMPLING AND TESTING. Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The RPR will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; test air content in accordance with ASTM C231; make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

610-4.2 DEFECTIVE WORK. Any defective work that cannot be satisfactorily repaired as determined by the RPR, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

METHOD OF MEASUREMENT

610-5.1 Concrete shall be considered incidental and no separate measurement shall be made of concrete complete in place and accepted.

BASIS OF PAYMENT

610-6.1 Concrete shall be considered incidental and no separate payment shall be made. This price shall be full compensation for furnishing all materials including reinforcement and embedded items and for all preparation,

delivery, installation, and curing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete

ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

END OF ITEM P-610

ITEM T-901 SEEDING

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding and fertilizing the areas shown on the plans or as directed by the RPR in accordance with these specifications.

MATERIALS

901-2.1 Seed. The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows:

Seed Properties and Rate of Application

Seed	Minimum Seed Purity (Percent)	Minimum Germination (Percent)	Rate of Application lb/acre (or lb/1,000 S.F.)
Redtop or Oregon Bentgrass	92	85	24
Red Fescue	98	90	84
Idaho Bentgrass	98	90	12

901-2.2 Lime. Not required.

901-2.3 Fertilizer. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;

b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be 10-4-6 50% urea formaldehyde commercial fertilizer and shall be spread at the rate of 250 pounds per acre.

901-2.4 Soil for repairs. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

CONSTRUCTION METHODS

901-3.1 Advance preparation and cleanup. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 Dry application method.

a. Liming. Not required.

b. Fertilizing. Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

c. Seeding. Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing. The fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

901-3.3 Wet application method.

a. General. The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. Spraying equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls

mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the RPR all sources of water at least two (2) weeks prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed or they shall be wasted and disposed of at approved locations.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.4 Maintenance of seeded areas. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the RPR. A grass stand shall be considered adequate when bare spots are one square foot (0.01 sq m) or less, randomly dispersed, and do not exceed 3% of the area seeded.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of units 1,000 square feet measured on the ground surface, completed and accepted.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per 1,000 square feet or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Bid Item No. 5	Seeding – Per 1,000 Square Feet
Bid Item No. A5	Seeding – Per 1,000 Square Feet

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C602	Standard Specification for Agricultural Liming Materials

Federal Specifications (FED SPEC)

FED SPEC	JJJ-S-181, Federal Specification, Seeds, Agricultural

Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-901

ITEM E-800 GENERAL ELECTRICAL PROVISIONS
AIRFIELD LIGHTING SYSTEM

DESCRIPTION

800-1.1 GENERAL. This item is intended to supplement the specifications for the Airfield Electrical, Lighting, and Lighting Control requirements of this contract.

a. It is the intent and meaning of the Drawings and Specifications that the Contractor shall provide an electrical installation that is complete, including all items and appurtenances necessary, reasonably incidental or customarily included, even though each and every item is not specifically called out or shown.

b. Installations and construction under these provisions shall be coordinated with the RPR. Specification requirements for approvals and reviews shall be coordinated with the RPR.

QUALITY ASSURANCE

800-2.1 APPLICABLE STANDARDS.

a. Codes. All electrical work shall conform to the requirements and recommendations of the latest edition of the National Electrical Code and local city and county Building and Fire Codes. In conflicts between drawings, specifications and codes, the more stringent requirements shall govern.

b. Standards. The specifications and standards of the following organizations are by reference made part of these specifications and all electrical work, unless otherwise indicated, shall comply with their requirements and recommendations wherever applicable.

Institute of Electrical and Electrical Engineers (IEEE)
American National Standards Institute (ANSI)
American Society for Testing and Materials (ASTM)
Insulated Power Cable Engineers Association (ICEA)
National Bureau of Standards (NBS)
National Electrical Contractors Association (NECA)
National Electrical Manufacturer's Association (NEMA)
National Fire Protection Association (NFPA)
Underwriter's Laboratories, Inc. (UL)
National Electrical Safety Code (NESC)

800-2.2 REQUIREMENTS OF REGULATORY AGENCIES.

a. Airport lighting equipment and materials covered by FAA specifications shall have the prior approval of the Federal Aviation Administration, Airports Service, Washington, D.C. 20591 and shall be listed in Advisory Circular 150/5345-53 or certified under the Airport Lighting Equipment Certification Program (ALECP). All advisory circulars referenced in these specifications shall be the edition indicated or the current edition.

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.

c. The requirements and recommendations of the latest edition of the Occupational Safety and Health Act are by reference made a part of these specifications and all electrical work shall comply with their requirements and recommendations wherever applicable.

800-2.3 WORKMANSHIP AND PERSONNEL REQUIREMENTS.

a. All electrical work shall be performed by workmen skilled in the electrical trade and licensed for the work by the State in which the work is being performed.

b. A licensed Supervising Electrician will be required for the issuance of a building permit for constructing, installing, altering, maintaining, repairing, or replacing any electrical wiring, apparatus, or equipment on any voltage level in the jurisdiction of the Airport.

c. A licensed Journeyman Electrician is required to be on the job site whenever any electrical work is performed. Any airfield electrical work or associated electrical installations shall be accomplished under the direct supervision of a licensed Journeyman Electrician.

d. To ensure compliance with paragraph "C" above, only a documented Electrical work force with a ratio of a maximum of three Electrical Helpers for each licensed Journeyman Electrician shall be allowed to work on airfield electrical systems.

e. Contractor shall prepare documentation associated with the electrical work force confirming adherence to the requirements of paragraph "d" above. These documents shall be submitted to the RPR for approval. Also, any work force changes or revisions which affect compliance with Paragraph "d" above shall also be submitted to the RPR for approval.

f. Every airfield lighting cable splicer shall be qualified in making cable splices and terminations on cables rated above 1,000 volts A.C. The Contractor shall submit for approval, proof of the qualifications of each proposed cable splicer for the 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.

g. At least thirty (30) days prior to performing any cable splicing/terminating, Contractor shall submit a written list of proposed cable splicing/terminating personnel, including written evidence the proposed personnel have had a minimum of eight (8) hours of technical training by authorized splice/termination kit manufacturer personnel. Approved training shall include a thorough review of kit components and splicing/terminating techniques and procedures.

h. In addition, each trained cable splicer shall be required to install a sample splice and a sample connector on the type and size of cable to be used under this contract. Sample connections shall be accomplished in accordance with the manufacturer's instructions.

800-2.4 EQUIPMENT, MATERIAL, AND INSTALLATION REQUIREMENTS.

a. All materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer and the best practices of the trade and to conform to the Contract Documents.

b. The Contractor shall promptly notify the RPR in writing of any conflict between any requirements of the Contract Documents and equipment manufacturer's directions and shall obtain written instructions before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or such written instructions, they shall bear all costs arising in correcting deficiencies.

c. All equipment and materials shall be new, unless specifically noted otherwise, and shall bear the manufacturer's name, trademark and ASME, UL, and/or other labels in every case where a standard had been established for that particular item.

d. Where applicable, equipment shall be FAA approved design of a standard product of a manufacturer regularly engaged in the production of the required type of equipment, and shall be supported by a service organization reasonably convenient to the site.

e. The contractor shall furnish and install all equipment, accessories, connections, and incidental items necessary for a complete installation, ready for use and operation by the Owner.

f. It is the responsibility of the Contractor to ensure that items installed fit the space available with adequate room for proper equipment operation and maintenance. Contractor shall make field measurements to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that, in the final installation, will suit the true intent and meaning of the drawings and specification.

g. After review of equipment submittals, equipment installations may require arrangements or connections different from those shown on the drawings. It is the responsibility of the Contractor to install the equipment to operate properly. The Contractor shall provide any additional equipment and/or materials required for installations to operate in accordance with the intent of the drawings and specifications.

h. The Contractor shall be responsible for coordinating proper location of roughing in and connections by other trades. Changes associated with coordination requirements shall be made at no increase in the Contract amount or additional costs to other trades.

i. The Contractor shall support work and equipment plumb, rigid, and true to line. The Contractor shall determine how equipment, conduit, etc., are to be installed, as required by codes, drawings, and specifications. Foundations, bolts, inserts, stands, hangars, brackets, and accessories required for proper support shall be provided by the Contractor, whether or not specifically indicated on the Drawings.

800-2.5 ADDITIONAL REQUIREMENTS

a. The Contractor must ascertain that furnished components of all lighting systems, including FAA approved equipment, are compatible in all respects with each other and the remainder of the new/existing system. Consideration of power quality and control operation is required. Any non-compatible components furnished by the Contractor must be replaced by the Contractor at no additional cost to the Owner with a similar unit, approved by the RPR (different model or different manufacturer), that is compatible with the remainder of the airport lighting system. Compatibility include, but are not limited to, physical installation, electrical installation, electrical connection, maintainability, reliability, and operations.

b. In case the Contractor elects to furnish and install airport lighting equipment requiring additional wiring, transformers, adapters, mountings, etc., to those shown on the drawings and/or listed in the specifications, any cost for these items must be incidental to the equipment cost.

c. The Contractor-installed equipment (including FAA approved) must not generate any electromagnetic interference in the existing and/or new communications, weather, air navigation, and air traffic control equipment. Any equipment generating such interference must be replaced by the Contractor at no additional cost with equipment meeting the applicable specifications and not generating any interference.

d. When a specific type, style, class, etc., of FAA approved equipment is specified only that type, style, class, etc., will be acceptable, even though equipment of other types, style, class, etc., may be FAA approved.

e. Any and all instructions from the RPR to the Contractor regarding changes in, or deviations from, the plans and specifications must be in writing.

f. A minimum of three copies of the instruction book must be supplied with each different type of equipment. The books describing a more sophisticated type of equipment, such as regulators, PAPI, REIL, etc., at a minimum must contain the following:

(1) A detailed description of the overall equipment and its individual components.

(2) Theory of operation including the function of each component.

(3) Installation instructions including alignment, calibration and adjustment.

(4) Startup instructions.

(5) Preventative maintenance requirements.

(6) Chart for troubleshooting.

(7) Complete power and control detailed wiring diagram(s), showing each conductor/connection/component "black" boxes are not acceptable. The diagram or the narrative must show voltages/currents/wave shapes at strategic locations to be used when checking and/or troubleshooting the equipment. When the equipment has several brightness steps, these parameters must be indicated for all the different modes.

(8) Parts list will include all major and minor components, such as resistors, diodes, etc. It must include a complete nomenclature of each component and, if applicable, the name of its manufacturer and the catalog number.

(9) Safety instructions.

800-2.6 SUBMITTALS

a. Submit manufacturer's data or shop drawings of items giving full information as to the dimensions, materials, and other information required to define compliance with the specifications.

- All materials and equipment used to construct shall be submitted to the RPR for approval prior to ordering the equipment.
- Submittals consisting of marked catalog sheets or shop drawings shall be provided.
- Submittal data shall be presented in a clear, precise, and thorough manner.
- Original catalog sheets are preferred. Photocopies are acceptable, provided they are as good a quality as the original.
- Clearly and boldly mark each copy to identify pertinent products or models applicable to this project.
- Indicate all optional equipment and delete non-pertinent data.
- Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet.
- Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable).
- Failure to clearly identify materials on cut sheets is cause for submittal rejection.
- Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.
- Electronic submittals may be used to expedite review; however, printed submittals are required.

b. Equipment/installation diagrams shall also be submitted for approval, as required by the project specifications and/or requested. Where new or modified, L-821 & L-841 bill of materials, schematic, wiring, and layout diagrams shall be submitted. When requested, samples of these items shall be submitted for approval.

c. Contractor submittal package shall include a typewritten list indicating each bid item, with a breakdown of all item components and all parts that are assembled or associated with bid item's installation.

Submittal package list shall indicate: 1) Bid item number; 2) part numbers of associated item components, as required; and 3) reference page number where item and components information is located in the submittal package.

d. Review of submittals is done only as an aid to the Contractor and acceptance of submittals shall not relieve Contractor of responsibility for any errors or omissions in the submittals, nor shall it relieve the Contractor of total responsibility for proper and complete execution of the job. Review of submittals is not a certification or guarantee that equipment provided is compatible as required above.

CONSTRUCTION PROVISIONS

800-3.1 ELECTRICAL WORK PROVISIONS.

a. Power and Control

(1) Label all electrical equipment to identify function, circuit voltage and phase. Where the equipment contains fuses, also label the fuse or fuse link ampere rating. Where the equipment does not have sufficient area, the labeling must be done on the wall next to the unit. Labeling is subject to submittal and approval. Equipment shall have Lamacoid (engraved plastic) labels securely attached; the label text and lettering shall be readily readable and the size shall be appropriate for the equipment.

(2) Color code all phase wiring by the use of colored wire insulation and/or colored tape. Where tape is used, the wire insulation must be black. Black and red must be used for single-phase, three wire systems and black, red and blue must be used for three-phase systems. Neutral conductors, size No. 6 AWG or smaller, must be identified by a continuous white or natural outer finish. Neutral conductors larger than no. 6 AWG must be identified either by a continuous white or natural gray outer finish along its entire length or by the use of white tape at its terminations and inside accessible wireways. Equipment grounding conductors shall be green or bare copper.

(3) All branch circuit conductors connected to a particular phase must be identified with the same color. The color coding must extend to the point of utilization.

(4) In control wiring the same color must be used throughout the system for the same function, such as 10%, 30%, 100% brightness control, etc.

(5) All power and control circuit conductors must be copper; aluminum shall not be used. This includes wire, cable, busses, terminals, switch/panel components, etc.

(6) Low voltage (600 V) and high voltage (5000 V) circuits must be installed in separate conduits and wireways. Low and high-voltage conductors may occupy the same vaults or handholes if shown on the drawings or with RPR approval.

(7) Neatly lace wiring in distribution panels, wireways, switches and pull/junction boxes. Plastic wire ties are the preferred lacing method; alternate methods are subject to approval.

(8) The minimum size of pull/junction boxes, regardless of the quantity and the size of the conductors shown, must be as follows:

i. In straight pulls the length of the box must not be less than eight times the trade diameter of the larger conduit. The total area (including the conduit cross-sectional area) of a box end must be at least 3 times greater than the total trade cross-sectional area of the conduits terminating at the end.

ii. In angle or u-pulls the distance between each conduit entry inside the box and the opposite wall of the box must not be less than six times the trade diameter of the largest conduit. This distance must be increased for additional entries by the amount of the sum of the diameters of all other conduit entries on the same wall of the box. The distance between conduit entries enclosing the same conductor must of not be less than six times the trade diameter of the largest conduit.

(9) A run of conduit between terminations at equipment enclosures, square ducts and pull/junction boxes, must not contain more than the equivalent of four quarter bends (360 degrees total), including those bends located immediately at the terminations. Cast, conduit type outlets shall not be treated as pull/junction boxes.

(10) Equipment cabinets shall not be used as pull/junction boxes; only wiring terminating at the equipment shall be brought into these enclosures.

(11) Splices and junction points shall be permitted only in junction boxes, wireways equipped with removable covers, and at easily accessible locations.

(12) Circuit breakers in power distribution panel(s) shall be thermal-magnetic, molded case, permanent trip with 100-ampere, minimum, frame, rated for the available fault current.

(13) Dual lugs must be used where two wires, size no. 6 or larger, are to be connected to the same terminal.

(14) All wall mounted equipment enclosures must be mounted on “Unistrut”, “Superstrut”, “Kindorf”, or wooden mounting boards or as approved by RPR.

(15) Wooden equipment mounting boards must be plywood, exterior type, 3/4 inch nominal thickness, both sides painted with one coat of primer and two coats of gray, oil-based paint.

(16) Rigid steel conduit must be used throughout the installation, where subject to damage, unless otherwise specified. EMT may be used for interior installations. Flexible metal conduit (FMC) and flexible metal waterproof conduit (LFMC) shall be used where flexible connections are required. LFMC subject to outdoor conditions shall be CPE or TPU-coated; LFMC used indoors may be PVC-coated. The minimum trade size must be 3/4 inch. Conduit used outdoors must be rated for said use.

(17) All conduit must be terminated at constant current regulators with a section (10 inch minimum) of flexible conduit.

(18) Unless otherwise shown all exposed conduits must be run parallel to, or at right angles with, the lines of the structure.

(19) All steel conduits, fittings, nuts, bolts, etc., must be galvanized. EMT fittings shall be compression, set screw shall not be used.

(20) Use conduit bushings at each conduit termination. Where No. 4 AWG or larger ungrounded wire is installed, use insulated bushings.

(21) Use double lock nuts, one each side of enclosure wall, at each rigid conduit termination.

(22) Medium voltage conductor terminations shall be manufactured for that purpose.

(23) Unless otherwise noted, all indoor single conductor control wiring must be No. 12 AWG, 600V.

(24) Both ends of each control conductor must be terminated at a terminal block. The terminal block must be of proper rating and size for the function intended and they must be located in equipment enclosures or special terminal cabinets.

(25) All control conductor terminators must be of the open-eye connector/screw type. Soldered, closed-eyed terminators, or terminators without connectors are not acceptable. Ferrules must be used where stranded control wires are placed in screw-compression terminal blocks.

(26) In terminal block cabinets the minimum spacing between parallel terminal blocks must be 6 inches. The minimum spacing between terminal block sides/ends and cabinet sides/bottom/top must be 5 inches. The minimum spacing will be increased as required by the number of conductors. Additional spacing must be provided at conductor entrances.

(27) Both ends of all control conductors must be identified as to the circuit, terminal, block, and terminal number. Conductor and cable labels shall be thermal-transfer pre-printed shrink-type sleeve. The use of continuously-numbered conductors where such numbers match wiring diagrams may be an accepted alternate upon approval of the RPR.

(28) A separate and continuous neutral conductor must be installed and connected for each breaker circuit in the power panel(s) from the neutral bar to each power/control circuit.

(29) For all grounded circuits, a separate equipment grounding conductor shall be installed in all conduits; the conduit shall not be the sole grounding conductor.

(30) The following shall apply to L-821/841 relay/contactor panel/enclosures:

- **(a)** All components must be mounted in dust proof enclosures with vertically hinged covers.
- **(b)** The enclosures must have ample space for the circuit components, contactors, switches, control power transformers, terminal blocks, and incoming internal wiring.
- **(c)** All incoming/outgoing wiring must be terminated at terminal blocks.
- **(d)** Each terminal on terminal blocks and on circuit components must be clearly identified.
- **(e)** All control conductor terminations must be of the open-eye connector/screw type. Soldered, closed-eye connectors, or terminations without connectors are not acceptable. Ferrules must be used where stranded wires are placed in screw-compression terminal blocks.

(f) When the enclosure cover is opened, all circuit components, wiring, and terminals must be exposed and accessible without any removal of any panels, covers, etc., except those covering high voltage components.

(g) Access to, or removal of, a circuit component or terminal block will not require the removal of any other circuit component or terminal block.

(h) Each circuit component must be clearly identified indicating its corresponding number shown on the drawing and its function.

(i) A complete wiring diagram (not a schematic diagram) must be provided in each equipment cabinet. The diagram must represent each conductor by a separate line.

(j) The diagram must identify each circuit component and numbering and color of each internal conductor and terminal.

(k) All wiring must be neatly trained and laced. Wire management gutters may be used.

(l) Minimum power wire size shall be No. 12 AWG. Conductors shall be sized per NEC 75C tables.

b. Field Lighting

(1) Unless otherwise notified all underground field power multiple and series circuit conductors whether direct earth burial (DEB) or in duct/conduit must be FAA approved L-824 type. Insulation voltage and size must be as specified.

(2) No components of a primary circuit such as cable, connectors and transformers shall be brought above ground at edge lights, signs, REIL, etc.

(3) There must be no exposed power/control cables between the point where they leave the underground (DEB or L-867 bases) and where they enter the equipment (such as taxiway signs, PAPI, REIL, etc.) enclosures. These cables must be enclosed in rigid conduit or in flexible water-tight conduit with frangible coupling(s) at the grade or the housing cover, as shown in applicable details. Plastic conduits used above grade shall be rated for such exposure. LFMC shall be CPE or TPU coated.

