STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

ADDENDUM NO. 1
FOR
TAXILANE T1 EXTENSION
AT LIHUE AIRPORT
LIHUE, KAUAI, HAWAII
STATE PROJECT NO. CK1627-33

MAY 15, 2026

This Addendum shall make the following amendment(s) to the Solicitation:

A. SPECIAL PROVISIONS

1. Delete **SPECIAL PROVISIONS** dated April 2026, in its entirety, and replace it with attached **SPECIAL PROVISIONS** dated r5/15/26.

B. PART II – TECHNICAL PROVISIONS

1. Delete **SECTION 01005** – **DESCRIPTION OF WORK**, dated April 2026, in its entirety, and replace it with attached **SECTION 01005** – **DESCRIPTION OF WORK** dated r5/15/26.

2. Delete **SECTION 02101** – **PREPARATION/REMOVAL OF EXISTING PAVEMENT**, dated April 2026, in its entirety, and replace it with attached **SECTION 02101** – **PREPARATION/REMOVAL OF EXISTING PAVEMENT** dated r5/15/26.

3. Delete **SECTION 02152** – **EXCAVATION, SUBGRADE, AND EMBANKMENT**, dated April 2026, in its entirety, and replace it with attached **SECTION 02152** – **EXCAVATION, SUBGRADE, AND EMBANKMENT** dated r5/15/26.

4. Delete **SECTION 02209** – **CRUSHED AGGREGATE BASE COURSE**, dated April 2026, in its entirety, and replace it with attached **SECTION 02209** – **CRUSHED AGGREGATE BASE COURSE dated** r5/15/26.

5. Delete **SECTION 02403** – **ASPHALT MIX PAVEMENT, SURFACE COURSE**, dated April 2026, in its entirety, and replace it with attached **SECTION 02403** – **ASPHALT MIX PAVEMENT, SURFACE COURSE** dated r5/15/26.

6. Delete **SECTION 16108** – **UNDERGROUND POWER CABLE FOR AIRPORTS**, dated April 2026, in its entirety, and replace it with attached **SECTION 16108** – **UNDERGROUND POWER CABLE FOR AIRPORTS** dated r5/15/26.

7. Delete **SECTION 16110** – **AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS**, dated April 2026, in its entirety, and replace it with attached **SECTION 16110** – **AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS** dated r5/15/26.

8. Delete **SECTION 16115** – **ELECTRICAL MANHOLES AND JUNCTION STRUCTURES**, dated April 2026, in its entirety, and replace it with attached **SECTION 16115** – **ELECTRICAL MANHOLES AND JUNCTION STRUCTURES** dated r5/15/26.

C. PROPOSAL

1. Delete **PROPOSAL** dated April 2026, in its entirety, and replace it with the attached **PROPOSAL** pages P-1 to P-11 dated r5/15/26.

D. PLANS

1. Delete **PLAN SHEET NO. G-002, DRAWING INDEX**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. G-002, DRAWING INDEX**.

2. Delete **PLAN SHEET NO. G-004, ABBREVIATIONS & LEGEND**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. G-004, ABBREVIATIONS & LEGEND**

3. Delete **PLAN SHEET NO. G-008, GENERAL PROJECT DESCRIPTION**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. G-008, GENERAL PROJECT DESCRIPTION**.

4. Delete **PLAN SHEET NO. PH001, CONSTRUCTION SEQUENCING SCHEDULE**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. PH001, CONSTRUCTION SEQUENCING SCHEDULE**.

5. Delete **PLAN SHEET NO. PH201, PHASE 2A AND 2B (2000 TO 0500)**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. PH201, PHASE 2A AND 2B (2000 TO 0500)**.

6. Delete **PLAN SHEET NO. PH202, PHASE 2A AND 2B (2000 TO 0500) – ENLARGED 1**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. PH202, PHASE 2A AND 2B (2000 TO 0500) – ENLARGED 1**.

7. Delete **PLAN SHEET NO. PH203, PHASE 2A AND 2B (2000 TO 0500) – ENLARGED 2**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. PH203, PHASE 2A AND 2B (2000 TO 0500) – ENLARGED 2**.