(4) The joints of the L-823 primary connectors must be wrapped with 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. Alternate connector sealing methods may be approved by the RPR.

(5) The cable entrance into the field attached L-823 connectors must be enclosed by a heat-shrinkable tubing with continuous internal adhesive.

(6) The inside diameter (ID) of the primary L-823 field attached connectors must match the cable ID to provide a watertight cable entrance. This entrance must be encapsulated in a heat shrinkable tubing with continuous factory applied internal adhesive.

(7) L-823 type 11, two-conductor secondary connector must be class "A" (factory molded).

(8) There must be no splices in the secondary cable(s) within the stems of a runway/taxiway edge/threshold lighting fixtures and the wireways leading to taxiway signs and PAPI/REIL equipment.

(9) Electrical insulating grease must be applied within the L-823, secondary, two conductor connectors to prevent water entrance. These connectors must not be taped.

(10) DEB isolation transformers must be buried at a depth of 10 inches on a line crossing the light and perpendicular to the runway/taxiway centerline at a location 12 inches from the light opposite from the runway/taxiway.

(11) DEB primary connectors must be buried at a depth of 10 inches near the isolation transformer. They must be orientated parallel with the runway/taxiway centerline. There must be no bends in the primary cable 6 inches, minimum, from the entrance into the field-attached primary connection.

(12) A slack of 3 feet, minimum, must be provided in the primary cable at each transformer/connector termination. At stake-mounted lights the slack must be loosely coiled immediately below the isolation transformer.

(13) Direction of DEB primary cables must be identified by color coding as follows, when facing light with back facing pavement, cable to the left is coded red and cable to the right is coded blue, this applies to the stake-mounted lights and base-mounted lights where the base has only one entrance.

(14) L-867 bases must be size B, 24" deep class 1 unless otherwise noted.

(15) Base-mounted frangible couplings must not have weep holes to the outside. Plugged up holes are not acceptable. It must have a 1/4" diameter minimum or equivalent opening for drainage from the space around the secondary connector into the L-867 base.

(16) The elevation of the frangible coupling groove must not exceed 1-1/2" above the edge of the cover in case of base-mounted couplings, or the top of the stake in case of stake-mounted couplings.

(17) Where the frangible coupling is not an integral part of the light fixture stem or mounting leg, a bead of silicon seal must be applied completely around the light stem or wireway at frangible coupling to provide a watertight seal.

(18) Tops of the stakes supporting light fixtures must be flush with the surrounding grade.

(19) Plastic lighting fixture components, such as lamp heads, stems, frangible couplings, base covers, brackets, stakes, are not acceptable. L-867 plastic transformer housings are acceptable. The metal threaded fitting must be set in flange during casting process. Base cover bolts must be fabricated from 18-8 stainless steel.

(20) The tolerance for the height of runway/taxiway edge lights shall be ± one (1) inch. In the case of base-mounted lights, the specified lighting fixture height must be measured between the top of the base flange and the top of the lens, thus including the base cover, the frangible coupling, the stem, the lamp housing and the lens.

(21) The tolerance for the lateral spacing (light lane to runway/taxiway centerline) of runway/taxiway edge lights shall be ± one (1) inch. This also applies at intersections to lateral spacing between lights of a runway/taxiway and the intersecting runway/taxiway.

(22) Soil permitting, the L-867 bases shall not be pre-cast in concrete unless otherwise shown on the drawings or approved by the RPR.

(23) Conduit entrances into L-867 bases and other equipment, including signs, REIL, PAPI, etc., must be plugged from the inside with duct seal. Gardner Bender, RectorSeal, Ideal or as approved. This includes PAPI, REIL, and EBB entrance conduits, if included in the project. Duct seal shall be submitted for approval.

(24) Galvanized/painted equipment/component surfaces must not be damaged by drilling, filing, etc. Drain holes in metal transformer housings must be made before galvanized.

(25) Edge light numbering tags must be facing the pavement. Tags shall be as indicated on the drawings and are subject to approval. Method of attachment to the light is subject to approval.

(26) Cable/splice/duct markers must be pre-cast concrete of the size shown. Letters/numbers/arrows for the legend to be impressed into the tops of the markers must be pre-assembled and secured

in the mold before the concrete is poured. Legend inscribed by hand in wet concrete shall not be accepted.

(27) All underground conduit or cable runs over 200 feet shall be identified by markers at 200 feet maximum spacing, with an additional marker at each change of direction of the cable run. Cable markers must be installed immediately above the cable.

(28) Locations of all DEB underground cable splice/connections, except those at isolation transformers, must be identified by splice markers. Splice markers must be placed immediately above the splice/connections.

(29) The cable and splice markers must identify the circuits which the cables belong to, such as RWY 4-22, PAPI-4, PAPI-22, etc.

(30) Locations of ends of all underground ducts must be identified by duct markers.

(31) The preferred mounting method of runway and taxiway signs is by the use of single row of legs. However, two rows will be acceptable upon approval of the RPR.

(32) All power and control cables in man/hand holes must be tagged. Use engraved plastic labels attached at both ends to the cable by the use of two plastic straps.

(a) Minimum of two tags must be provided on each cable in a man/hand hole - one at each cable entrance.

(b) Contractor shall propose and implement a color-coding scheme where each circuit shall be assigned a color and all labels for that circuit shall be fabricated using that color.

(c) Tagging is subject to submittal, review, and acceptance.

(33) Apply an oxide inhibiting, anti-seizing compound to all bolts, screws, nuts and frangible coupling threads. Compound shall be waterproof and appropriate for the materials.

(34) There shall be no splices between the isolation transformers. L-823 connectors are allowed at transformer connections only, unless otherwise shown.

(35) DEB splices in home runs must be of the heat-shrink or cast type, unless otherwise shown.

(36) Unless otherwise specified, concrete used for slabs, footing, foundations, backfill around transformer housings, markers, etc., shall conform to Item P-610, Concrete for Miscellaneous Structures.

c. Grounding

(1) Ground all non-current-carrying metal parts of electrical equipment by using no. 6 AWG bare copper wire to be run inside cabinets and in conduits together with other wires. Where this is not feasible, run the exposed grounding wire parallel or at right angles to the building line and secure it at least every 24 inches and within 6 inches from bend or junction. The exposed wire may be no. 6 AWG if it is not subjected to physical abuse, otherwise No. 4 AWG must be used.

(2) All ground connections to busses, panels, etc., must be made with pressure type solderless lugs and ground clamps. Soldered or bolt and washer type connections are not acceptable. Clean all metal surfaces before making ground connections. Ground rods shall use irreversible connections.

(3) Tops of ground rods must be 10 inches below grade.

(4) The resistance to ground of the vault grounding system with the commercial power line neutral disconnected must not exceed 10 ohms.

(5) The resistance to ground of the counterpoise system, or at isolation locations, such as airport beacon, must not exceed 25 ohms

d. Existing Underground Utilities.

(1) At least forty-eight (48) hours prior to beginning any excavation within the airfield, locations of all utility lines and FAA cables in the construction area shall be identified and marked by Contractor with surveyor flags.

(2) Contractor shall use cable tracing equipment, hand digging location holes, or other approved methods, to pinpoint line locations. Excavations shall not proceed until all underground lines have been identified.

(3) Contractor shall hand excavate in areas of underground electrical lines to avoid disturbing the circuits.

(4) Repair of underground lines damaged by the Contractor shall be the sole responsibility of the Contractor.

800-3.2 TEMPORARY AND BYPASS CIRCUIT PROVISIONS. During construction, temporary or bypass wiring or cable installations may be required to maintain operation of certain equipment and/or airfield lighting circuits, as indicated in Construction Documents and/or as specified. Temporary/bypass circuit installations shall adhere to provisions indicated below.

a. General Requirements.

(1) Contractor shall review the requirements in the specifications and Construction Documents. Contractor shall determine locations, sizes, and quantities of temporary/bypass wiring and conduits required for project construction.

(2) At least 7 days prior to commencement of installation of temporary/bypass wiring, the Contractor shall submit a layout of proposed temporary/bypass conduits and circuits for review and approval, including proposed installation protection provisions.

b. Equipment and Materials.

(1) Temporary/bypass wiring shall meet the requirements of the Construction Plans and Specifications. Temporary/bypass wiring shall be identified at junction points with heat shrink, stainless steel, or brass tags.

(2) Provisions of Paragraph 100.3.1 shall be applicable to temporary/bypass wiring installation. All damage to existing circuits as a result of Contractor action or inaction shall be corrected accordingly at the Contractor's expense.

(3) Unless otherwise approved, temporary/bypass cables shall be installed in galvanized rigid conduit. Conduit shall be protected from damage by vehicles with suitable fencing, barriers, and/or adequately sized boards or timbers. The conduit shall be securely fastened to the pavement surface and not to the conduit protective barriers.

(4) Temporary/bypass circuits shall be removed immediately upon completion of construction or purpose for which the wiring was installed. Upon removal of boards or timbers fastened to the pavement surface to protect temporary/bypass circuits, the Contractor shall repair the pavement with approved materials and methods. Drainage toward pavement used for aircraft and vehicle movement areas is prohibited.

(5) Temporary/bypass cable shall be removed and discarded off the Airport by the Contractor, unless used and placed in conformance with the specifications, as a permanent installation. Underground conduits installed for temporary/bypass circuits shall be removed, unless Contractor is authorized to abandon in place.

(6) Any temporary/bypass cable removed from initial installation, shall not be reused for any Airport temporary or permanent, high-voltage installation. Cable reuse is not allowed to minimize the possibility of a damaged cable being reinstalled on an active Airport circuit.

(7) Temporary lighting for barricades shall be battery or generator powered, unless otherwise shown on the Drawings. Submit proposed method of providing required barricade lighting for approval.

800-3.3 EXISTING ELECTRICAL AND MATERIALS.

a. Remove all existing wiring and electrical equipment made unnecessary by the new installation. All materials removed remain property of the Owner unless otherwise shown on the Drawings or directed by the RPR. Coil conductors and sort materials according to type, class, and/or size. Store or dispose of materials as directed.

b. Underground circuiting shall not be abandoned in place without approval.

c. Removal of airfield electrical items shall be per Item E-110.

800-3.4 POWER SERVICE CONTINUITY.

a. Provide labor, materials, and supervision required to maintain full capacity power service continuity when connection or modifications are made to existing systems and facilities.

b. Do not interrupt service without prior consent of the Owner with a definite understanding of time and duration of outage. All outages will take place at a time for minimum disruption of facility activity.

800-3.5 AS-BUILT DRAWINGS.

a. The Contractor shall maintain a set of as-built drawings on the job site as required by the General Provisions of the Contract. Contractor shall mark on the as-built drawings all work details, alterations installed to meet site conditions and changes made by Change Notices. As-built drawings shall be kept available for inspection at all times. Copies of as-built drawings shall be provided to Owner and RPR upon project completion.

b. The Contractor shall document work performed by regularly taking digital photographs of work performed. Photos shall be provided to RPR **[** on a regular basis.

800-3.6 TESTING AND TRAINING. The Contractor shall be responsible for scheduling, coordination, and payment of testing and training to include the following:

a. The Contractor shall provide a manufacturer's certified technician to supervise the initial startup service and calibration for the following equipment. The certified technician shall provide an approved site acceptance test for each piece of equipment that documents both testing and calibration results.

- Taxiway Edge Lighting
- L-828 Regulator
- PAPI

b. The Contractor shall also engage a manufacturer's certified technician to provide maintenance and operations training for airport personnel for the following minimum durations for each equipment. Training shall include manufacturer's recommended troubleshooting solutions.

- Approximately 2 Hours – Airfield Equipment
  - Taxiway Edge Lights
  - PAPI
- Approximately 2 Hours – Lighting Vault & Controls
  - L-828 Regulator
  - Other EEB improvements

METHOD OF MEASUREMENT

800-4.1 MEASUREMENT. Works in this provision will not be measured but shall be considered subsidiary to the applicable bid item.

BASIS OF PAYMENT

800-5.1 PAYMENT. All items covered in this section will not be measured or paid directly, but will be considered subsidiary to the bid items.

ITEM L-108 UNDERGROUND POWER CABLE FOR AIRPORTS

DESCRIPTION

108-1.1 This item shall consist of furnishing and/or installing power cables within conduit or duct banks per these specifications at the locations shown on the plans. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, cable racking and training, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the RPR. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities.

EQUIPMENT AND MATERIALS

108-2.1 GENERAL.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program described in AC 150/5345-53, current version.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum of 50 megaohms *(*1000V Megger*)* insulation resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, *Maintenance Airport Visual Aid Facilities*, paragraph 5.1.3.1, Insulation Resistance Test.

108-2.2 CABLE. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Federal Specification A-A-5944 and shall be type XHHW-2. THWN-2 may be used with RPR approval in above grade applications. Wire used in manufactured assemblies shall be per manufacturer standards. Low-voltage (below 50V) control cable shall be as indicated in the drawings.

All other conductors shall comply with FAA and National Electric Code (NEC) requirements.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified on the plans. Where not indicated, Contractor shall install wire in compliance with NEC in consideration of reasonable voltage drop.

108-2.3 BARE COPPER WIRE (COUNTERPOISE, BARE COPPER WIRE GROUND AND GROUND RODS). Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6 AWG solid copper wire for counterpoise and/or No. 6 AWG stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire.

Ground rods shall be copper-clad steel unless otherwise indicated on the drawings. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 8 feet long and 5/8 inch in diameter.

108-2.4 CABLE CONNECTIONS. In-line connections of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

a. The cast splice. A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M™ Company, “Scotchcast” Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable upon RPR approval.

b. The field-attached plug-in splice. Unless otherwise shown on the plans, field attached plug-in splices shall be installed per Figure 3 of AC 150/5345-26, Specification for L-823 Plug and Receptacle, Cable Connectors, employing connector kits, for field attachment to single conductor cable. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer’s requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.

c. The factory-molded plug-in splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

d. The taped or heat-shrink splice. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable for use 600V and below. 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. Splices made using split-bolts (or equivalent) and taped shall not be used.

e. Crimped Connections In all the above cases, connections of cable conductors shall be made using crimp connectors utilizing a crimping tool designed to make a complete crimp before the tool can be removed. Set-screw type in-line splices may be used with copper conductors for low voltage applications with RPR approval and review of submittal. All L-823/L-824 splices and terminations shall be made in accordance with the manufacturer’s recommendations and listings.

f. Exothermic Welding All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved irreversible equivalent, except the base can ground clamp connector shall be used for attachment to the base can. All exothermic connections shall be made in accordance with the manufacturer's recommendations and listings.

108-2.5 SPLICER QUALIFICATIONS. Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

108-2.6 CONCRETE. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

108-2.7 FLOWABLE BACKFILL. Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

108-2.8 CABLE IDENTIFICATION TAGS. Cable identification tags shall be made from a non-corrosive material with the circuit identification embossed, stamped, engraved, or etched onto the tag. The tags shall be of the type as detailed on the plans. Contractor shall propose and implement a color-coding scheme where each circuit shall be assigned a color and all tags for that circuit shall be fabricated using that color. Tags and attachment means are subject to submittal and review.

108-2.9 TAPE. Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

108-2.10 ELECTRICAL COATING. Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

108-2.11 EXISTING CIRCUITS. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

108-2.12 DETECTABLE WARNING TAPE. Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

CONSTRUCTION METHODS

108-3.1 GENERAL. The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification tags attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

108-3.2 INSTALLATION IN DUCT BANKS OR CONDUITS. This item includes the installation of the cable in duct banks or conduit as described below. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

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 manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. Pulling sleeves and sheaves shall be used pulling cable through conduits to prevent damage to both cable and conduit. 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. Applicable only where shown on the plans. Unless otherwise specified, the Contractor shall not direct bury cable or wire. If direct bury is approved, the contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

a. Trenching. Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches (0.5 m) below finished grade except as follows:

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.
- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill material may alternatively be used.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.

(2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

b. Backfilling. After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables ; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8 inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to the requirements of Item P-152.

Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turfing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

c. Restoration. Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the methods and/or materials as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to the requirements of Item P-152. Restoration shall be considered incidental to the pay item of which it is a component part.

108-3.4 CABLE MARKERS FOR DIRECT-BURIED CABLE. The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word “CABLE” and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

The location of each underground cable connection/splice, except at lighting units, or isolation transformers, or power adapters shall be marked by a concrete marker slab be installed to mark the location of the connection/splice. The Contractor shall impress the word “SPLICE” on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange unless otherwise directed by the RPR. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

108-3.5 SPLICING. Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

a. Cast splices. These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer’s instructions and to the satisfaction of the RPR.

b. Field-attached plug-in splices. These shall be assembled per the manufacturer’s instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and

one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

c. Factory-molded plug-in splices. These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

d. Taped or heat-shrink splices. A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. The manufacturer's recommendation for stretching tape during splicing shall be followed. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately one inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer’s instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminates prior to application.

e. Assembly. Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer’s recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

108-3.6 BARE COUNTERPOISE WIRE INSTALLATION FOR LIGHTNING PROTECTION AND GROUNDING. If shown on the plans or included in the job specifications, bare solid copper counterpoise wire shall be installed for lightning protection of the underground cables. Installation shall comply with applicable sections of the latest edition of NFPA 780 “*Standard for the Installation of Lightning Protection Systems*”. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

a. Equipotential. Not Used.

b. Isolation. Not Used.

c. Common Installation requirements. When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

When a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Elevated lights shall be bonded to the internal ground lug provided in the light base can.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made electrode-grounding system. The connections shall be made as shown on the plans and in the specifications.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

d. Parallel Voltage Systems. Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

108-3.7 COUNTERPOISE INSTALLATION ABOVE MULTIPLE CONDUITS AND DUCT BANKS. Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of counterpoise wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

108-3.8 COUNTERPOISE INSTALLATION AT EXISTING DUCT BANKS. When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

108-3.9 EXOTHERMIC BONDING. Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections. With RPR review and acceptance, irreversible crimp connections may be used for connections of grounded copper wire and copper-clad ground rods.

Contractor shall demonstrate to the satisfaction of the RPR, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

a. All slag shall be removed from welds.

b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.

c. If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3M™ Scotchkote™, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

108-3.10 TESTING. The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

a. Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.

b. Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

c. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

d. That all affected circuits (existing and new) are free from unspecified grounds.

e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than 50 megohms. Verify continuity of all series airfield lighting circuits prior to energization.

f. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 50 megohms.

g. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

h. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.

i. That the impedance to ground of the typical ground rod does not exceed 25 ohms. Ground rod testing shall be by sample and shall not be less than 10% of all rods installed. The fall-of-potential ground impedance test, or other test approved by the Engineer, shall be utilized to verify this requirement.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

Correction of any defect identified above shall be per Engineer direction. The Engineer may require replacement of equipment at no cost to Owner. Correction of failed ground rod tests may include the installation of a second ground rod nearby, at no cost to the Owner.

METHOD OF MEASUREMENT

108-4.1 Cable installed in trench, duct bank or conduit shall be measured by the number of linear feet of cable installed in duct bank or conduit, including ground rods and grounding connectors ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable installed in duct bank or conduit. Cable or wire above ground or not identified as a bid item, shall be considered incidental to the applicable bid item. The measurement for this item shall not include additional quantities required for slack or above ground.

108-4.2 No separate payment will be made for ground rods.

BASIS OF PAYMENT

108-5.1 Payment will be made at the contract unit price for cable installed in duct bank or conduit, in place by the Contractor and accepted by the RPR. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Bid Item No. 6	No. 8 AWG, 5kV, L-824 Cable - Per Linear Foot
Bid Item No. A6	No. 8 AWG, 5kV, L-824 Cable - Per Linear Foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems

American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

ANSI/IEEE STD 81 IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Federal Aviation Administration Standard

FAA STD-019E Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment

END OF ITEM L-108

ITEM L-109 AIRPORT TRANSFORMER VAULT AND VAULT EQUIPMENT

DESCRIPTION

109-1.1 This item shall consist of the furnishing of all vault equipment, wiring, cable, conduit and grounding systems in the existing electrical equipment building (EEB). 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 RPR.

Where indicated on the drawings, this item shall include furnishing of constant current power regulators, L-854 pilot radio and L-821/841 control systems or modifications thereto, electric service equipment, voltage power transformers, and power distribution panels. Auxiliary equipment such as lighting, heating, and ventilation are included where indicated or otherwise required to provide a fully functional system.

Included in this item is removal of abandoned and obsolete equipment and conductors, providing access to existing cable chase, labeling of conductors and cables, installation of new control cables between L-821/841 elements, installation of conduits with power and control cables to make a functioning lighting control system. For this project, the meaning of vault includes the EEB and interconnecting conduits, chases, and vaults.

EQUIPMENT AND MATERIALS

109-2.1 GENERAL.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be certified in AC 150/5345-53, Airport Lighting Equipment Certification Program (ALECP) and listed in the ALECP Addendum.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for review prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

**CONSTRUCTION OF VAULT AND ELECTRICAL EQUIPMENT BUILDING;
MISCELLANEOUS EQUIPMENT AND MATERIALS**

109-3.1 ELECTRICAL VAULT BUILDING. The electrical vault building must comply with NEC Article 110.31, Enclosure for Electrical Installations, Item (A) Electrical Vaults. Construct the building of materials having adequate structural strength for the conditions and installed location, has a minimum fire rating of two or three hours as determined by the authority having jurisdiction (AHJ), and is bullet resistant to minimum UL 752 Level 4.

109-3.2 CONCRETE. Concrete shall be proportioned, placed, and cured per Item 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 RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

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 RIGID STEEL CONDUIT. Rigid steel conduit and fittings shall be per Underwriters Laboratories Standards 6 and 514B. Electrical Metallic Tubing (EMT) may be used for interior applications where not subject to physical damage. Set-screw couplings may not be used. EMT shall comply with UL514B.

109-3.7 Plastic Conduit and fittings. Plastic Conduit and fittings shall conform to the requirements of UL-651 and UL-654 schedule 40 polyvinyl chloride (PVC) suitable for use above or below ground.

109-3.8 LIGHTING. Vault or metal-housing light fixtures shall be UL listed and labeled for wet locations.

109-3.9 OUTLETS. Convenience outlets shall be heavy-duty duplex units designed for industrial service.

109-3.10 SWITCHES. Vault or metal-housing light switches shall be single-pole switches.

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 (0.24 liter) of raw linseed oil to each gallon (liter).

d. Paint for the floor, ceiling, and inside walls shall be per Porter Paint Company 69, 71, and 79 or equivalent. 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 $\times$ 3/4 inch (3 $\times$ 19 mm) minimum copper bus bar.

109-3.13 SQUARE DUCT. Duct shall be square similar to that manufactured by the Square D Company (or equivalent), or the Trumbull Electric Manufacturing Company (or equivalent). 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 $\times$ 4 inch (100 $\times$ 100 mm) except where otherwise shown in the plans.

109-3.14 GROUND RODS. Ground rods shall be in accordance with Item L-108. Ground wire shall be attached to ground rods using irreversible connections.

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 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
AC 150/5345-56	Specification for L-890 Airport Lighting Control and Monitoring System (ALCMS)

Regulators shall be as indicated on the drawings. Unless otherwise indicated, regulators shall be 240V 60Hz Class 1, Style 1. Regulators shall be ferro-resonant or saturable reactor type unless approved by Engineer.

Pilot control equipment shall include radio receiver, antenna, antenna lead, and antenna support.

Lighting control (L-821) and relay (L-841) panel shall be as indicated on the drawings.

109-3.17 OTHER ELECTRICAL EQUIPMENT. Distribution transformers, power distribution panels, automatic transfer 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 interrupting current rating of the existing systems or specified rating whichever is greater when applicable.

a. Control wiring to regulators. Unless otherwise shown on the plans, control wiring to regulators shall be incidental to control installation; power to regulators shall be incidental to regulator installation.

b. Service equipment. Where service equipment is installed, service equipment shall be as required by the serving utility and shall include meter socket, test switch, and enclosures as required. Metering and power distribution equipment located outdoors shall have stainless steel or aluminum enclosure. Contractor shall coordinate with serving utility as required.

c. *Additional items as required (Relamping etc.),* Photoelectric control device or equipment is incidental to the L-821/841 equipment.

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 or thermoplastic wire conforming to Fed. Spec. J-C-30, Types XHHW-2, THW-2, and THWN-2 as indicated on the drawings shall be used. Thermoset wire (XHHW-2) shall be used in all damp or wet locations. Thermoplastic wire may be used as approved by the Engineer in above ground applications. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal. Where unspecified, wire shall be sized per NEC.

a. Control circuits. Unless otherwise indicated on the plans, wire for field-wired control shall be not less than No. 12 American wire gauge (AWG) and shall be insulated for 600 volts. If telephone control cable is specified, No. 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 per NEC and insulated for at least 600 volts.

(2) 3,000 volts maximum – Wire shall be No. 8 AWG or larger and insulated for at least 3,000 volts.

(3) Over 3,000 volts-Wire shall be No. 8 AWG or larger and insulated for at least the circuit voltage.

109-3.19 SHORT CIRCUIT / COORDINATION / DEVICE EVALUATION / ARC FLASH ANALYSIS. For three-phase power systems od 208V and above, the Contractor shall, based upon the equipment provided, include as a part of the submittal process the electrical system "Short Circuit / Coordination / Device evaluation / Arc Flash Analysis". The analysis shall be performed by a registered professional Engineer and submitted in a written report. The analysis shall be signed and sealed by a registered professional Engineer from the state in which the project is located. The analysis shall comply with NFPA-70E and IEEE 1584.

The analysis will include: one line diagrams, short circuit analysis, coordination analysis, equipment evaluation, arc flash analysis and arc flash labels containing at a minimum, equipment name, voltage/current rating, available incident energy and flash protection boundary.

The selected firms field service Engineer shall perform data gathering for analysis completion and device settings, perform device setting as recommended by the analysis and will furnish and install the arc flash labels. The components worst case incident energy will be considered the available arc flash energy at that specific point in the system. Submit three written copies and one electronic copy of the report.

CONSTRUCTION METHODS

CONSTRUCTION OF VAULT AND ELECTRICAL EQUIPMENT BUILDING

109-4.1 GENERAL. If shown on the drawings, the Contractor shall construct the transformer vault or electrical equipment building at the location indicated in the plans. Vault construction shall be reinforced concrete, concrete masonry, or brick wall as specified. The electrical equipment buidling housing shall be prefabricated equipment enclosure to be supplied in the size 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.

The Contractor shall clear, grade, and seed the area around the vault or metal housing for a minimum distance of 10 feet (3 m) on all sides. The slope shall be not less than 1/2 inch per foot (12 mm per 0.3 m) away from the vault or metal housing in all directions.

The vault shall provide adequate protection against weather elements, including rain, wind-driven dust, snow, ice and excessive heat. The vault shall have sufficient filtered ventilation, to assure that the interior room temperatures and conditions do not exceed the recommended limits of the electrical equipment to be installed in the vault. The Contractor is responsible for contacting the manufacturer of the equipment to be installed to obtain environmental limitations of the equipment to be installed.

109-4.2 FOUNDATION AND WALLS.

a. Reinforced concrete construction. Not Used.

b. Brick and concrete construction. Not Used.

c. Concrete masonry construction. Not Used.

109-4.3 ROOF. Not Used.

109-4.4 FLOOR. Not Used.

109-4.5 FLOOR DRAIN. Not Used.

109-4.6 CONDUITS IN FLOOR AND FOUNDATION. Not Used.

109-4.7 DOORS. Not Used.

109-4.8 PAINTING. Not Used.

109-4.9 LIGHTS AND SWITCHES. Not Used.

INSTALLATION OF EQUIPMENT IN VAULT OR ELECTRICAL EQUIPMENT 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 optional standby power supply and transfer switch shall be provided and installed. The equipment installation and mounting shall comply with the requirements of the National Electrical Code and local code agency having jurisdiction. All electrical work shall comply with the NEC and local code agency having jurisdiction including the separation of under 600V work from 5,000V work.

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 RPR. The power supply equipment shall be set on galvanized steel "H" sections, "I" beams, or channels to provide a minimum space of 1-1/2 inch (38 mm) between the equipment and the floor. Where indicated, galvanized steel elevating stands shall be provided. The equipment shall be placed so as not to obstruct the oil-sampling plugs of the oil-filled units; and name-plates shall not be obscured. Manufacturer recommended operating clearances and access shall be maintained.

If specified in the plans and specifications, equipment for an alternate power source or an optional standby 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 power generator set shall be the size and type specified.

Constant current regulator(s) shall be of the rating indicated on the drawing conforming to the requirements of FAA Specification L-828 and is indicated on the drawings or these specifications. Regulators shall be provided with power circuit wiring and overcurrent protection per manufacturer recommendation, incidental to the regulator installation. Regulators shall be of ferroresonant design for low power system harmonics.

109-5.3 SWITCHGEAR AND PANELS. Switches, fuses, circuit breakers, fused cutouts, relays, transfer switches, panels, panel boards, and other similar items shall be furnished and installed at the location shown in the plans or as directed by the RPR. Wall or ceiling mounted items shall be attached to the wall or ceiling with galvanized bolts of not less than 3/8-inch (9 mm) diameter engaging metal expansion shields or anchors in masonry or concrete vaults. Manufacturer mounting requirements shall be satisfied. Mount equipment using a commercially available strut channel framing and fittings system where indicated or required.

109-5.4 DUCT AND CONDUIT. The Contractor shall furnish and install square-type exposed metallic raceway with removable covers for the power and control circuits in the vault where indicated on the drawings. These shall be mounted along the walls behind all floor-mounted equipment and immediately below all wall-mounted equipment.

Wall brackets for square ducts shall be installed at all joints 2 feet (60 cm) 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.

To facilitate maintenance and accommodate vibration, flexible metallic conduit shall be used for connections to equipment such as constant current regulators, exhaust fans, heaters, and standby generators where applicable.

109-5.5 WIRING AND CONNECTIONS. The Contractor shall make all necessary electrical connections in the vault per the wiring diagrams furnished, in accordance with manufacturer installation manuals, and as directed by the RPR.

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 labeled and neatly laced in place; wiring gutter may be used.

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 heat-shrink wire sleeves or identifying tags on all control wires at the point where they connect to the control equipment or to the terminal blocks. Identification markings designated in the plans shall be followed. Engraved plastic labels, embossed durable metal tags, or other RPR approved means, secured with non-metallic ties, shall be used. Control cables shall be labeled at every accessible location.

b. Labels. The Contractor shall install engraved labels on the cases of regulators, breakers, and distribution and control relay cases as designated by the RPR. The letters and numerals shall be not less than one inch (25 mm) 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.

109-5.7 CABLE ENTRANCE. Incoming underground cable from field lighting circuits and supply circuits will be installed outside the walls of the transformer vault as a separate item under Item L-108. The Contractor installing the vault equipment shall bring the cables from the trench or duct through the entrance conduits into the vault and make the necessary electrical connections.

109-5.8 EEB IMPROVEMENTS. Improvements to the EEB shall be installed as indicated on the drawings, as approved by the RPR, as required to provide a complete system, and as required by National Electric Code. Appropriate controls shall be installed to provide for a fully functional system. Work includes:

a. Removal of L-821/841/854 and associated equipment.
b. Removal of control cables.
c. Removal of obsolete and abandoned equipment.
d. Identification and labeling of cables not being removed.
e. Fabrication and installation of L-821/841.
f. Installation of control cable from to EEB and connection to L-821/841.
g. Connection of L-821/841 to external devices at EEB including PE cell, contactors, CCRs.
h. Installation of L-854 in EEB including power and control wiring.
i. Installation of L-854 antenna.
j. Installation of low-loss coaxial cable from L-854 to antenna.

109-5.9 EEB EXISTING ELECTRICAL AND MATERIALS. Remove all existing unused components and all existing wiring and electrical equipment made unnecessary by the new installation and as noted on the drawings. All materials shall be disposed of offsite by the Contractor unless otherwise directed by the RPR or noted for salvage in the specifications or drawings.

METHOD OF MEASUREMENT

109-6.1 The measured quantity of L-828 Regulator to be paid for under this item shall be for each item, installed connected, tested and accepted as a complete unit ready for operation.

109-6.2 The measured quantity for L-821/L-841 Lighting Control Cabinet Shall be per Lump Sum, installed, connected, tested and accepted as a complete unit of work ready for operation. Measurement includes removal and disposal of all components of the existing system no longer needed for functions of the new system.

109-6.3 The measured quantity of Miscellaneous Electrical Equipment shall be per Lump Sum, installed, connected, tested and accepted as a complete unit ready for operation.

BASIS OF PAYMENT

109-7.1 Payment will be made at the contract unit price for each completed and accepted L-828 regulator. 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 item.

109-7.2 Payment will be made at the contract lump sum price for a completed and accepted L-821/L-841 Lighting Control Cabinet. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

109-7.3 Payment will be made at the contract lump sum price for a completed and accepted miscellaneous electrical improvements. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Bid Item No. 7	L-821/L-841 Lighting Control Cabinet – Per Lump Sum
Bid Item No. 8	Miscellaneous Electrical Improvements - Per Lump Sum
Bid Item No. A7	L-828 6.6A, 10kW, 240 VAC Regulator - Per Each
Bid Item No. A8	Miscellaneous Electrical Improvements - Per Lump Sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

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
NFPA-780	Standard for the Installation of Lightning Protection Systems

END OF ITEM L-109

ITEM L-110 AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 GENERAL.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials that comply with these specifications, at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner

110-2.2 STEEL CONDUIT. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth.

EMT conduit may be used with Engineer Approval in protected above-grade locations. EMT shall use compression type connectors only, set-screw type shall not be used. Conduit support shall follow NEC requirements and shall essentially follow the standard construction practices used at the facility.

Conduit bodies, where their use is approved, shall be galvanized malleable iron. Conduit bodies shall not be used as junction or splice enclosures. Conduit bodies shall have no more than two conduit entries.

LFMC, where approved for use, shall be CPE or TPU-coated when used outdoors and may be PVC-coated when used indoors.

110-2.3 PLASTIC CONDUIT. Plastic conduit and fittings-shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I–Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II–Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 SPLIT CONDUIT. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic, as appropriate.

110-2.5 CONDUIT SPACERS. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads, they shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 CONCRETE. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

110-2.7 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 FLOWABLE BACKFILL. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 DETECTABLE WARNING TAPE. Non-Ferrous, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend shall be 3-6 inches (75-150 mm) wide, and subject to submittal. Detectable tape is incidental to the respective bid item. Warning tape shall be red and labeled “CAUTION: BURIED ELECTRIC LINE BELOW”

CONSTRUCTION METHODS

110-3.1 GENERAL. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All spare conduits within concrete encasement of the duct banks shall terminate in the adjacent handhole, unless otherwise shown on the plans. Where terminated outside a handhole install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a ¼-inch (6.3 mm) sieve. Flowable backfill may alternatively be used

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 DUCT BANKS. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inch (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the

concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

110-3.3 CONDUITS WITHOUT CONCRETE ENCASEMENT. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a ¼-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and lot less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

110-3.4 MARKERS. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 BACKFILLING FOR CONDUITS. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

If approved by the RPR, flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.6 BACKFILLING FOR DUCT BANKS. After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 "Excavation and Embankment" except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period's construction, whichever is less.

If approved by the RPR, flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.7 RESTORATION. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include the methods and/or materials shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 Ownership of removed cable. The Contractor shall be responsible to dispose of cable identified for removal offsite unless otherwise directed by the RPR.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet of conduits installed, 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 Electrical Trench for underground conduit shall be measured by the linear feet. Trenching measurements shall also include excavation and backfill required to connect new conduit with existing conduit or duct banks. In either case, measurement of electrical trench shall be backfilled with designated material, measured in place, complete, and accepted. No other separate measurement shall be made for variations the number or size of conduit, or for any variations in material encountered. Trench backfill and compaction shall be included as shown on the Plans for each respective item.

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 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 conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

110-5.2 Payment will be made at the contract unit price per linear foot for electrical trench completed and accepted, including excavation and backfill with the designated material, and, for termination at the structure.

This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications.

Payment will be made under:

Bid Item No. 9	2-Inch PVC Conduit - Per Linear Foot
Bid Item No. 10	Electrical Trench - Per Linear Foot
Bid Item No. A9	2-Inch PVC Conduit - Per Linear Foot
Bid Item No. A10	4-Inch PVC Conduit - Per Linear Foot
Bid Item No. A11	Electrical Trench - Per Linear Foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit - Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 1242	Electrical Intermediate Metal Conduit Steel
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

ITEM E-130 DIRECTIONAL BORE - ELECTRICAL DUCT

DESCRIPTION

130-1.1 GENERAL. This item covers the requirements for the installation of ducts installed under existing pavement by the method of directional boring, jacking, or jack and boring, in conformance with the design and dimensions shown on the Drawings.

MATERIALS

Conduit to be installed, as indicated on drawing, shall be either, Flexible Nonmetallic Conduit, or Rigid Nonmetallic Conduit as specified below.

130-2.1 RIGID METAL CONDUIT. Not Used.

130.2.2 FLEXIBLE NONMETALLIC CONDUIT. Heavy wall, Schedule 80, flexible high-density sunlight-resistant polyethylene (HDPE) conforming to UL 651B. HDPE may be installed where directional boring is used to place conduits. Where HPDE is installed it shall be continuous between handholes.

130-2.3 RIGID NONMETALLIC CONDUIT. Heavy wall, extruded, rigid polyvinyl chloride (PVC) conforming to UL 651, schedule 80 Rigid PVC Conduit.

CONSTRUCTION METHODS

130-3.1 GENERAL.

a. Contractor is responsible for adequacy of boring, installing support systems as indicated, encasement, carrier pipe, and faithful execution of work using the non-hydraulic (dry) method of boring and installing encasement pipe simultaneously. Contractor shall have sole responsibility for safety of boring operations and for persons engaged in work. Contractor's attention is directed to the Construction Industry Occupational Safety and Health Administration (OSHA) Standards (29 FR 1926/1920) as published in U.S. Department of Labor Publication OSHA 2207, revised October 1, 1979, with particular attention to Subpart S.

b. Contractor shall furnish shop drawings showing his proposed method of handling, including design for boring head, installation of back stop, arrangement and position of jacks, pipe guides, grouting plan, and installation of conduit, for boring complete in assembled position, for RPR's review.

c. Location of pit for boring equipment and workmen shall conform to requirements of Manual on Uniform Construction Barricading Standards detail indicated and will be reviewed by RPR. Review by RPR will not relieve Contractor of his responsibility to obtain specified results in a safe workmanlike manner.

d. Construction shall be undertaken in such a manner that will not interfere with operation of any runway or taxiway, utility, or other facility and shall not weaken or damage any embankment or structure. During construction operations, and until pits are backfilled, barricades and lights to safeguard traffic and pedestrians shall be furnished and maintained.

e. When grade of pipe at boring end is below ground surface, suitable pits of trenches shall be excavated for the purpose of conducting the boring operations and for joining pipe. Work shall be sheeted securely and braced as required to prevent earth caving and to provide a safe and stable work area. Pipe, preferably, shall be bored from

low or downstream end. Minor lateral or vertical variation in final position of pipe and from line and grade established by the Engineer will be permitted at the discretion of RPR provided that such variation shall be regular and only in one direction and that final grade of low line shall be in direction indicated.

f. When conforming to details indicated, if trench bottom is unstable or excessively wet or when installation will result in less than 48 inches of cover, Contractor shall notify RPR. RPR may require Contractor to install a concrete seal, cradle, cap, or encasement or other appropriate action.

g. Immediately after boring is complete and encasement pipe is accurately positioned and approved for line and grade, clear space between pipe and surrounding excavated material shall be completely filled by pressure grouting for entire length of installation.

h. After placement of carrier pipe, ends of encasement pipe shall be bulkheaded with brick, concrete blocks, or stones, sufficient to prevent intrusion of backfill, etc., into encasement pipe, but provided with adequate weep holes to facilitate the escape of contents of carrier pipe, should failure occur.

i. As soon as possible after carrier pipe and bulkheads are completed, pits or trenches excavated to facilitate these operations shall be backfilled with the same material originally in place in layers not exceeding 6 inches. The backfill shall be compacted to not less than 90 percent of the density conforming to ASTM D 1667.

j. Excavated material shall not be placed on the runway or taxiway during installation. Any unused excavated material shall be disposed of offsite.

k. The Contractor shall avoid all underground utilities (airfield electric and control wires, sewer, storm sewer, fuel line, etc.) when digging the pits or installing the pipe. Contractor shall determine the location and depth of utilities in-line with the bore.

l. Pulling of conduit into directional bores shall be performed in one smooth and continuous pull. All such pulls shall be within the allowable loads for the pipe being installed. Bentonite slurry shall be used as a lubricant for all bores and conduit pulls.