8. Delete **PLAN SHEET NO. PH204, PHASE 2A AND 2B (2000 TO 0500) – ENLARGED 3**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. PH204, PHASE 2A AND 2B (2000 TO 0500) – ENLARGED 3**.

9. Delete **PLAN SHEET NO. C-202, DEMOLITION PLAN 2 OF 3**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. C-202, DEMOLITION PLAN 2 OF 3**.

10. Delete **PLAN SHEET NO. C-302, PAVING PLAN 2 OF 3**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. C-302, PAVING PLAN 2 OF 3**,

11. Delete **PLAN SHEET NO. C-401, PAVEMENT ELEVATION PLAN**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. C-401, PAVEMENT ELEVATION PLAN**.

12. Delete **PLAN SHEET NO. C-501, GRADING AND DRAINAGE PLAN**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. C-501, GRADING AND DRAINAGE PLAN**.

13. Delete **PLAN SHEET NO. C-602, HORIZONTAL CONTROL AND PAVEMENT MARKING PLAN 2 OF 3**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. C-602, HORIZONTAL CONTROL AND PAVEMENT MARKING PLAN 2 OF 3**.

14. Delete **PLAN SHEET NO. E-001, ELECTRICAL GENERAL NOTES, SYMBOLS AND ABBREVIATIONS**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. E-001, ELECTRICAL GENERAL NOTES, SYMBOLS AND ABBREVIATIONS**.

15. Delete **PLAN SHEET NO. E-101A, ELECTRICAL PLAN ADDITIVE ALTERNATE "A"**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. E-101A, ELECTRICAL PLAN ADDITIVE ALTERNATE "C."**

16. Delete **PLAN SHEET NO. E-110A, ELECTRICAL DETAILS ADDITIVE ALTERNATE "A"**, dated April 13, 2026, and replace it with attached **PLAN SHEET NO. ADD. E-110A, ELECTRICAL DETAILS ADDITIVE ALTERNATE "C."**

The following is provided for information.

E. PRE-BID MEETING MINUTES

1. The attached **PRE-BID MEETING MINUTES** and **ATTENDANCE SHEET** are provided for information.

F. PRE-BID SITE VISIT

1. There were no RSVP's for the site visit, therefore the site visit was not held.

Please acknowledge receipt of this **ADDENDUM NO. 1** by recording the date of its receipt in the space provided on **PAGE P-4** of the Proposal.

NATHAN C. KANESHIGE
Engineering Program Manager

SPECIAL PROVISIONS

The following additional amendments to the General Provisions are applicable to this project:

1.3 DEFINITIONS is amended as follows:

The definition for Subcontractor is deleted in its entirety and replaced with the following:

Subcontractor – An individual, partnership, firm, corporation, joint venture or other legal entity, as licensed or required to be licensed under Chapter 444, Hawaii Revised Statutes, as amended, which enters into an agreement with the Contractor to perform a portion of the work.

The following definitions shall be added:

AASHTO - The American Association of State Highway and Transportation Officials.

Access Road - The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.

Air Operations Area (AOA) - The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.

Apron - Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.

ASTM International (ASTM) - Formerly known as the American Society for Testing and Materials (ASTM).

Bid - The offer of a Bidder, on the prescribed HDOT form, to perform the work and to furnish the labor and materials at the prices quoted.

Building Area - An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.

Certificate of Analysis (COA) - The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.

Certificate of Compliance (COC) - The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.

Contractors Quality Control (QC) Facilities - The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).

Contractor Quality Control Program (CQCP) - Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.

Control Strip - A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.

Drainage System - The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

Extra Work - An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.

FAA - The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.

Force Account – a) Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. b) Owner Force Account - Work performed for the project by the Owner's employees.

HAWAII ePROCUREMENT SYSTEM (HIePRO) - The State of Hawaii eProcurement System for issuing solicitations, receiving proposals and responses, and issuing notices of award.

Intention of Terms - Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner. Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.