130-3.2 BORING.

a. The hole shall be bored mechanically with a suitable boring assembly designed to produce a smooth, straight shaft and so operated that the completed shaft shall be at the established line and grade. The size of the bored hole shall be of such diameter to provide ample clearance for bells or other joints. The holes are to be bored mechanically. The boring shall be done by using either a pilot hole or a dry bore method. A pilot hole boring shall be constructed by the following method:

(1) An approximate 2-inch pilot hole shall be bored the entire length of the crossing and shall be checked for line and grade on the opposite end of the bore from the work pit. This pilot hole shall serve as the centerline of the largest diameter hole to be bored.

b. The dry bore shall be constructed as follows:

(1) Boring shall proceed from a pit excavated for boring equipment and workers. Use of water or other fluids in connection with jacking or boring shall be minimized and permitted only to lubricate cutters. Rear edge of boring cutters shall not extend beyond encasement pipe by more than 2 inches. Jetting will not be permitted.

(2) The casing pipe shall be advanced as the spoil is removed by augers. Bentonite may only be used as a lubricant. Casing shall be new steel conduit approved by the National Air Company, with a minimum inside

diameter sufficiently larger than the outside diameter of the carrier pipe or ducts to accommodate placement or removal.

c. Directional bore shall be guided to maintain a path with minimal deviation in bore track. Contractor shall maintain records showing track of conduit. Bore pits shall be used to establish proper depth and alignment of the bore. Single or multiple bores and conduit pull-backs shall be performed as required to install the requisite conduits. Conduit shall be allowed to cool and shrink to final length before termination in vaults and handholes. Any stuck, broken, or conduit that fails to be installed for the entire distance shall be removed and replaced at contractor expense. Contactor shall clean, proof, and install pull cord in each conduit.

METHOD OF MEASUREMENT

130-4.1 The quantity of Directional Bore shall be per foot of installed conduit measured in a direct line between two handholes, junction cans or points designated by the RPR, connected by the conduits, as indicated on the drawings or as directed by the RPR, complete and accepted by the RPR. The length of directional bore shall be approved prior to installation by the RPR. Connection to handholes, junction cans, or light base cans shall be considered incidental to the their respective bid item.

BASIS OF PAYMENT

130-5.1 Payment shall be made under the Contract unit price for the Directional Bore installation. This price shall be full compensation for all connections, fittings, grout, and for furnishing all materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Bid Item No. A12	Cross Directional Boring - Per Linear Foot

ITEM L-115 ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

115-2.1 GENERAL.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

115-2.2 CONCRETE STRUCTURES. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

115-2.3 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure loading capacity shall be as shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans. Square knockouts are not acceptable.

Threaded inserts and pulling eyes shall be cast in as shown on the plans. Precast structures shall include cable support mounting slots on all four interior sides.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

115-2.4 JUNCTION CANS. Junction cans shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

115-2.5 MORTAR. The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

115-2.6 CONCRETE. All concrete used in structures shall conform to the requirements of Item P-610, Concrete for Miscellaneous Structures.

115-2.7 FRAMES AND COVERS. The frames shall conform to one of the following requirements:

- **a.** ASTM A48 Gray iron castings
- **b.** ASTM A47 Malleable iron castings
- **c.** ASTM A27 Steel castings
- **d.** ASTM A283 Grade D Structural steel for grates and frames
- **e.** ASTM A536 Ductile iron castings
- **f.** ASTM A897 Austempered ductile iron castings

All castings specified shall withstand a maximum tire pressure of 190 psi and maximum load of 20,000 lbs.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

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

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word “ELECTRIC” or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

115-2.8 LADDERS. Ladders, if specified, shall be galvanized steel or as shown on the plans.

115-2.9 REINFORCING STEEL. All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

115-2.10 BEDDING/SPECIAL BACKFILL. Bedding or special backfill shall be as shown on the plans.

115-2.11 FLOWABLE BACKFILL. Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

115-2.12 CABLE TRAYS. Cable trays shall be of as shown on the plans. Cable trays shall be located as shown on the plans.

115-2.13 PLASTIC CONDUIT. Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

115-2.14 CONDUIT TERMINATORS. Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

115-2.15 PULLING-IN IRONS. Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

115-2.16 GROUND RODS. Ground rods shall be one piece, copper or copper clad steel unless otherwise shown on the drawings**.** The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8 feet (2.4 m) long nor less than 5/8 inch (16 mm) in diameter.

CONSTRUCTION METHODS

115-3.1 UNCLASSIFIED EXCAVATION. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

115-3.2 CONCRETE STRUCTURES. Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

115-3.3 PRECAST UNIT INSTALLATIONS. Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

115-3.4 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS. All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 INSTALLATION OF LADDERS. Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

115-3.6 REMOVAL OF SHEETING AND BRACING. In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 BACKFILLING. After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 CONNECTION OF DUCT BANKS. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.9 GROUNDING. A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of #6 bare solids copper shall be irreversibly bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 6 American wire gauge (AWG) bare copper pigtails shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

115-3.10 CLEANUP AND REPAIR. After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

115-3.11 RESTORATION. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

115-3.12 INSPECTION. Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

115-3.13 MANHOLE ELEVATION ADJUSTMENTS. The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the

manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

115-3.14 DUCT EXTENSION TO EXISTING DUCTS. Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

METHOD OF MEASUREMENT

115-4.1 Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing.

BASIS OF PAYMENT

115-5.1 The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Bid Item No. 11	Junction Can - Per Each
Bid Item No. A13	Junction Can - Per Each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Advisory Circular (AC)

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C206	Standard Specification for Finishing Hydrated Lime

FAA Engineering Brief (EB)

EB #83	In Pavement Light Fixture Bolts

Mil Spec

MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

END OF ITEM L-115

ITEM L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DESCRIPTION

125-1.1 GENERAL. This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, controls, circuit breakers, materials, services, base cans, transformers, concrete foundations, specified wiring, cable connections; associated conduit and conduit fittings between master and slave unit(s); the furnishing and installation of all lamps, ground rods, and ground connection; the testing of the installation; and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR. Trenching, backfill, conduit, and power cable to the lighting systems are considered separately under the respective specification sections associated with these items.

125-1.2 REFERENCED MATERIALS. Additional details pertaining to specific systems covered in this item are contained in the Advisory Circulars (latest edition) listed below:

150/5340-30	Design and Installation Details for Airport Visual Aids
150/5345-28	Precision Approach Path Indicator (PAPI) Systems
150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and AccessoriesF
150/5345-44	Specification for Runway and Taxiway Signs
150/5345-46	Specification for Runway and Taxiway Light Fixtures
150/5345-47	Isolation Transformers for Airport Lighting Systems
150/5345-53	Airport Lighting Equipment Certification Program

The Contractor is responsible for using the latest edition of the referenced FAA Advisory Circulars.

EQUIPMENT AND MATERIALS

125-2.1 GENERAL.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not performs as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is

not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

e. All non-LED equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. All LED light fixtures must be warranted by the manufacturer for a minimum of 4 years after date of installation inclusive of all electronics (See AC 150/5340-26 for replacement criterion for light fixtures). The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

EQUIPMENT AND MATERIALS

125-2.2 CONDUIT/DUCT. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 CABLE AND COUNTERPOISE. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 TAPE. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.5 CABLE CONNECTIONS. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 RETROREFLECTIVE MARKERS. Not required.

125-2.7 RUNWAY AND TAXIWAY LIGHTS. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

a. Taxiway Edge Light, Elevated. Elevated taxiway edge lights shall conform to the requirements of FAA specification(s) and the following table and as indicated on the drawings. Base cans shall be as shown in the following table and considered part of the light unit. Unused hubs shall be sealed per manufacturer's recommendations and the specifications.

Lights

Type	Class	Mode	Style	Option	Base	Filter	Transformer	Notes
L-861T (L)	2	1	N/A	N/A	L-867, Class 1A, Size B	Blue	L-830-1	14" Height

125-2.8 RUNWAY AND TAXIWAY SIGNS. Not Used.

125-2.9 RUNWAY END IDENTIFIER LIGHT (REIL). Not required.

125-2.10 PRECISION APPROACH PATH INDICATOR (PAPI). Provide and install a PAPI System serving Runway 16 and Runway 34, complete with control, lamps, mounting accessories, and aiming instrument set. PAPI shall receive

power from the EEB with no remote control. The light units for the PAPI shall meet the requirements of AC 150/5345-28, Type L-881(L), Style A, Class I.

The new constant current power supply, series plug cutout, and installation thereof as well as the installation of conduit and cable from the electrical equipment building to PAPI master shall conform to Specification Items L-108 L-109, and L-110. PAPI day-night control and anti-fogging shall be controlled by the L-821/841 and L-854 located in the EEB. A new circuit and installation thereof as well as the installation of conduit and cable from the electrical equipment building to PAPI master shall conform to Specification Items L-108 L-109, and L-110. Day-night light level dimming shall be provided by the control unit installed at the PAPI location.

125-2.11 CIRCUIT SELECTOR CABINET. Not required.

125-2.12 LIGHT BASE, JUNCTION CANS, AND TRANSFORMER HOUSINGS. Light Base, junction cans for splice boxes, and Transformer Housings shall conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867, L-868, Class 1A, Size B shall be provided as indicated on the drawings or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures. The location of hubs for various installation locations shall be field verified by the Contractor, and if a new system, as shown on the plans and details in the Drawings or, if not shown, shall be submitted for approval. Cans shall have interior and exterior grounding lugs and drain hole.

125-2.13 ISOLATION TRANSFORMERS. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

125-2.14 CONCRETE. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Where reinforced concrete is specified, reinforcing steel shall conform to ASTM A615 Grade 60. Concrete and reinforcing steel are incidental to the respective pay item of which they are a component part.

125-2.15 CONDUIT. Conduit shall conform to Item L-110, "Airport Underground Electrical Duct Banks and Conduits." Conduits entering any building, structure, or equipment shall be sealed with an approved “duct-seal.”

125-2.16 WIRE. Wire shall conform to Item L-108, “Underground Power Cable for Airports.” Unless otherwise shown on the plans, install new No. 8 AWG, 5kV and 600V cable as required and indicated on the plans. Splicing shall be performed in junction can or handhole and shall be an approved submersible in-line splices, submittal required. Bolted or taped splices shall not be used.

125-2.17 LIGHT FIXTURE IDENTIFICATION. An identification marker with approved numbering/lettering shall be provided for every elevated light. Marker shall be as shown on the drawings adjusted for size to accommodate as many letter/numbers as required for the application. Marker and labeling scheme is subject to submittal. Reflective adhesive numbers/letters shall be used to designate each and every elevated light. Markers shall be installed to be visible from adjacent taxiway or runway. Light marking is incidental to the light installation.

INSTALLATION

125-3.1 INSTALLATION. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans or accepted shop drawings.

Tolerances given in the FAA Advisory Circulars, these Specifications, and the Drawings shall not be exceeded. Where no tolerance is given, no deviation is permitted. Items not installed in accordance with the FAA Advisory Circulars, these Specifications, and Drawings shall be replaced by and at the expense of the Contractor.

a. Assemble units and connect to the system in accordance with the manufacturer's recommendations and instructions.

b. Provide 5 feet of slack in each cable in each base can.

c. Painted and galvanized surfaces that are damaged shall be repaired according to the manufacturer's recommendations, to the satisfaction of the Engineer. All areas to be field galvanized shall be dry and free of all cutting debris, welding debris, oil, grease or any contamination, immediately prior to application of the compound. Application shall consist of a minimum of three coats and a minimum dry film thickness of 3.0 mils. Application of the galvanizing compound shall be applied within 2 hours of the damage to the galvanized surface. Application of the galvanizing compound should extend a minimum of 3 inches beyond the edges of the damaged area.

d. All airfield lighting bolting hardware and threaded connections, i.e., frangible couplings, shall be coated with a water-proof anti-seize compound appropriate for the environment and materials before being screwed together. Anti-seize compound is subject to submittal and review.

There must be no exposed power/control cables between the point where they leave the underground (DEB or L-867 bases) and where they enter the equipment enclosures such as taxiway signs, PAPI, REIL, etc. These cables must be enclosed in rigid conduit or in flexible water-tight conduit with frangible coupling(s) at the grade or the housing cover, as shown in applicable details. Where LFMC is used outdoors, it shall be CPE or TPU-coated.

125-3.2 PAPI SYSTEM INSTALLATION. Install PAPI System as indicated on the Drawings in conformance with AC 150/5340-30 150/5345-28 and in accordance with manufacturer's instructions. PAPI is to be powered by constant current regulator in electrical equipment building (EEB). Power cables are required from the PAPI to the EEB and shall be installed and paid for under other bid items.

The fixture shall be oriented and leveled, using appropriate leveling fixtures if necessary, so that it is within 1 degree of level and within 1 degree of parallel to the runway centerline. Final adjustment of the Optical System shall be made at night, following manufacturer's instructions, and shall be to the satisfaction of the RPR.

a. Wire and Connections. The Contractor shall make all necessary electrical connections in accordance with the wiring diagrams furnished and as directed by the RPR. 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. Seal conduits using DuctSeal upon completion of wire installation.

b. Ground Connection and Ground Rod. The Contractor shall furnish and install a ground rod, grounding cable, and ground clamps for grounding the frame of the assembly near the base. The ground rod shall be of the diameter and length specified in the Drawings and shall be stainless steel, solid copper or copper-clad steel as indicated. The ground rod shall be driven into the ground adjacent to the concrete foundation so that the top is at least 6 inches below grade. The grounding cable shall consist of No. 6 AWG bare copper wire or larger and shall be firmly attached to the ground rod by means of an irreversible connection. The other end of the grounding cable shall be securely attached to a leg or to the base of the pipe support with noncorrosive metal and shall be of substantial construction; a clamp designed for grounding shall be used.

c. Field Lighting. Stencil vertical aiming angles on the outside of each PAPI lamp housing. The numerals must be black and one -inch minimum height.

125-3.3 EXISTING AIRPORT LIGHTING SYSTEMS DURING CONSTRUCTION. Protect existing airport lighting systems. Any portion of the existing airport lighting systems damaged or disconnected during installation of the new systems shall be repaired and reconnected and must be fully functional prior to dusk each day or during adverse weather conditions, to the satisfaction of the RPR. This work shall be at no additional cost to the Owner.

125-3.4 TESTING. All systems 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.

Up to two walk-throughs may be initiated by the Engineer during which the airfield lighting units would be required to be in operation. Additional walk-throughs may be necessary depending upon the number of discrepancies found on the previous walk-throughs.

The Contractor is responsible for lamp replacements and necessary maintenance of airfield items during the testing, construction, and walk-through periods.

Test cabling per Specification L-108.

The Contractor shall perform the necessary inspection and tests for some items concurrently with the installation because of subsequent inaccessibility of some components. The Engineer shall be notified by the Contractor 48 hours in advance of any testing.

125-3.5 SHIPPING AND STORAGE. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.6 ELEVATED AND IN-PAVEMENT LIGHTS. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

METHOD OF MEASUREMENT

125-4.1 Taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR.

Precision Approach Path Indicator shall be measured by lump sum system installed as a completed unit, in place, ready for operation, and accepted by the RPR.

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete taxiway light or precision approach path indicator. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

Bid Item No. 12	L-881(L) RW 34 PAPI System - Per Lump Sum
Bid Item No. 13	L-881(L) RW 16 PAPI System - Per Lump Sum
Bid Item No. A14	Taxiway Edge Light on Existing Base Can - Per Each
Bid Item No. A15	Taxiway Edge Light on New Base Can - Per Each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

END OF ITEM L-125

SECTION VI

PREVAILING WAGE RATES

FEDERAL DAVIS-BACON WAGE RATES ARE ATTACHED

PREVAILING WAGE RATES - OREGON

THIS PROJECT IS A PUBLIC WORKS CONTRACT SUBJECT TO ORS 279C.800 TO 279C.870 AND THE DAVIS-BACON ACT (40 U.S.C. 276A).

ORS 279c.838 requires state prevailing wage rates to be paid on projects subject to both the state prevailing wage rate law and the Federal Davis-Bacon act, if the state prevailing rate of wage is higher than the federal prevailing rate of wage.

State prevailing wage rates, as set forth in the January 5, 2024, and any amendment(s) Bureau of Labor and Industry (BOLI) publication *"Prevailing Wage Rates for Public Contracts in Oregon Subject to both State PWR Law and The Federal Davis-Bacon Act"* are attached and applicable rates (including current amendments and corrections to that publication) are available at:
http://www.oregon.gov/boli/whd/pwr/pages/index.aspx

General Decision Number: OR20240001 05/31/2024

Superseded General Decision Number: OR20230001

State: Oregon

Construction Type: Highway

Counties: Oregon Statewide

HIGHWAY CONSTRUCTION PROJECTS

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

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022;	Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least $17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022.	Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least $12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

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

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

Modification Number	Publication Date
0	01/05/2024
1	01/12/2024
2	02/02/2024
3	02/23/2024
4	04/12/2024
5	05/31/2024

BROR0001-006 06/01/2020

BAKER, BENTON (NORTH), CLACKAMAS, CLATSOP, COLUMBIA, GILLIAM, HARNEY, HOOD RIVER, LINCOLN (NORTH), LINN (NORTH), MALHEUR (NORTH), MARION, MORROW, MULTNOMAH, POLK, SHERMAN, TILLAMOOK, UMATILLA, UNION, WALLOWA, WASCO (NORTH), WASHINGTON AND YAMHILL COUNTIES

	Rates	Fringes
BRICKLAYER	$ 41.20	22.39

BROR0001-007 06/01/2020

BENTON (SOUTH), CROOK, DESCHUTES, GRANT, JACKSON, JEFFERSON, KLAMATH, LAKE, LANE, LINCOLN (SOUTH), LINN (SOUTH), MALHEUR (SOUTH), WASCO (SOUTH) AND WHEELER COUNTIES

	Rates	Fringes
BRICKLAYER	$ 41.20	22.39

CARP9001-001 06/01/2022

ZONE 1:

	Rates	Fringes
Carpenters:		
CARPENTERS	$ 42.31	19.21
DIVER STANDBY	$ 58.32	19.21
DIVERS TENDERS	$ 51.32	19.21
DIVERS	$ 95.32	19.21
MANIFOLD AND/OR DECOMPRESSION CHAMBER OPERATORS	$ 51.32	19.21
MILLWRIGHTS	$ 43.26	19.21
PILEDRIVERS	$ 45.74	19.21

DEPTH PAY:

50 to 100 feet $2.00 per foot over 50 feet

101 to 150 feet 3.00 per foot over 50 feet

151 to 200 feet 4.00 per foot over 50 feet

over 220 feet 5.00 per foot over 50 feet

Zone Differential (Add to Zone 1 rates):

Zone 2 - $1.25

Zone 3 - 1.70

Zone 4 - 2.00

Zone 5 - 3.00

Zone 6 - 5.00

Zone 7 - 10.00

ZONE 1 - All jobs or projects located within 30 miles of the respective City Hall

ZONE 2 - More than 30 miles and less than 40 miles from the respective City Hall

ZONE 3 - More than 40 miles and less than 50 miles from the respective City Hall

ZONE 4 - More than 50 miles and less than 60 miles from the respective City Hall

ZONE 5 - More than 60 miles and less than 70 miles from the respective City Hall

ZONE 6 - More than 70 miles from the respective City Hall.