Lighting - A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.

Major and Minor Contract Items - A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.

Owner - The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is the State of Hawaii, Department of Transportation, Airports Division.

Pavement Structure - The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.

Payment Bond - The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.

Performance Bond - The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.

Project - The agreed scope of work for accomplishing specific airport development with respect to a particular airport.

Proposal Guaranty - The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.

Quality Assurance (QA) - Owner's responsibility to assure that construction work completed complies with specifications for payment.

Quality Control - Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.

Quality Assurance (QA) Inspector - An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.

Quality Assurance (QA) Laboratory - The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.

Resident Project Representative (RPR) - The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor and acting directly or through an authorized representative.

Runway - The area on the airport prepared for the landing and takeoff of aircraft.

Runway Safety Area (RSA) - A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.

Subgrade - The soil that forms the pavement foundation.

Supplemental Agreement - A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%: (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.

Taxilane - A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.

Taxiway - The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.

Taxiway/Taxilane Safety Area (TSA) - A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.

2.7 REQUEST FOR SUBSTITUTION OF SPECIFIED MATERIALS AND EQUIPMENT BEFORE BIG OPENING is amended as follows:

1. The last sentence in the first paragraph (line 147 to 152) shall be replaced with the following:

"Where a bidder intends to use a material or equipment of an unspecified brand, make, or model, the bidder must submit a request to the Department for review and approval at the earliest date possible. As specified in the Notice to Bidders, all requests shall be posted as a question in HIePRO under the "Question and Answer" tab. Supporting documents for specific request shall be emailed to the Project Manager specified in the Notice to Bidders. Request must be posted in HIePRO and supporting documents received by the Project Manager no later than twenty (20) calendar days before the bid opening date."

2. The first sentence in the second paragraph (line 154 to 156) shall be replaced with the following:

"It shall be the responsibility of the bidder to submit sufficient evidence based upon which a determination can be made by the Department that the alternate brand is a qualified equivalent."

2.8 PREPARATION AND DELIVERY OF BID is amended as follows: Last Paragraph (line 189 to 192) shall be replaced with the following:

"**Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Do not include confidential and/or proprietary documents with the proposal.** The record of each bidder and respective bid shall be open to public inspection. Original (wet ink, hard copy) proposal documents are not required to be submitted. **Contract award shall be based on evaluation of proposals submitted and uploaded to HIePRO.**

FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

If there is a conflict between the specification document and the HIePRO solicitation, the specifications shall govern and control, unless otherwise specified."

2.11 BID SECURITY is amended by deleting (a) and replacing it with:

"(a) Unless directed otherwise in the invitation for bids, each bid shall be accompanied by bid security which is intended to protect the Department against the failure or refusal of a bidder to execute the contract for the work bid or to supply the required performance and payment bonds. Bid security shall be in an amount equal to at least five percent of the base bid and additive alternates. Bid security shall be in one of the following forms:

1. A deposit of legal tender,

2. A valid surety bid bond, underwritten by a company licensed to issue bonds in the State of Hawaii, in the form and composed, substantially with the same language as provided herewith and signed by both parties;

3. A certificate of deposit; credit union share certificate; or cashier's, treasurer's, teller's, or official check drawn by or a certified check accepted by a bank, savings institution, or credit union insured by the Federal Deposit Insurance Corporation (FDIC) or the National Credit Union Administration (NCUA) and payable at sight or unconditionally assigned to the Department. These instruments may be utilized only to a maximum of one hundred thousand dollars ($100,000.00). If the required amount totals over one hundred thousand dollars ($100,000.00), more than one instrument not exceeding one hundred thousand dollars ($100,000.00) each and issued by different financial institutions shall be accepted.

If bidder elects options (1) or (3) above for its bid security, said bid security shall be in its <u>original</u> form a<u>nd shall be submitted before the bid deadline</u> to the Contract Office, Department of Transportation, Aliiaimoku Hale, 869 Punchbowl Street, Room 103, Honolulu, Hawaii 96813. Original surety bid bonds do <u>not</u> need to be submitted to the Contracts Office. Bidders are reminded that a copy of its surety bid bond shall be <u>included with its bid</u> submitted and uploaded to HIePRO."