ZONE 7 - More than 100 miles from the respective City Hall.

BASEPOINTS CITIES FOR CARPENTERS (EXCLUDING MILLWRIGHTS, PILEDRIVERS AND DIVERS)

ALBANY ASTORIA BAKER BEND BROOKINGS BURNS
COOS BAY CORVALLIS EUGENE GOLDENDALE GRANTS PASS HERMISTON
HOOD RIVER KLAMATH FALLS LAGRANDE LAKEVIEW LONGVIEW MADRAS
MEDFORD McMINNVILLE NEWPORT OREGON CITY ONTARIO
PENDLETON PORTLAND PORT ORFORD REEDSPORT ROSEBURG SALEM
ST. HELENS THE DALLES TILLAMOOK VANCOUVER

BASEPOINTS FOR MILLWRIGHTS

EUGENE NORTH BEND LONGVIEW PORTLAND MEDFORD
THE DALLES VANCOUVER

BASEPOINTS FOR PILEDRIVERS AND DIVERS

ASTORIA BEND COOS BAY EUGENE KLAMATH FALLS LONGVIEW
MEDFORD NEWPORT PORTLAND ROSEBURG SALEM THE DALLES

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* ELEC0048-006 01/01/2024

CLACKAMAS, CLATSOP, COLUMBIA, HOOD RIVER, MULTNOMAH, TILLAMOOK, WASCO, WASHINGTON, SHERMAN AND YAMHILL (NORTH) COUNTIES

	Rates	Fringes
CABLE SPLICER	$ 66.55	29.34
ELECTRICIAN	$ 60.50	28.64

HOURLY ZONE PAY:

Hourly Zone Pay shall be paid on jobs located outside of the free zone computed from the city center of the following listed cities:

Portland, The Dalles, Hood River, Tillamook, Seaside and Astoria

Zone Pay:

Zone 1: 31-50 miles $1.50/hour

Zone 2: 51-70 miles $3.50/hour

Zone 3: 71-90 miles $5.50/hour

Zone 4: Beyond 90 miles $9.00/hour

*These are not miles driven. Zones are based on Delorrne Street Atlas USA 2006 plus.

ELEC0112-001 06/01/2021

BAKER, GILLIAM, GRANT, MORROW, UMATILLA, UNION, WALLOWA, AND WHEELER COUNTIES

	Rates	Fringes
CABLE SPLICER	$ 52.50	23.01
ELECTRICIAN	$ 50.00	22.93

ELEC0280-003 01/01/2024

BENTON, CROOK, DESCHUTES, JEFFERSON, LANE (EAST OF A LINE RUNNING NORTH AND SOUTH FROM THE NORTHEAST CORNER OF COOS COUNTY TO THE SOUTHEAST CORNER OF LINCOLN COUNTY), LINN, MARION, POLK AND YAMHILL (SOUTHERN HALF) COUNTIES

	Rates	Fringes
CABLE SPLICER	$ 60.80	22.24
ELECTRICIAN	$ 55.27	22.24

ELEC0291-006 06/01/2023

MALHEUR COUNTY

	Rates	Fringes
CABLE SPLICER	$ 41.69	6%+14.80
ELECTRICIAN	$ 37.90	6%+14.80

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* ELEC0659-004 01/01/2024

DOUGLAS (EAST OF A LINE RUNNING NORTH AND SOUTH FROM THE NE CORNER OF COOS COUNTY TO THE SE CORNER OF LINCOLN COUNTY), HARNEY, JACKSON, JOSEPHINE, KLAMATH AND LAKE COUNTIES

	Rates	Fringes
CABLE SPLICER	$ 64.58	1.5%+22.34
ELECTRICIAN	$ 45.00	19.88

ZONE PAY: BASE POINTS ARE FROM THE DOWNTOWN POST OFFICE IN GRANTS PASS, KLAMATH FALLS, ROSEBURG AND MEDFORD.

ZONE 1:	0-20 MILES	$0.00 PER HOUR
ZONE 2:	> 20-30 MILES	$1.50 PER HOUR
ZONE 3:	>30-40 MILES	$3.30 PER HOUR
ZONE 4:	>40-50 MILES	$5.00 PER HOUR
ZONE 5:	>50-60 MILES	$6.80 PER HOUR
ZONE 6:	>60 MILES	$9.50 PER HOUR

*THESE ARE NOT MILES DRIVEN. zONES ARE BASED ON DELORNE STREET ATLAS USA 5.0.

ELEC0932-004 01/01/2024

COOS, CURRY, LINCOLN, DOUGLAS AND LANE COUNTIES (AREA LYING WEST OF A LINE NORTH AND SOUTH FROM THE N.E. CORNER OF COOS COUNTY TO THE S.E. CORNER OF LINCOLN COUNTY)

	Rates	Fringes
ELECTRICIAN	$ 50.03	24.00

ENGI0701-005 01/01/2024

ZONE 1:

POWER EQUIPMENT OPERATORS (See Footnote C)

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1	$ 56.66	16.90
GROUP 1A	$ 58.82	16.90
GROUP 1B	$ 60.98	16.90

GROUP 2.....$ 54.75 16.90

GROUP 3.....$ 53.60 16.90

GROUP 4.....$ 50.27 16.90

GROUP 5.....$ 49.03 16.90

GROUP 6.....$ 45.81 16.90

Zone Differential (add to Zone 1 rates):

Zone 2 - $3.00

Zone 3 - $6.00

For the following metropolitan counties: MULTNOMAH; CLACKAMAS; MARION; WASHINGTON; YAMHILL; AND COLUMBIA; CLARK; AND COWLITZ COUNTY, WASHINGTON WITH MODIFICATIONS AS INDICATED:

All jobs or projects located in Multnomah, Clackamas and Marion Counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Highway 26 and West of Mile Post 30 on Highway 22 and all jobs or projects located in Yamhill County, Washington County and Columbia County and all jobs or porjects located in Clark & Cowlitz County, Washington except that portion of Cowlitz County in the Mt. St. Helens ""Blast Zone"" shall receive Zone I pay for all classifications.

All jobs or projects located in the area outside the identified boundary above, but less than 50 miles from the Portland City Hall shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the Portland City Hall, but outside the identified border above, shall receive Zone III pay for all classifications.

For the following cities: ALBANY; BEND; COOS BAY; EUGENE; GRANTS PASS; KLAMATH FALLS; MEDFORD; ROSEBURG

All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone I pay for all classifications.

All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone III pay for all classifications.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

Group 1

Concrete Batch Plan and or Wet mix three (3) units or more Crane, Floating one hundred and fifty (150) ton but less than two hundred and fifty (250) ton. Crane, two hundred (200) ton through two hundred ninety-nine (299) ton with two-hundred-foot (200?) boom or less (including jib, inserts and/or attachments) Crane, ninety (90) ton through one hundred ninety-nine (199) ton with over two hundred (200?) boom Including jib, inserts and/or attachments) Crane, Tower Crane with one hundred seventy-five-foot (175?) tower or less and with less than two-hundred-foot (200?) jib Crane, Whirley ninety (90)

ton and over Helicopter when used in erecting work Tunnel Boring Machine Tunnel, Micro Boring Tunnel Machine

Group 1A

Crane, floating two hundred fifty (250) ton and over Crane, two hundred (200) ton through two hundred ninety-nine (299) ton, with over two-hundred-foot (200?) boom (including jib, inserts and/or attachments) Crane, three hundred (300) ton through three hundred ninety-nine (399) ton Crane, Tower Crane with over one hundred seventy-five-foot (175?) tower or over two hundred foot (200?) jib Crane, tower Crane on rail system or 2nd tower or more in work radius

Group 1B

Crane, three hundred (300) ton through three hundred ninety-nine (399) ton, with over two hundred-foot (200?) boom (including jib, inserts and/or attachments) Floating crane, three hundred fifty (350) ton and over Crane, four hundred (400) ton and over

Group 2

Asphalt Plant (any type) Asphalt Roto-Mill, pavement profiler eight foot (8?) lateral cut and over Auto Grader or ?Trimmer? Blade, Robotic Bulldozer, Robotic Equipment (any type) Bulldozer, over one hundred twenty thousand (120,000) lbs. and above Canal Trimmer Concrete Batch Plant and/or Wet Mix one (1) and two (2) drum Concrete Canal Liner Operator Concrete Diamond Head Profiler Concrete, Automatic Slip Form Paver Crane, Boom Truck fifty (50) ton and with over one hundred fifty-foot (150?) boom and over Crane, Floating (derrick barge) thirty (30) ton but less than one hundred fifty (150) ton Crane, Cableway twenty-five (25) ton and over Crane, Floating Clamshell three (3) cu. Yds. And over Crane, ninety (90) ton through one hundred ninety-nine (199) ton up to and including two hundred-foot (200?) boom (including jib inserts and/or attachments) Crane, fifty (50) ton through eighty-nine (89) ton with over one hundred fifty-foot (150?) boom (including jib inserts and/or attachments) Crane, Whirley under ninety (90) ton Crusher Plant Drone Excavator over one hundred thirty thousand (130,000) lbs. Heavy Equipment Robotics Operator or Mechanic Loader one hundred twenty thousand (120,000) lbs. and above Master environmental Maintenance Mechanic Remote Controlled Earth Moving Equipment Shovel, Dragline, Clamshell, five (5) cu. Yds. And over Underwater Equipment remote or otherwise, when used in construction work Wheel Excavator any size

Group 3

Bulldozer, over seventy thousand (70,000) lbs. up to and including one hundred twenty thousand (120,000) lbs. Crane, Boom Truck fifty (50) ton and over with less than one hundred fifty-foot (150?) boom Crane, fifty (50) ton through eighty-nine (89) ton with one hundred fifty-foot (150?) boom or less (including jib inserts and/or attachments) Crane, Shovel, Dragline or Clamshell three (3) cu. yds. but less than five (5) cu. Yds. Excavator over eighty-five thousand (85,000) lbs. through one hundred thirty thousand (130,000) lbs. Loader sixty thousand (60,000) lbs. and less than one hundred twenty thousand (120,000) lbs.

Group 4

Asphalt, Screed Asphalt Paver Asphalt Roto-Mill, pavement profiler, under eight foot (8?) lateral cut Asphalt, Recycle Machine Asphalt, Material Transfer Vehicle Operator Back Filling Machine Backhoe, Robotic, track and wheel type up to and including twenty thousand (20,000) lbs. with any attachments Blade (any type) Boatman, Licensed Boring Machine Bulldozer over twenty thousand (20,000) lbs. and more than one hundred (100) horse up to seventy thousand (70,000) lbs. Cable-Plow (any type) Cableway up to twenty-five (25) ton Cat Drill (John Henry) Challenger Chippers Combination Heavy Duty

Mechanic-Welder, when required to do both Compactor, multi-engine Compactor, Robotic Compactor with blade self-propelled Concrete, Breaker Concrete, Grout Plant Concrete, Mixer Mobile Concrete, Paving Road Mixer Concrete, Reinforced Tank Banding Machine Crane, Boom Truck twenty (20) ton and under fifty (50) ton Crane, Bridge Locomotive, Gantry and Overhead Crane, Carry Deck, Spider Crane, and similar types Crane, Chicago Boom and similar types Crane, Derrick Operator, under one hundred (100) ton Crane, Floating Clamshell, Dragline, etc. under three (3) cu. yds. Or less than thirty (30) ton Crane, under fifty (50) ton Crane, Quick Tower under one-hundred-foot (100?) in height and less than one hundred fifty foot (150?) jib (on rail included) Diesel-Electric Engineer (Plant or Floating) Directional Drill over twenty thousand (20,000) lbs. pullback Drill Cat Operator Drill Doctor and/or Bit Grinder Drill, Oscillator Driller, Percussion, Diamond, Core, Cable, Rotary and similar type Excavator Operator over twenty thousand (20,000) lbs. through eighty-five thousand (85,000) lbs. Generator Operator Grade Setter/layout from plans Grade-all Guardrail Machines, i.e., punch, auger, etc. Hammer Operator (Piledriver) Hoist, stiff leg, guy derrick or similar type, fifty (50) ton and over Hoist, two (2) drums or more Hydro Axe (loader mounted or similar type) Jack Operator, Elevating Barges, Barge Operator, self-unloading Loader Operator, front end and overhead, twenty-five thousand (25,000) lbs. and less than sixty thousand (60,000) lbs. Log Skidders Mechanic, Heavy Duty Piledriver Operator (not crane type) Pipe, Bending, Cleaning, Doping and Wrapping Machines Rail, Ballast Tamper Multi-Purpose Rubber-tired Dozers and Pushers Scraper, all types Side-Boom Skip Loader, Drag Box Stump Grinder (loader mounted or similar type) Surface Heater and Planer Tractor, rubber-tired, over fifty (50) HP Flywheel Trenching Machine three-foot (3?) depth and deeper (Assistant to the Operator required) Truck, Crane Oiler-Driver 250 tons and over Tub Grinder (used for wood debris) Tunnel Boring Machine Mechanic ? hyperbaric pay: additional ten dollars ($10.00) per hour, incudes prep and decompress Tunnel, Mucking Machine Tunnel, Segment Plant Tunnel, Separation Plant Tunnel, Shaef Loader Tunnel, Shield Operator Ultra-High-Pressure Water Jet Cutting Tool System Operator Vacuum Blasting Machine Operator Water pulls, Water Wagons Welder; Heavy Duty

Group 5

Asphalt, Extrusion Machine Asphalt, Roller (any asphalt mix) Asphalt, Roto-Mill pavement profiler ground man Bulldozer, twenty thousand (20,000) lbs. or less, or one hundred (100) horse or less Cement Pump Chip Spreading Machine Churn Drill and Earth Boring Machine Compactor, self-propelled without blade Compressor, (any power) one thousand two hundred fifty (1,250) cu. ft. and over, total capacity Concrete, Batch Plant Quality control Concrete, Combination Mixer and compressor operator, gunite work Concrete, Curb Machine, Mechanical Berm, Curb and/or Curb and Gutter Concrete, Finishing Machine Concrete, Grouting Machine Concrete, Internal Full Slab Vibrator Operator Concrete, Joint Machine Concrete, Mixer single drum, any capacity Concrete, Paving Machine eight foot (8?) or less (Assistance to the Operator required) Concrete, Placing Boom Concrete, Planer Concrete, Pump Concrete, Pump Truck Concrete, Pumpcrete Operator (any type) Concrete, Slip Form Pumps, power driven hydraulic lifting device for concrete forms Concrete, Spreader Concrete, Tele belt Concrete, Treated Base Roller Operator, Oiling Conveyored Material Hauler Crane, Boom Truck under twenty (20) tons Crane, Boom Type lifting device, five (5) ton capacity or less Drill, Directional type less than twenty thousand (20,000) lbs. pullback Drill, Mud Mixer Elevating Grader Operator, Tractor towed requiring Operator or Grader Elevating Loader Operator (any type) Elevator to move personnel or materials Forklift, over ten (10) ton or Robotic Helicopter Hoist Hoist Operator, single drum Hydraulic Backhoe track type up to and including twenty thousand (20,000) lbs. Hydraulic Backhoe wheel type (any make) Laser Screed Lime Spreader, construction job site Loaders, rubber-tired type, less than twenty-five thousand (25,000) lbs. Pavement Grinder and/or Grooving Machine (riding type) Pipe, cast in place Pipe Laying Machine Pulva-Mixer or similar types Pump Operator, more than five (5) pumps (any size) Rail, Ballast Compactor, Regulator, or Tamper machines Rail, Car Mover Rail, Clip Applicator Rail, High Rail

Self Loader Truck Rail, Locomotive, forty (40) ton and over Rail, Lo-Railer Rail, Shuttle Car Operator Rail, Speedswing Rail, Track Liner Service Oiler (Greaser) Sweeper Self-Propelled, Construction Job Site Tractor, Rubber-Tired, fifty (50) HP flywheel and under Trenching Machine Operator, maximum digging capacity three-foot (3?) depth Truck, All Terrain or Track type Truck, Barrel type Truck, Crane Oiler-Driver 100-249 tons Truck, Heavy Haul, specialized transporter, hydraulic, electric, or similar Truck, Off Road Trucks, Articulated and Non-articulated Trucks over forty (40) ton Truck, Vacuum Truck, Water Tunnel, Locomotive, Dinkey Tunnel, Power Jumbo setting slip forms, etc.

Group 6

Air Filtration Equipment Asphalt, Pugmill (any type) Asphalt, Raker Asphalt, Truck Mounted Asphalt Spreader, with Screed Assistant to the Operator Auger Oiler Bell Man (any type of communication) Boatman Bobcat, skid steed (less than one (1) yard) Broom, self-propelled, construction job site Compressor Operator (any power) under 1,250 cu. ft. total capacity Concrete Curing Machine (riding type) Concrete Saw Conveyor Operator or Assistant Crane, Tugger Crusher Feederman Crusher Oiler Deckhand Drill Assistant Drill, Directional Locator Forklift Grade Checker Guardrail Punch Oiler Heavy Duty Repairman Assistant Helicopter Radioman (ground) Hydraulic Pipe Press Hydrographic Seeder Machine, straw, pulp or seed Hydrostatic Pump Operator Material Handler Mixer Box (CTB, dry batch, etc.) Oiler Parts Man (Tool Room) Plant Oiler Pump (any power) Rail, Brakeman, Switchman, Motorman Rail, Tamping Machine, mechanical, self-propelled Rigger Roller grading (not asphalt) Truck, Crane Oiler-Driver under 100 tons Truck, Off-Road Trucks, Articulated and Non-Articulated Trucks forty (40) ton and under Truck, over highway, examples: material and equipment Welder?s Assistant Welding Machine Wire Mat or Brooming Machine

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IRON0029-004 07/03/2023

	Rates	Fringes
IRONWORKER	$ 43.27	33.07

LABO0737-001 06/01/2023

	Rates	Fringes
Mason Tender/Hod Carrier Tenders to Bricklayers, Tile Setters, Marble Setters and Terrazzo Workers, Topping for Cement Finishers and Mortar Mixers	$ 41.29	16.80

LABO0737-008 06/01/2023

ZONE 1:

LABORERS (SEE FOOTNOTE C)

	Rates	Fringes
Laborers:		
GROUP 1	$ 36.11	16.80
GROUP 2	$ 37.41	16.80
GROUP 3	$ 31.39	16.80

Zone Differential (Add to Zone 1 rates):

Zone 2 - $0.85

Zone 3 - 2.00

Zone 4 - 3.00

Zone 5 - 5.00

ZONE 1 - All jobs or projects located within 30 miles of the respective City Hall

ZONE 2 - More than 30 miles and less than 40 miles from the respective City Hall

ZONE 3 - More than 40 miles and less than 50 miles from the respective City Hall

ZONE 4 - More than 50 miles and less than 80 miles from the respective City Hall

ZONE 5 - More than 80 miles from the respective City Hall.

BASEPOINTS:

ALBANY ASTORIA BAKER CITY BEND BURNS COOS BAY

EUGENE GRANTS PASS HERMISTON KLAMATH FALLS MEDFORD

PENDLETON PORTLAND ROSEBURG SALEM THE DALLES

LABORER CLASSIFICATIONS

GROUP 1: Applicator (including Pot Tender for same) applying protective material by hand or nozzle on utility lines or storage tanks on project, Asphalt Plant; Asphalt Spreader; Batch Weighman; Broomers; Brush Burners and Cutters; Choker Setter; Choker Splicer; Clary Power Spreader; Clean-up Laborer; Clean up Nozzleman (concrete, rock, etc); Concrete Laborer; Crusher Feeder; Curing, Concrete; Demolition, wrecking, and moving; Dopping and Wrapping Pipe; Dumpman (for Grading Crew); Erosion Control Specialist; Fine Graders; Fence Builders; Form Strippers; Guard Rail, Median Rail, Barriers, Reference Post, Guide Post, Right of Way Marker; Remote Control (Dry Pack Machine, Jackhammer, Chipping Guns, Compaction, Paving Breakers, Hand Held Concrete Saw, Demo Saw, Core Drill); Precast Concrete Setter; Pressure Washer; Railroad Track Laborer; Ribbon Setter; Rip Rap Map; Sand Blasting (Wet); Scaffold Tender; Self Propelled Concrete Buggy; Sewer Laborer; Sign Erector; Signalman; Scissor and Manlift; Skipman; Slopers; Sprayman; Stake Chaser; Stake Setter; Tamper; Timber Faller and Bucker; Tool Operators (Hand Held, Walk Behind)

GROUP 2: Asbestos Removal; Asphalt Rakers, Bit Grinder, Concrete Core Drill, Concrete Pump Nozzleman, Concrete Saw Operator (Walk Behind, Walk Saw, Rail Mounted, Wire); Drill Operator; Grade Checker; Gunite Nozzleman; Hazardous Waste Laborer; High Scalers; Laser Bean (Pipe Laying); Loop Installation; Manhole Builder; Mold Remediation Laborer; Nippers and Timberman; Pipelayer; Powderman; Power Saw Operators (Bucking and Falling); Pumpcrete Nozzleman; Sand Blasting (Dry); Sewer Timberman; Tugger Operator; Vibrators; Water Blaster

GROUP 3: Final Clean-up(detailed clean-up, limited to cleaning up floors, ceilings, walls, windows-prior to acceptance by the owner); Fire Watch; Landscaper; Traffic Flagger

FOOTNOTE C:

HANDLING OF HAZARDOUS WAST MATERIALS - Personnel in all craft classifications subject to working inside a federally designated Hazardous Waste perimeter shall be eligible for compensation in accordance with the following group schedule relative to the level of Hazardous Waste as outline in the specific Hazardous Waste Project Site Safety Plan:

H-1 Base Wage Rate when on a hazardous waste site when not outfitted with protective clothing.

H-2 Class ""C"" Suit - Basic hourly wage rate plus $1.00 per hour, fringes plus $0.15.

H-3 Class ""B"" Suit - Basic hourly wage rate plus $1.50 per hour, fringes plus $0.15.

H-4 Class ""A"" Suit -Basic hourly wage rate plus $2.00 per hour, fringes plus $0.15.

PAIN0010-005 07/01/2022

	Rates	Fringes
PAINTER		
HIGHWAY & PARKING LOT STRIPER	$ 38.18	15.08

PAIN0010-008 07/01/2022

	Rates	Fringes
PAINTER	$ 38.18	15.08

PLAS0555-001 06/01/2023

ZONE 1:

	Rates	Fringes
Cement Masons: (ZONE 1)		
CEMENT MASONS DOING BOTH COMPOSITION/POWER MACHINERY AND SUSPENDED/HANGING SCAFFOLD	$ 45.06	19.95
CEMENT MASONS ON SUSPENDED, SWINGING AND/OR HANGING SCAFFOLD	$ 44.19	19.95
CEMENT MASONS	$ 43.33	19.95
COMPOSITION WORKERS AND POWER MACHINERY OPERATORS	$ 44.19	19.95

Zone Differential for Cement Mason - Add to Basic Hourly Rate

FOR THE FOLLOWING CITIES: (Reference City)

Bend, Portland, Pendleton, Medford, Corvallis, Salem, Eugene, The Dalles, Vancouver

When a contractor takes current employees to a project that is located more than 59 miles from the City Hall of the Reference City that is closest to the contractor's place of business, Zone Pay is to be paid for the distance between the City Hall of the identified Reference City and the project site, per the following:

Zone A - 60-79 miles - additional $3.00 hourly premium above the base rate of all classification as listed in Schedule ""A"".

Zone B - 80-99 miles - additional $5.00 hourly premium above the base rate of all classifications as listed in Schedule ""A""

Zone C -100 or more miles - additional $10.00 hourly premium above the base rate of all classifications as listed in Schedule ""A""

TEAM0037-004 06/01/2023

ZONE 1:

TRUCK DRIVERS (See Footnote C):

	Rates	Fringes
Truck drivers:		
GROUP 1	$ 32.06	17.18
GROUP 2	$ 32.21	17.18
GROUP 3	$ 32.36	17.18
GROUP 4	$ 32.67	17.18
GROUP 5	$ 32.92	17.18
GROUP 6	$ 33.12	17.18
GROUP 7	$ 33.35	17.18

Zone Differential (add to Zone 1 rates):

Zone 2 - $0.65

Zone 3 - 1.15

Zone 4 - 1.70

Zone 5 - 2.75

Zone 1 - All jobs or projects located within 30 miles of the respective City Hall

Zone 2 - More than 30 miles and less than 40 miles from the respective City Hall

Zone 3 - More than 40 miles and less than 50 miles from the respective City Hall

Zone 4 - More than 50 miles and less than 80 miles from the respective City Hall

Zone 5 - More than 80 miles from the respective City Hall

BASEPOINTS:

ALBANY	ASTORIA	BAKER	BEND	BINGEN	BROOKINGS
BURNS	COOS BAY	CORVALLIS	EUGENE	GOLDENDALE	GRANTS PASS
HERMISTON	HOOD RIVER	KLAMATH FALLS	LAGRANDE	LAKEVIEW	LONGVIEW
MADRAS	MEDFORD	MCMINNVILLE	OREGON CITY	NEWPORT	ONTARIO
PENDLETON	PORTLAND	PORT ORFORD	REEDSPORT	ROSEBURG	SALEM
THE DALLES	TILLAMOOK	VANCOUVER			

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: A-frame or hydra-lift truck w/load bearing surface; Articulated dump truck; Battery rebuilders; Bus or manhaul driver; Concrete buggies (power operated); Concrete pump truck; Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: up to and including 10 cu. yds.; Lift jitneys, fork lifts (all sizes in loading, unloading and transporting material on job site); Loader and/or leverman on concrete dry batch plant (manually operated); Lubrication man, fuel truck driver, tireman, wash rack, steam cleaner or combination; Pilot car; Pickup truck; Slurry truck driver or leverman; Solo flat bed and misc. body truck, 0-10 tons; Team drivers; Tireman; Transit mix and wet or dry mix trucks: 5 cu yds. and under; Water wagons (rated capacity) up to 3,000 gallons

GROUP 2: Boom truck/hydra-lift or retracting crane; Challenger; Dumpsters or similar equipment-all sizes; Dump trucks/articulated dumps 6 cu to 10 cu.; Flaherty spreader driver or leverman; Low bed equipment, flat bed semi-truck and trailer or doubles transporting equipment or wet or dry materials; Lumber carrier, driver-straddle carrier (used in loading, unloading and transporting of materials on job site); Oil distributor driver or leverman; Transit mix and wet or dry mix trucks: over 5 cy yds and including 7 cu. yds; Vacuum trucks; Water Wagons (rated capacity) over 3,000 to 5,000 gallons

GROUP 3: Ammonia nitrate distributor driver; Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: over 10 cu. yds. and including 30 cu. yds., includes articulated dump trucks; Self-Propelled street sweeper; Transit mix and wet or dry mix trucks, over 7 cu. yds. and including 11 cu. yds.; truck mechanic-Welder-Body repairman; Utility and clean-up truck; Water wagons (rated capacity) 5,000 to 10,000 gallons.

GROUP 4: Asphalt Bruner; Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: over 30 cu. yds. and including 50 cu. yds. includes articulated dump trucks; Fire guard; Transit Mix and Wet or Dry Mix Trucks, over 11 cu. yds. and including 15 cu. yds.; Water Wagon (rated capacity) over 10,000 gallons to 15,000 gallons

GROUP 5: Composite Crewman; Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: over 50 cu. yds. and including 60 cu. yds., includes articulated dump trucks

GROUP 6: Bulk cement spreader w/o auger; Dry Pre-Batch concrete mix trucks; Dump trucks, side, end and bottom dumps, including semi-trucks and trains of combinations thereof: over 60 cu. yds. and including 80 cu. yds. and includes articulated dump trucks; Skid truck

GROUP 7: Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: over 80 cu. yds. and including 100 cu. yds. includes articulated dump trucks; Industrial lift truck (mechanical tailgate)

FOOTNOTE C:

HANDLING OF HAZARDOUS WAST MATERIALS -(LABORERS, POWER EQUIPMENT OPERATORS, AND TRUCK DRIVERS): Personnel in all craft classifications subject to working inside a federally designated Hazardous Waste perimeter shall be eligible for compensation in accordance with the following group schedule relative to the level of Hazardous Waste as outline in the specific Hazardous Waste Project Site Safety Plan:

H-1 Base Wage Rate when on a hazardous waste site when not outfitted with protective clothing.

H-2 Class ""C"" Suit - Basic hourly wage rate plus $1.00 per hour, fringes plus $0.15.

H-3 Class ""B"" Suit - Basic hourly wage rate plus $1.50 per hour, fringes plus $0.15.

H-4 Class ""A"" Suit -Basic hourly wage rate plus $2.00 per hour, fringes plus $0.15.

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* SUOR1991-003 04/01/1991

	Rates	Fringes
Timber Sales Roads:		
LABORERS	$ 8.35 **	4.30
OPERATING ENGINEERS	$ 10.37 **	4.15
POWER SAW, DRILLER, POWDERMAN	$ 9.12 **	4.30
TEAMSTERS	$ 9.74 **	3.74

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

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($17.20) or 13658 ($12.90). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year.

Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at

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

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union

negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1,2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

State Adopted Rate Identifiers

Classifications listed under the ""SA"" identifier indicate that the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an

internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

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

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations

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

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

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

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

Occupation and Premium/Differential Pay	Base Rate	Fringe Rate
ASBESTOS WORKER/INSULATOR	**60.62**	**24.42**
Firestop Containment	**46.64**	**17.98**
CARPENTER		
Zone A (Base Rate)		
Group 1	**49.44**	**16.01**
Group 2	**49.61**	**16.01**
Group 3 (Millwrights)	**55.28**	**19.65**
Group 4		**Eliminated**
Group 5 (Bridge & Highway)	**50.04**	**16.01**
Group 6 (Piledrivers)	**50.33**	**16.01**

Zone Differential for Carpenters - Add to Zone A Base Rate

Zone B **1.25** per hour
Zone C **1.70** per hour
Zone D **2.00** per hour
Zone E **3.00** per hour
Zone F **5.00** per hour
Zone G **10.00** per hour

Zone A: Projects located within 30 miles of the respective city hall of the cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 60 miles.
Zone E: More than 60 miles but less than 70 miles.
Zone F: More than 70 miles but less than 100 miles.
Zone G: More than 100 miles.

Reference Cities for Group 1 and 2 Carpenters

Albany	Coos Bay	Klamath Falls	Newport	Roseburg
Astoria	Eugene	La Grande	Ontario	Salem
Baker City	Goldendale	Lakeview	Pendleton	The Dalles
Bend	Grants Pass	Longview	Portland	Tillamook
Brookings	Hermiston	Madras	Port Orford	Vancouver
Burns	Hood River	Medford	Reedsport	

Reference Cities for Group 3 Carpenters

Eugene	Medford	Portland	Vancouver
Longview	North Bend	The Dalles	

Reference Cities for Group 5 and 6 Carpenters

Bend	Longview	North Bend
Eugene	Medford	Portland

See more Zone Differential Information on page 2

CARPENTER (continued)

Zones for **Group 6** Carpenter are determined by the distance between the project site and **either**

1) The worker's residence; ***or***
2) City Hall of a reference city listed, whichever is closer.

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time--best road via Google Maps) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Group 2, 5 and 6:
Welders shall receive a 5% premium per hour based on their Group's journeyman wage rate, with an 8-hour minimum.

Group 1 and 3:
When working with toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 5 and 6:
When working with creosote and other toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 6:
When working in sheet pile coffer dams or cells up to the external water level, workers shall receive $.15/hour premium pay for minimum of eight (8) hours.

DRYWALL, LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER

Zone 1 (Base Rate)

1. DRYWALL INSTALLER	**49.24**	**16.01**
2. LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER	**49.24**	**16.01**

Zone Differential for Lather, Acoustical Carpenter & Ceiling Installer

Zone mileage based on road miles:

Zone B	61-80 miles	**6.00** per hour
Zone C	81-100 miles	**9.00** per hour
Zone D	101 or more	**12.00** per hour

The correct transportation allowance shall be based on AAA road mileage from the City Hall of the transportation reference cities listed herein.

Reference Cities for Drywall, Lather, Acoustical Carpenter & Ceiling Installer

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

Certified welders shall receive 5% over the base wage rate, with an eight (8) hour minimum.

Occupation and Premium/Differential Pay	Base Rate / Fringe Rate	

ELECTRICIAN

Area 4

Electrician	**55.27**	**23.24**
Cable Splicer	**60.80**	**23.40**
Lighting Maintenance/Material Handler	**26.04**	**10.43**

Reference Counties for Area 4

Benton	Deschutes	Lane	Lincoln
Crook	Jefferson	Linn	

Marion – **See Area 5 rate** Polk – **See Area 5 rate** Yamhill – **See Area 5 rate**

Shift Differential*

1st Shift "day"	Between the hours of 8:00am and 4:30pm –	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am –	8 hours pay for 8 hours work plus 17% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 9:00am –	8 hours pay for 8 hours work plus 31.4% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

ELEVATOR CONSTRUCTOR, INSTALLER AND MECHANIC

Area 2

Mechanic	**65.14**	**43.10**

Reference Counties

Benton	Deschutes	Jefferson	Malheur	Wasco
Clackamas	Douglas	Josephine	Marion	Washington
Clatsop	Gilliam	Klamath	Morrow	Wheeler
Columbia	Grant	Lake	Multnomah	Yamhill
Coos	Harney	Lane	Polk	
Crook	Hood River	Lincoln	Sherman	
Curry	Jackson	Linn	Tillamook	

Umatilla – **See Area 1 rate**

Occupation and Premium/Differential Pay	Base Rate	Fringe Rate

PAINTER & DRYWALL TAPER

COMMERCIAL PAINTING	**35.62**	**15.06**
INDUSTRIAL PAINTING	**37.69**	**15.06**
BRIDGE PAINTING	**44.20**	**15.06**

Shift Differential for Painter
Add $2.00/hour to base rate for entire shift if any hours are worked outside of 5:00 a.m. to 5:00 p.m.

DRYWALL TAPER		
Zone A (Base Rate)	**42.52**	**20.78**

Zone Differential for Drywall Taper – Add to Zone A Base Rate

Zone B: **6.00** per hour
Zone C: **9.00** per hour
Zone D: **12.00** per hour

Zone A: Projects located less than 61 miles from the respective city hall of the dispatch cities listed.
Zone B: Projects located 61 miles to 80 miles.
Zone C: Projects located 81 miles to 100 miles.
Zone D: Projects located 101 miles or more.

Dispatch Cities for Drywall Taper

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

Note: Zone pay is based on AAA Road Mileage.

PLUMBER/PIPEFITTER/STEAMFITTER

Area 2	**57.00**	**35.51**

Reference Counties

Baker	Morrow	Union
Grant	Umatilla	Wallowa

Gilliam – **See Area 3 rate** Wheeler – **See Area 3 rate**

Zone Differential for Area 2 – Add to Base Rate
Zone 2: **10.62/**hr. not to exceed $80.00 day.

Zone mileage based on road miles:
Zone 2: Eighty (80) miles or more from City Hall in Pasco, Washington.

Add $1.00 to base rate in one-hour minimum increments if it is possible for worker to fall 35 ft. or more.

Add $1.00 to base rate in one-hour minimum increments if worker is required to wear a mask in hazardous areas

Occupation and Premium/Differential Pay	Base Rate	Fringe Rate

PLUMBER/PIPEFITTER/STEAMFITTER (Continued)

Area 3	**57.92**	**36.35**

Reference Counties

Benton	Deschutes	Klamath	Polk
Clackamas	Douglas	Lake	Sherman
Clatsop	Hood River	Lane	Tillamook
Columbia	Jackson	Lincoln	Wasco
Coos	Jefferson	Linn	Washington
Crook	Josephine	Marion	Wheeler
Curry	Gilliam	Multnomah	Yamhill

Oregon Bureau of Labor and Industries

Prevailing Wage Rates for Public Works Contracts

Christina E. Stephenson
Labor Commissioner
Rates Effective January 5, 2024

In this rate book are the new prevailing wage rates for Oregon non-residential public works projects, effective January 5, 2024.

Prevailing wage rates are the minimum hourly wages that must be paid to all workers employed on all public works projects. Thank you for your engagement in the process and commitment to Oregon law.

Our team is ready to help support you with any questions you have. We also offer regular, free, informational seminars and webinars for contractors and public agencies. Contact us at PWR.Email@boli.oregon.gov or (971) 353-2416.

Christina E. Stephenson
Labor Commissioner

More information about prevailing wage rates:

The Oregon Bureau of Labor & Industries publishes the prevailing wage rates (PWR) that are required to be paid to workers on non-residential public works projects in Oregon.

A separate document, *Definitions of Covered Occupations for Public Works Contracts in Oregon,* provides occupational definitions used to classify the duties performed on public works projects. These definitions are used to find the correct prevailing wage rate.

The rate book and definition publications are available online at https://www.oregon.gov/boli, as well as additional information, supporting documents, and forms.

Please contact us at PWR.Email@boli.oregon.gov or (971) 353-2416, for additional information such as:

- Applicable prevailing wage rates for projects (Generally, the rates in effect at the time the bid specifications are first advertised are those that apply for the duration of the project.)
- Federal Davis-Bacon rates (In cases where projects are subject to both state PWR and federal Davis-Bacon rates, the higher wage must be paid.)
- Required PWR provisions for specifications and contracts
- Apprentice rates

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JANUARY 5, 2024

Forms necessary to comply with ORS 279C.800 through ORS 279C.870 can be found on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx. Contractors are encouraged to use and keep on file the forms provided as master copies for use on future prevailing wage rate projects.

All of the information in this booklet can be accessed and printed from the Internet at: www.oregon.gov/BOLI

Pursuant to ORS 279C.800 to ORS 279C.870, the prevailing wage rates contained in this booklet have been adopted for use on public works contracts in Oregon.

Required Postings for Prevailing Wage Contractors and Subcontractors

PREVAILING WAGE RATES

Every contractor and subcontractor engaged in work on a public works must post the applicable prevailing wage rates for that project in an obvious place on the worksite, so workers have ready access to the information.

DETAILS OF FRINGE BENEFIT PROGRAMS

When a contractor or subcontractor provides or contributes to a health and welfare plan or a pension plan, or both, for employees who are working on a public works project, the details of all fringe benefit plans or programs must be posted on the worksite.

The posting must include a description of the plan or plans, information about how and where claims can be made and where to obtain more information. The notice must be posted in an obvious place on the work site in the same location as the prevailing wage rates.

WORK SCHEDULE

Contractors and subcontractors must give workers their regular work schedule (days of the week and number of hours per day) in writing before beginning work on the project.

Contractors and subcontractors may provide the schedule at the time of hire, prior to starting work on the contract, or by posting the schedule in a location frequented by employees, along with the prevailing wage rate information and any fringe benefit information.

If an employer fails to give written notice of the worker's schedule, the work schedule will be presumed to be a five-day schedule. The schedule may only be changed if the change is intended to be permanent and is not designed to evade the PWR overtime requirements.

ORS 279C.840(4); OAR 839-025-0033(1). ORS 279C.840(5); OAR 839-025-0033(2). ORS 279C.540(2); OAR 839-025-0034.

PUBLIC WORKS BONDS

Every contractor and subcontractor who works on public works projects subject to the prevailing wage rate (PWR) law is required to file a $30,000 **"PUBLIC WORKS BOND"** with the Construction Contractors' Board (CCB). This includes flagging and landscaping companies, temporary employment agencies, and sometimes sole proprietors.

The key elements of ORS 279C.830(2) and ORS 279C.836 specify that:

- Specifications for every contract for public works must contain language stating that the contractor and every subcontractor must have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt.
- Every contract awarded by a contracting agency must contain language requiring the contractor:
  - To have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt; and
  - To include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the CCB before starting work on the project unless otherwise exempt
- Every subcontract that a contractor or subcontractor awards in connection with a public works contract between a contractor and a public agency must require any subcontractor to have a public works bond filed with the CCB before starting work on the public works project, unless otherwise exempt.
- Before permitting a subcontractor to start work on a public works project, contractors must first verify their subcontractors either have filed the bond, or have elected not to file a public works bond due to a bona fide exemption.
- The PWR bond is to be used exclusively for unpaid wages determined to be due by the Bureau of Labor & Industries.
- The bond is in effect continuously (you do not have to have one per project).
- A public works bond is in addition to any other required bond the contractor or subcontractor is required to obtain.

Exemptions:

- Allowed for a disadvantaged business enterprise, a minority-owned business, woman-owned business, a business that a service-disabled veteran owns or an emerging small business certified under ORS 200.055, for the first FOUR years of certification;
  - Exempt contractor must still file written verification of certification with the CCB, and give the CCB written notice that they elect not to file a bond.
  - The prime contractor must give written notice to the public agency that they elect not to file a public works bond.
  - Subcontractors must give written notice to the prime contractor that they elect not to file a public works bond.
- For projects with a total project cost of $100,000 or less, a public works bond is not required. (Note this is the total project cost, not an individual contract amount.)
- Emergency projects, as defined in ORS 279A.010(f).

PREVAILING WAGE RATES

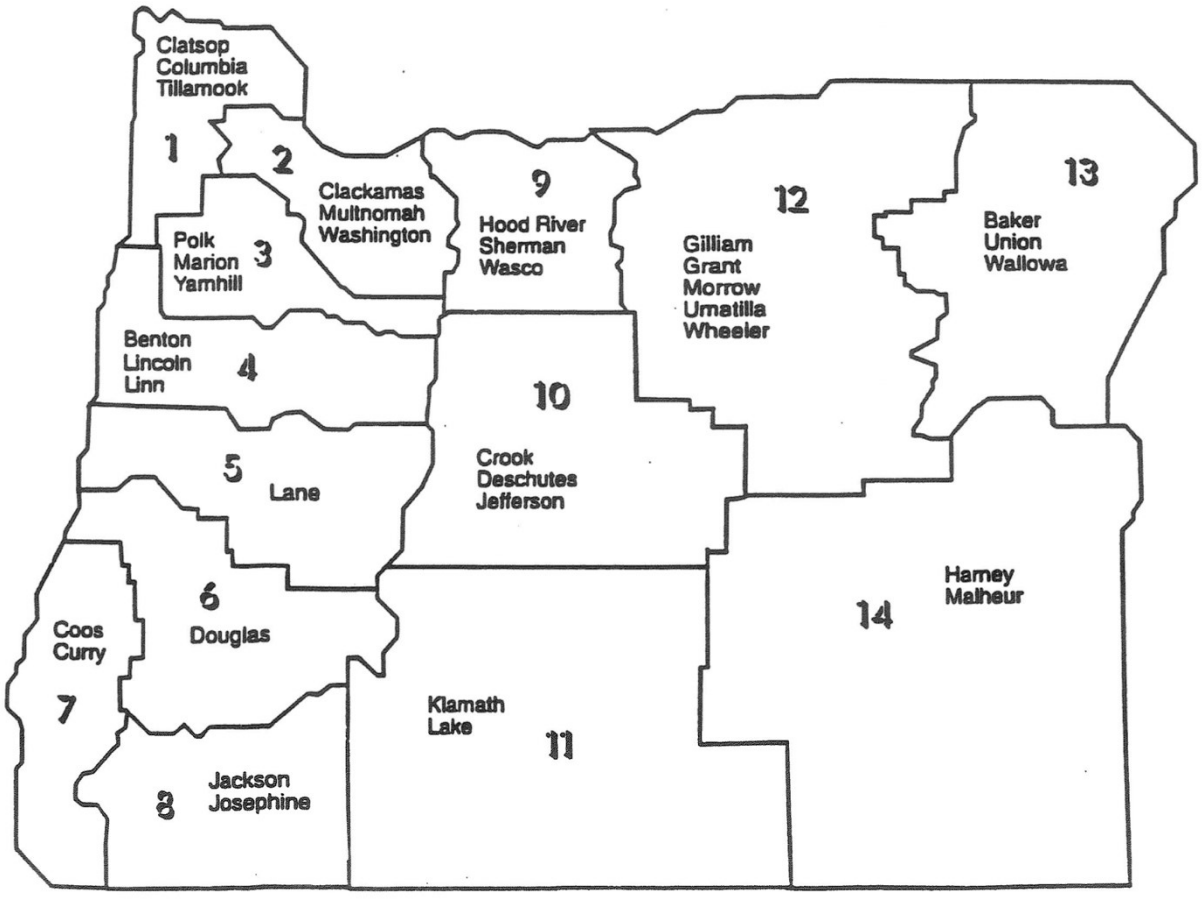
FINDING THE CORRECT PREVAILING WAGE RATE

To find the correct rate(s) required on your public works project, you will need:

- the date the project was first advertised for bid
- the county your project is in
- the duties of workers on the job

Generally, the rate you should look for is based on the date the project was first advertised for bid. (See OAR 839-025-0020(8) for information about projects that contract through a CM/GC, or contract manager/general contractor.)

The Labor Commissioner must establish the prevailing rate of wage for each region as defined in law. (See ORS 279C.800.) Each region is comprised of one to five counties. See below instructions on locating the correct prevailing wage rate for your public works project.



To find the correct rate in this rate book:

1. *Determine the duties that are being performed by each worker.* Use the booklet *Definitions of Covered Occupations* to find the definition that most closely matches the actual work performed by the worker. You can find this publication online at https://www.oregon.gov/boli/employers/Pages/occupational-definitions.aspx.

2. *Find the correct occupation in the "Prevailing Wage Rate for Public Works Contracts" below.* The prevailing wage rate is made up of an hourly base rate and an hourly fringe rate. The combination of these two amounts must be paid to each worker. Watch for possible zone differential, shift differential, and/or hazard pay. If the occupation lists different rates for different Areas of the state, locate the Area that includes the county where the project is located.

Apprentices must be paid consistent with their registered apprenticeship program standard. You can find apprenticeship rates on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage-rates.aspx. You may also contact the agency to confirm the correct apprenticeship rate.

The "Prevailing Wage Rate Laws" handbook provides specific information and answers questions regarding prevailing wage laws and is available on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx.

If you have any questions about any of this information, please contact the Bureau of Labor & Industries at PWR.Email@boli.oregon.gov or (971) 353-2416.

Prevailing Wage Rates by Occupations—Table of Contents

Using the booklet, Definitions of Covered Occupations, find the definition and group number, if applicable, that most closely matches the actual work being performed by the worker.

ASBESTOS WORKER/INSULATOR	**59.32**	**23.42**
Firestop Containment	**44.83**	**16.99**
BOILERMAKER	**42.33**	**32.22**
BRICKLAYER/STONEMASON	**45.42**	**24.92**

This trade is tended by "Tenders to Mason Trades."

Add $1.00 per hour to base rate for refractory repair work.

CARPENTER

Zone A (Base Rate)		
Group 1	**45.80**	**19.65**
Group 2	**45.97**	**19.65**
Group 3 (Millwrights)	**55.28**	**19.65**
Group 4		**Eliminated**
Group 5 (Bridge & Highway)	**46.40**	**19.65**
Group 6 (Piledrivers)	**46.74**	**19.65**

Zone Differential for Carpenters - Add to Zone A Base Rate

Zone B **1.25** per hour
Zone C **1.70** per hour
Zone D **2.00** per hour
Zone E **3.00** per hour
Zone F **5.00** per hour
Zone G **10.00** per hour

Zone A: Projects located within 30 miles of the respective city hall of the cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 60 miles.
Zone E: More than 60 miles but less than 70 miles.
Zone F: More than 70 miles but less than 100 miles.
Zone G: More than 100 miles.

Reference Cities for Group 1 and 2 Carpenters

Albany	Coos Bay	Klamath Falls	Newport	Roseburg
Astoria	Eugene	La Grande	Ontario	Salem
Baker City	Goldendale	Lakeview	Pendleton	The Dalles
Bend	Grants Pass	Longview	Portland	Tillamook
Brookings	Hermiston	Madras	Port Orford	Vancouver
Burns	Hood River	Medford	Reedsport	

See more Reference Cities for Zone Differential on page 7

CARPENTER (continued)

Reference Cities for Group 3 Carpenters

Eugene	Medford	Portland	Vancouver
Longview	North Bend	The Dalles	

Reference Cities for Group 5 and 6 Carpenters

Bend	Longview	North Bend
Eugene	Medford	Portland

Zones for **Group 6** Carpenter are determined by the distance between the project site and **either**

1) The worker's residence; ***or***
2) City Hall of a reference city listed, whichever is closer.

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time--best road via Google Maps) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Group 2, 5 and 6:
Welders shall receive a 5% premium per hour based on their Group's journeyman wage rate, with an 8-hour minimum.

Group 1 and 3:
When working with toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 5 and 6:
When working with creosote and other toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 6:
When working in sheet pile coffer dams or cells up to the external water level, workers shall receive $.15/hour premium pay for minimum of eight (8) hours.

CEMENT MASON
This trade is tended by "Concrete Laborer."

Group 1	**41.33**	**21.95**
Group 2	**42.19**	**21.95**
Group 3	**42.19**	**21.95**
Group 4	**43.16**	**21.95**

Zone Differential for Cement Mason - Add to Basic Hourly Rate

Zone A: **3.00** per hour
Zone B: **5.00** per hour
Zone C: **10.00** per hour

Zone A: Projects located 60-79 miles of the respective city hall of the Reference Cities listed below.
Zone B: Projects located 80-99 miles of the respective city hall of the Reference Cities listed below.
Zone C: Projects located 100 or more miles of the respective city hall of the Reference Cities listed below (Page 8).

CEMENT MASON (continued)

Reference Cities for Cement Mason

Bend	Eugene	Pendleton	Salem	Vancouver
Corvallis	Medford	Portland	The Dalles	

When a contractor takes current employees to a project that is located more than 59 miles from the city hall of the Reference City that is closest to the contractor's place of business, Zone Pay is to be paid for the distance between the city hall of the identified Reference City and the project site.

Note: All miles are to be determined on the basis of road miles using the normal route (shortest time – best road), from the city hall of the Reference City closest to the contractor's place of business and the project.

DIVER & DIVER TENDER

Zone 1 (Base Rate)

DIVER	**97.56**	**19.65**
DIVER TENDER	**53.56**	**19.65**

1) For those workers who reside within a reference city below, their zone pay shall be computed from the city hall of the city wherein they reside.

2) For those workers who reside nearer to a project than is the city hall of any reference city below, the mileage from their residence may be used in computing their zone pay differential.

3) The zone pay for all other projects shall be computed from the city hall of the nearest reference city listed below.

Zone Differential for Diver/Diver Tender - Add to Zone 1 Base Rate

Zone 2: **1.25** per hour
Zone 3: **1.70** per hour
Zone 4: **2.00** per hour
Zone 5: **3.00** per hour
Zone 6: **5.00** per hour
Zone 7: **10.00** per hour

Zone 1: Projects located within 30 miles of city hall of the reference cities listed.
Zone 2: More than 30 miles, but less than 40 miles.
Zone 3: More than 40 miles, but less than 50 miles.
Zone 4: More than 50 miles, but less than 60 miles.
Zone 5: More than 60 miles, but less than 70 miles.
Zone 6: More than 70 miles, but less than 100 miles.
Zone 7: More than 100 miles.

Reference Cities for Diver/Diver Tender

Bend	Longview	North Bend
Eugene	Medford	Portland

See more information on Zone Pay calculation and Diver Depth/Enclosure Pay on Page 9

DIVER & DIVER TENDER (continued)

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time--best road via Google Maps) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Diver Depth Pay:

Depth Below Water Surface (FSW)	Daily Depth Pay
50-100 ft.	**2.00** per foot over 50 feet
101-150 ft.	**3.00** per foot over 100 feet
151-220 ft.	**4.00** per foot over 150 feet
Over 220 ft.	**5.00** per foot over 220 feet

The actual depth in FSW shall be used in determining depth premium.

Diver Enclosure Pay (working without vertical escape):

Distance Traveled in the Enclosure	Daily Enclosure Pay
0 – 25ft.	**N/C**
25 – 300 ft.	**1.00** per foot from the entrance
300 – 600 ft.	**1.50** per foot beginning at 300 ft.
Over 600 ft.	**2.00** per foot beginning at 600 ft.

DREDGER

Zone A (Base Rate)

Leverman (Hydraulic & Clamshell)	**56.47**	**16.70**
Assistant Engineer (Watch Engineer, Mechanic Machinist)	**53.31**	**16.70**
Tenderman (Boatman Attending Dredge Plant), Fireman	**51.82**	**16.70**
Fill Equipment Operator	**50.65**	**16.70**
Assistant Mate	**47.95**	**16.70**

Zone Differential for Dredgers – Add to Zone A Base Rate

Zone B: **3.00** per hour
Zone C: **6.00** per hour

Zone mileage based on road miles:

Zone A: Center of jobsite to no more than 30 miles from the **City Hall of Portland.**
Zone B: More than 30 miles but not more than 60 miles.
Zone C: Over 60 miles.

DRYWALL, LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER

Zone 1 (Base Rate)

1. DRYWALL INSTALLER	**45.80**	**19.45**
2. LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER	**45.80**	**19.45**

Zone Differential for Lather, Acoustical Carpenter & Ceiling Installer

Zone mileage based on road miles:

Zone B	61-80 miles	**6.00** per hour
Zone C	81-100 miles	**9.00** per hour
Zone D	101 or more	**12.00** per hour

The correct transportation allowance shall be based on AAA road mileage from the City Hall of the transportation reference cities listed herein.

Reference Cities for Drywall, Lather, Acoustical Carpenter & Ceiling Installer

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

Certified welders shall receive 5% over the base wage rate, with an eight (8) hour minimum.

ELECTRICIAN

Area 1

Electrician	**45.00**	**19.88**
Lighting Maintenance and Material Handler	**22.38**	**10.32**

Reference County

Malheur

Shift Differential*

1st Shift "day":	Between the hours of 8:00am and 4:30pm	– 8 hours pay for 8 hours work
2nd Shift "swing":	Between the hours of 4:30pm and 12:30am	– 8 hours pay for 8 hours work plus 7.5% for all hours worked
3rd Shift "graveyard":	Between the hours of 12:30am and 8:00am	– 8 hours pay for 8 hours work plus 15% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

When workers are required to work under compressed air or to work from trusses, scaffolds, swinging scaffolds, bosun's chair or on building frames, stacks or towers at a distance, the following should be added to base rate.

50 – 90 feet to the ground:	Add 1 ½ x the base rate
90+ feet to the ground:	Add 2 x the base rate

Pursuant to ORS 279C.815(2)(b), the Electrician Area 6 rate is the highest rate of wage among the collective bargaining agreements for Electrician Areas 1 and 6

ELECTRICIAN (continued)

Area 2

Electrician	**54.65**	**24.37**
Cable Splicer	**57.38**	**24.45**
Certified Welder	**60.12**	**24.53**
Material Handler	**32.79**	**13.11**

Reference Counties

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Add 50% of the base rate when workers are required to work under the following conditions:

1) Under compressed air with atmospheric pressure exceeding normal pressure by at least 10%.

2) From trusses, swing scaffolds, bosun's chairs, open platforms, unguarded scaffolds, open ladders, frames, tanks, stacks, silos and towers where the workman is subject to a direct fall of (a) more than 60 feet or (b) into turbulent water under bridges, powerhouses or spillway faces of dams.

Area 3

Electrician	**50.03**	**24.00**

Reference Counties

Coos Curry Douglas

Lane – **See Area 4** Lincoln – **See Area 4**

Shift Differential*

1st Shift "day":	Between the hours of 8:00am and 4:30pm	–	8 hours pay for 8 hours work
2nd Shift "swing":	Between the hours of 4:30pm and 1:00am	–	8 hours pay for 8 hours work plus 17% for all hours worked
3rd Shift "graveyard":	Between the hours of 12:30am and 9:00am	–	8 hours pay for 8 hours work plus 31% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

When workers are required to work under compressed air or where gas masks are required, or to work from trusses, all scaffolds including mobile elevated platforms, any temporary structure, bosun's chair or on frames, stacks, towers, tanks, within 15' of the leading edges of any building at a distance of:

50 – 75 feet to the ground	Add 1 ½ x the base rate
75+ feet to the ground	Add 2 x the base rate

High Time is not required to be paid on any permanent structure with permanent adequate safeguards (handrails, mid-rails, and toe guards). Any vehicle equipped with outriggers are exempted from this section.

ELECTRICIAN (continued)

Area 4

Electrician	**55.27**	**23.24**
Cable Splicer	**60.80**	**23.40**
Lighting Maintenance/Material Handler	**24.29**	**10.38**

Reference Counties for Area 4

Benton	Deschutes	Lane	Lincoln
Crook	Jefferson	Linn	

Marion – **See Area 5 rate** Polk – **See Area 5 rate** Yamhill – **See Area 5 rate**

Shift Differential*

1st Shift "day"	Between the hours of 8:00am and 4:30pm	–	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	–	8 hours pay for 8 hours work plus 17% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 9:00am	–	8 hours pay for 8 hours work plus 31.4% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

Area 5

Electrician	**60.50**	**30.39**
Electrical Welder	**66.55**	**30.57**
Material Handler/Lighting Maintenance	**34.49**	**20.67**

Reference Counties

Clackamas	Hood River	Polk	Wasco
Clatsop	Marion	Sherman	Washington
Columbia	Multnomah	Tillamook	Yamhill

Shift Differential*****

1st Shift "day"	Between the hours of 7:00am and 5:30pm	–	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 3:00am	–	8 hours pay for 8 hours work plus 17.3% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 11:00am	–	8 hours pay for 8 hours work plus 31.4% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

See more information on Shift Differentials and Zone Pay on Page 13.

ELECTRICIAN (continued)

Zone Pay for Area 5 – **Electrician and Electrical Welder**
Add to Basic Hourly Rate

Zone mileage based on air miles:

Zone 1: 31-50 miles – **1.50** per hour
Zone 2: 51-70 miles – **3.50** per hour
Zone 3: 71-90 miles – **5.50** per hour
Zone 4: Beyond 90 – **9.00** per hour

There shall be a 30-mile free zone from downtown Portland City Hall and a similar 15-mile free zone around the following cities:

Astoria	Seaside	Tillamook
Hood River	The Dalles	

Further, the free zone at the Oregon coast shall extend along Hwy 101 west to the ocean Hwy 101 east 10 miles if not already covered by the above 15-mile free zone.

Area 6

Electrician	**45.00**	**19.88**
Lighting Maintenance and Material Handler	**22.38**	**10.32**

Reference Counties

Harney	Josephine	Lake
Jackson	Klamath	Malheur

Douglas – **See Area 3 rate**

Shift Differential

1st Shift "day"	Between the hours of 8:00am and 4:30pm	–	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	–	8 hours pay for 8 hours work plus 7.5% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 9:00am	–	8 hours pay for 8 hours work plus 15% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

When workers are required to work under compressed air or to work from trusses, scaffolds, swinging scaffolds, bosun's chair or on building frames, stacks or towers at a distance, the following should be added to base rate.

50 – 90 feet to the ground: Add 1 ½ x the base rate
90+ feet to the ground: Add 2 x the base rate

ELEVATOR CONSTRUCTOR, INSTALLER AND MECHANIC

Area 1

Mechanic	**64.87**	**43.07**

Reference Counties

Baker	Union	Wallowa	Umatilla

Area 2

Mechanic	**62.51**	**42.34**

Reference Counties

Benton	Deschutes	Jefferson	Malheur	Wasco
Clackamas	Douglas	Josephine	Marion	Washington
Clatsop	Gilliam	Klamath	Morrow	Wheeler
Columbia	Grant	Lake	Multnomah	Yamhill
Coos	Harney	Lane	Polk	
Crook	Hood River	Lincoln	Sherman	
Curry	Jackson	Linn	Tillamook	

Umatilla – **See Area 1 rate**

FENCE CONSTRUCTOR (NON-METAL)	**36.11**	**16.80**
FENCE ERECTOR (METAL)	**36.11**	**16.80**
GLAZIER	**47.36**	**26.36**

Add $1.00 to base rate when employee works from a swing stage, scaffold, suspended contrivance or mechanical apparatus from the third floor up or thirty feet of free fall (whichever is less), and employee is required to wear a safety belt.

Add twenty percent (20%) to base rate when employee works from a bosun chair (non-motorized single-man apparatus), regardless of height.

Certified welders shall receive twenty percent (20%) above the base rate for actual time spent performing welding duties.

HAZARDOUS MATERIALS HANDLER	**30.03**	**16.18**
HIGHWAY/PARKING STRIPER	**70.00**	**15.52**

IRONWORKER

Zone 1 (Base Rate):	**43.82**	**33.98**

Zone Differential for Ironworker – Add to Basic Hourly Rate

Zone 2: **6.88/**hr. or $55.00 maximum per day
Zone 3: **10.00**/hr. or $80.00 maximum per day
Zone 4: **12.50/**hr. or $100.00 maximum per day

Zone 1: Projects located within 45 miles of city hall in the reference cities listed below.
Zone 2: More than 46 miles, but less than 60 miles.
Zone 3: More than 61 miles, but less than 100 miles.
Zone 4: More than 100 miles.

Note: Zone pay for Ironworkers shall be determined using the quickest route per Google Maps and computed from the city hall or dispatch center of the reference cities listed below **or** the residence of the employee, whichever is nearer to the project.

Reference Cities and Dispatch Center

Medford Portland

LABORER

Zone A (Base Rate):

Group 1	**36.11**	**16.80**
Group 2	**37.41**	**16.80**
Group 3 (Flagger)	**31.39**	**16.80**
Group 4 (Landscape Laborer)	**25.01**	**16.80**

Zone Differential for Laborers Add to Zone A Base Rate

Zone B: **.85** per hour
Zone C: **1.25** per hour
Zone D: **2.00** per hour
Zone E: **4.00** per hour
Zone F: **5.00** per hour

Zone A: Projects located within 30 miles of city hall in the reference cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 80 miles.
Zone E: More than 80 miles but less than 100 miles.
Zone F: More than 100 miles.

Reference Cities for Laborer

Albany	Burns	Hermiston	Roseburg
Astoria	Coos Bay	Klamath Falls	Salem
Baker City	Eugene	Medford	The Dalles
Bend	Grants Pass	Portland	

See More Information on Zone Differentials on Page 16.

LABORER (continued)

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time, best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Any Laborer working in Live Sewers shall receive forty dollars ($40) per day in addition to their regular pay.

LANDSCAPE LABORER/TECHNICIAN (Laborer Group 4)	**25.01**	**16.80**

LIMITED ENERGY ELECTRICIAN

Area 1	**35.05**	**17.28**

Reference County

Malheur

Pursuant to ORS 279C.815(2)(b), the Limited Energy Electrician Area 6 rate is the highest rate of wage among the collective bargaining agreements for Limited Energy Electrician Areas 1 and 6.

Area 2	**35.97**	**16.88**

Reference Counties

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Area 3	**40.52**	**21.58**

Reference Counties

Benton	Curry	Lane	Linn
Coos	Douglas	Lincoln	

Area 4	**40.34**	**17.72**

Reference Counties

Deschutes	Jefferson
Crook	

Benton – **See Area 3 rate**	Linn – **See Area 3 rate**	Polk – **See Area 5 rate**
Lane – **See Area 3 rate**	Marion – **See Area 5 rate**	Yamhill – **See Area 5 rate**

LIMITED ENERGY ELECTRICIAN (continued)

Area 5	**49.66**	**25.03**

Reference Counties

Clackamas	Hood River	Polk	Wasco
Clatsop	Marion	Sherman	Washington
Columbia	Multnomah	Tillamook	Yamhill

Area 6	**35.05**	**17.28**

Reference Counties

Harney	Josephine	Lake
Jackson	Klamath	Malheur

Douglas – **See Area 3 rate**

LINE CONSTRUCTOR

Area 1 (All Regions)

Group 1	**67.80**	**25.20**
Group 2	**60.54**	**24.87**
Group 3	**35.58**	**15.44**
Group 4	**52.06**	**21.29**
Group 5	**45.41**	**18.09**
Group 6	**37.53**	**17.74**
Group 7	**20.71**	**12.56**

Reference Counties

All counties

Pursuant to ORS 279C.815(2)(b), the Line Constructor Area 1 rate is the highest rate of wage among the collective bargaining agreements for Line Constructor Area 1 and Area 2.

MARBLE SETTER	**46.42**	**24.92**

This trade is tendered by “Tile, Terrazzo, & Marble Finishers.” Add $1.00 per hour to base rate for refractory repair work.

PAINTER & DRYWALL TAPER

COMMERCIAL PAINTING	**33.50**	**15.06**
INDUSTRIAL PAINTING	**35.45**	**15.06**
BRIDGE PAINTING	**41.58**	**15.06**

Shift Differential for Painter
Add $2.00/hour to base rate for entire shift if any hours are worked outside of 5:00 a.m. to 5:00 p.m.

DRYWALL TAPER		
Zone A (Base Rate)	**42.52**	**20.78**

Zone Differential for Drywall Taper – Add to Zone A Base Rate

Zone B: **6.00** per hour
Zone C: **9.00** per hour
Zone D: **12.00** per hour

Zone A: Projects located less than 61 miles from the respective city hall of the dispatch cities listed.
Zone B: Projects located 61 miles to 80 miles.
Zone C: Projects located 81 miles to 100 miles.
Zone D: Projects located 101 miles or more.

Dispatch Cities for Drywall Taper

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

Note: Zone pay is based on AAA Road Mileage.

PLASTERER AND STUCCO MASON

This trade is tended by “Tenders to Plasterers.”

Zone A (Base Rate)	**42.86**	**19.38**

Zone Differential for Plasterer and Stucco Mason – Add to Zone A Base Rate

Zone B: **6.00** per hour
Zone C: **9.00** per hour
Zone D: **12.00** per hour

Zone A: Projects located less than 61 miles from the respective city hall of the reference cities listed below.
Zone B: Projects located 61 miles to 80 miles.
Zone C: Projects located 81 miles to 100 miles.
Zone D: Projects located 101 miles or more.

See More Information on Zone Differentials on Page 16

PLASTERER AND STUCCO MASON (Continued)

Reference Cities for Plasterer & Stucco Mason

Bend	Eugene	Medford	Portland	Seaside
Coos Bay	La Grande	Newport	Salem	The Dalles

Add $1.00 to base rate for swinging scaffold work.

Add $2.00 to base rate for nozzle technicians on plastering machines.

PLUMBER/PIPEFITTER/STEAMFITTER

Area 1 **37.50** **17.57**

Reference Counties

Harney Malheur

Baker – **See Area 2 rates**

Zone Differential for Area 1 – Add to Base Rate
Zone 1: **2.50** per hour
Zone 2: **3.50** per hour
Zone 3: **5.00** per hour

Zone mileage based on road miles:
Zone 1: Forty (40) to fifty-five (55) miles from City Hall in Boise, Idaho.
Zone 2: Fifty-five (55) to one hundred (100) miles from City Hall in Boise, Idaho.
Zone 3: Over one hundred (100) miles from City Hall in Boise, Idaho.

Add $2.21 to base rate if it is possible for worker to fall 30 ft. or more, or if required to wear a fresh-air mask or similar equipment for 2 hours or more.

Area 2 **57.00** **35.51**

Reference Counties

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Zone Differential for Area 2 – Add to Base Rate
Zone 2: **10.62/**hr. not to exceed $80.00 day.

Zone mileage based on road miles:
Zone 2: Eighty (80) miles or more from City Hall in Pasco, Washington.

Add $1.00 to base rate in one-hour minimum increments if it is possible for worker to fall 35 ft. or more.

Add $1.00 to base rate in one-hour minimum increments if worker is required to wear a mask in hazardous areas.

Area 3	**54.92**	**35.00**

Reference Counties

Benton	Deschutes	Lake	Sherman
Clackamas	Douglas	Lane	Tillamook
Clatsop	Hood River	Lincoln	Wasco
Columbia	Jackson	Linn	Washington
Coos	Jefferson	Marion	Yamhill
Crook	Josephine	Multnomah	
Curry	Klamath	Polk	

Gilliam – **See Area 2 rate** Wheeler – **See Area 2 rate**

POWER EQUIPMENT OPERATOR

Zone 1 (Base Rate)

Group 1	**56.66**	**16.90**
Group 1A	**58.82**	**16.90**
Group 1B	**60.98**	**16.90**
Group 2	**54.75**	**16.90**
Group 3	**53.60**	**16.90**
Group 4	**50.27**	**16.90**
Group 5	**49.03**	**16.90**
Group 6	**45.81**	**16.90**

POWER EQUIPMENT

POWER EQUIPMENT OPERATOR (continued)

Zone Pay Differential for Power Equipment Operator – Add to Zone 1 Base Rate
Zone 2: **3.00** per hour
Zone 3: **6.00** per hour

For projects in the following metropolitan counties:

Clackamas	Marion	Washington
Columbia	Multnomah	Yamhill

(A) All jobs or projects located in Multnomah, Clackamas and Marion counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Hwy 26 and West of Mile Post 30 on Hwy 22 and all jobs located in Yamhill County, Washington County and Columbia County shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located in the area outside the *identified boundary* above, but less than 50 miles from Portland City Hall shall receive Zone 2 pay for all classifications.

(C) All jobs or projects located more than 50 miles from Portland City Hall, but outside the identified border above, shall receive Zone 3 pay for all classifications.

Reference cities for projects in all remaining counties:

Albany	Coos Bay	Grants Pass	Medford
Bend	Eugene	Klamath Falls	Roseburg

(A) All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 2 for all classifications.

(C) All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 3 pay for all classifications.

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Add $10.00/hour hyperbaric pay for Group 4 Tunnel Boring Machine Mechanic.

Add $0.40 to the base rate for any and all work performed underground, including operating, servicing and repairing of equipment.

Add $0.50 to the base rate per hour for any employee who works suspended by a rope or cable.

Add $0.50 to the base rate for employees who do “pioneer” work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation.

Note: A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Waste Site. For information on this differential, call the Prevailing Wage Rate Coordinator at (971) 353-2416.

POWER EQUIPMENT OPERATOR (continued)

Shift Differential

Two-Shift Operations:

On a two-shift operation, when the second shift starts after 4:30 p.m., second-shift workers shall be paid the base hourly wage rate plus 5% for all hours worked.

When the second shift starts at 8:00 p.m. or later, the second-shift workers shall be paid at the base hourly wage rate plus 10% for all hours worked.

Three-Shift Operations:

On a three-shift operation, the base hourly wage rate plus five percent (5%) shall be paid to all second-shift workers for all hours worked, and the base hourly wage rate plus ten percent (10%) shall be paid to all third shift workers for all hours worked.

ROOFER

Area 1	**40.23**	**20.98**

Reference Counties

Baker	Deschutes	Morrow	Union
Clackamas	Gilliam	Multnomah	Wasco
Clatsop	Grant	Sherman	Wallowa
Columbia	Hood River	Tillamook	Washington
Crook	Jefferson	Umatilla	Wheeler

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials.

Add 10% to the base rate for handling fiberglass insulation.

Area 2	**35.05**	**18.85**

Reference Counties

Benton	Harney	Lake	Malheur
Coos	Jackson	Lane	Marion
Curry	Josephine	Lincoln	Polk
Douglas	Klamath	Linn	Yamhill

Crook – **See Area 1 rates** Deschutes – **See Area 1 rates**

Add $2.00 to the base rate for handling coal tar products.

Add $1.50 to the base rate for handling fiberglass insulation.

ROOFER (Continued)

Area 4 **40.23** **20.98**

Reference County

Umatilla Union Wallowa

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials.

Add 10% to the base rate for handling fiberglass insulation.

Pursuant to ORS 279C.815(2)(b), the Roofer Area 1 rate is the highest rate of wage among the collective bargaining agreements for Roofer Areas 1, 4 and 5.

Area 5 **40.23** **20.98**

Reference County

Morrow

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials. Add 10% to the base rate for handling fiberglass insulation.

Pursuant to ORS 279C.815(2)(b), the Roofer Area 1 rate is the highest rate of wage among the collective bargaining agreements for Roofer Areas 1, 4 and 5.

SHEET METAL WORKER

Area 1 **50.80** **26.46**

Reference Counties

Benton	Deschutes	Lincoln	Polk	Washington
Clackamas	Gilliam	Linn	Sherman	Wheeler
Clatsop	Grant	Marion	Tillamook	Yamhill
Columbia	Hood River	Morrow	Umatilla	
Crook	Jefferson	Multnomah	Wasco	

Add 10% to base rate for work performed on any swinging platform, swinging chair or swinging ladder. Add 10% to base rate for work where a worker is exposed to resins, chemicals, or acid.

Area 2 **-------** **-------**

Reference Counties

Baker – **See Area 3 rate** Malheur – **See Area 4 rate**

SHEET METAL WORKER (Continued)

Area 3 **45.78** **26.58**

Reference Counties

Baker Union Wallowa

Morrow – **See Area 1 rate** Umatilla – **See Area 1 rate**

Add $.45 to base rate for work performed on any swinging stage, swinging scaffold or boson chair in excess of thirty (30) feet above the ground.

Add $1.00 to base rate for work where it is necessary to wear a chemically activated type face mask.

Area 4 **42.03** **23.57**

Reference Counties

Douglas Jackson Klamath Lane
Harney Josephine Lake Malheur

Coos – **See Area 5 rate** Curry – **See Area 5 rate**

Add 10% to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add 10% to base rate for work where a worker is exposed to resins, chemicals, or acid.

Area 5 **42.39** **24.61**

Reference Counties

Coos Curry

Add 10% to base rate for work performed on any swinging platform, swinging chair or swinging ladder. Add 10% to base rate for work where a worker is exposed to resins, chemicals, or acid.

SOFT FLOOR LAYER **39.63** **18.57**

SPRINKLER FITTER

Area 1 **46.18** **26.40**

Reference Counties

Benton Deschutes Jefferson Malheur Umatilla
Clackamas Douglas Josephine Marion Wasco
Clatsop Gilliam Klamath Morrow Washington
Columbia Grant Lake Multnomah Wheeler
Coos Harney Lane Polk Yamhill
Crook Hood River Lincoln Sherman
Curry Jackson Linn Tillamook

SPRINKLER FITTER (Continued)

Area 2 **39.61** **26.39**

Reference Counties

Baker Union Wallowa

Gilliam – **See Area 1 rate** Malheur – **See Area 1 rate** Umatilla – **See Area 1 rate**
Grant – **See Area 1 rate** Morrow – **See Area 1 rate**

TENDER TO MASON TRADES (Brick and Stonemason, Mortar Mixer, Hod Carrier) **41.29** **16.80**

Add $0.50 to base rate for refractory repair work.

TENDER TO PLASTERER AND STUCCO MASON
Zone A (Base Rate) **39.62** **16.80**

Zone B: **6.00** per hour
Zone C: **9.00** per hour
Zone D: **12.00** per hour

Zone A: Projects located within 60 miles of city hall in the reference cities listed.
Zone B: More than 61 miles but less than 80 miles.
Zone C: More than 81 miles but less than 100 miles.
Zone D: More than 101 miles

Reference Cities

Bend	Eugene	Medford	Portland	Seaside
Coos Bay	La Grande	Newport	Salem	The Dalles

Add $0.50 to base rate for refractory repair work.

TESTING AND BALANCING (TAB) TECHNICIAN

For work performed under the Sheet Metal classification, including Air-Handling Equipment, Ductwork

See SHEET METAL WORKER RATE

For work performed under the Plumber/Pipefitter/Steamfitter classification, including Water Distribution Systems

See PLUMBER/PIPEFITTER/STEAMFITTER RATE

TILE SETTER/TERRAZZO WORKER: Hard Tile Setter **38.96** **21.51**

This trade is tended by “Tile, Terrazzo, & Marble Finisher.” Add $1.00 when performing terrazzo work.

Add $1.00 when working with epoxy, furnane, or alkor acetylene.

TILE, TERRAZZO, AND MARBLE FINISHER

1. TILE, TERRAZZO FINISHER	**29.12**	**15.95**

Add $1.00 when performing terrazzo work.

Add $1.00 when working with epoxy, furnane, or alkor acetylene.

2. BRICK & MARBLE FINISHER	**29.12**	**16.08**

Add $1.00 per hour to base rate for refractory repair work.

TRUCK DRIVER

Zone A (Base Rate)

Group 1	**32.06**	**17.13**
Group 2	**32.21**	**17.13**
Group 3	**32.36**	**17.13**
Group 4	**32.67**	**17.13**
Group 5	**32.92**	**17.13**
Group 6	**33.12**	**17.13**
Group 7	**33.35**	**17.13**

Zone differential for Truck Drivers – Add to Zone A Base Rate

Zone B: **.65** per hour
Zone C: **1.15** per hour
Zone D: **1.70** per hour
Zone E: **2.75** per hour

Zone A: Projects within 30 miles of the cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 80 miles.
Zone E: More than 80 miles.

Reference Cities

Albany	Burns	Hermiston	Madras	Pendleton	The Dalles
Astoria	Coos Bay	Hood River	Medford	Portland	Tillamook
Baker	Corvallis	Klamath Falls	McMinnville	Port Orford	Vancouver
Bend	Eugene	La Grande	Newport	Reedsport	
Bingen	Goldendale	Lakeview	Ontario	Roseburg	
Brookings	Grants Pass	Longview	Oregon City	Salem	

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Prevailing Wage Rate Laws Handbook

The 2024 edition of the ***Prevailing Wage Rate Laws Handbook*** is now available on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx.

In addition to providing this and other PWR publications, Oregon BOLI Labor & Industries' PWR Unit regularly offers free, informational seminars for both public agencies and contractors. The current schedule is available online at https://www.oregon.gov/boli/employers/Pages/prevailing-wage-seminars.aspx.

If you are interested in being included on our mailing lists for future seminar notifications, please contact us at PWR.Email@boli.oregon.gov or (971) 353-2416.

SECTION VII

DRAWINGS