<u>2.12 PRE-OPENING MODIFICATION OR WITHDRAWAL OF BIDS</u> is amended by deleting 2.12 Pre-Opening Modification or Withdrawal of Bids in its entirety and replace with the following:

"2.12 PRE-OPENING MODIFICATION OR WITHDRAWAL OF BIDS. Bids may be modified or withdrawn prior to the bid opening date and time. Withdrawal or revision of proposal shall be completed, submitted and uploaded to HIePRO prior to the bid opening date and time."

<u>2.14 PUBLIC OPENING OF BIDS</u> is amended by deleting 2.14 Public Opening of bids in its entirety

<u>2.20 BID EVALUATION AND AWARD</u> is amended as follows: Paragraph (a) shall be replaced with the following:

"(a) The award shall be made to the lowest, responsive, responsible bidder within ninety (90) days after bid opening and shall be based on the criteria set forth in the invitation for bids. The Department may request the bidders to allow the Department to consider the bids for the issuance of an award beyond the 90 day period. Agreement to such an extension must be made by a bidder in writing. Only bidders who have agreed to such an extension will be eligible for the award." No response to request shall mean the bidder shall no longer be eligible for award.

<u>4.12 UTILITIES AND SERVICES</u> - is amended as follows:

<u>Add the following after the last paragraph:</u>

"(e)Repairs and Outages.

(1) The Contractor shall have available on 24-hour call sufficient specialty contractors, such as

electrical and plumbing contractors, to repair any damage to existing facilities that might occur as a result of construction operations regardless of when the damage might occur.

(2) Outage: Written requests for power outage, communication changes, and water and sewer connection outages shall be submitted to the Engineer at least seven (7) days in advance or as specified in other sections of these specifications. Outages will be restricted to non-peak operational hours between midnight and 6:00 a.m."

7.21 PUBLIC CONVENIENCE AND SAFETY - is hereby added to the General Provisions:

"It shall be especially noted by the Contractor that the area directly adjacent to the existing in use runways and taxiways, is an extremely hazardous area and that very strict controls will apply throughout the entire period required to complete all work within 500 feet from the edge of an in use runway and 180 feet from the edge of an in use taxiway.

The Contractor shall familiarize himself with the Airport Certification Manual available for review at the Airport Manager's Office and shall comply with its requirements.

The Contractor is responsible for the security of access points to the Airport Operational Area that are located within the limits of construction and will be fined $1,000 per incident for any breach of security at these locations. All gates leading into the AOA shall be kept locked and if required to be open, the Contractor shall provide professional security guards to attend gates. The guards must be approved by the Director and shall be required to attend a training session conducted by the Airport Manager prior to gate assignment."

8.8 LIQUIDATED DAMAGES FOR FAILURE TO COMPLETE THE WORK OR PORTIONS OF THE WORK ON TIME: The General Provisions is hereby amended to include the following:

Liquidated damages shall be THREE THOUSAND DOLLARS ($3,000.00) for each Calendar Day for failure to complete construction within the Completion Times shown in the Proposal.

8.20 LIMITATION OF OPERATIONS: is hereby added to the General Provisions:

"The following limitations shall be observed by the Contractor when operating within 75 feet from the edge of any taxiway.

General - The Contractor shall schedule his operations to minimize interference with the movement of aircraft or passengers as may be required by the Engineer. The Contractor shall be responsible to alert all of his personnel to the location of power and signal cables installed for the operation of the airport. The Contractor shall control his operations in a manner to preclude any possible damage to those cables. Utility companies shall be notified by the Contractor one week before commencement of work. The Contractor shall give notice to the Engineer in writing, at least 168 hours before operating within 75 feet from the edge of any taxiway and the Engineer will assure himself that the Airport Management personnel are notified in sufficient time to publish the warning (NOTAM). The Contractor shall immediately repair any damages to the existing perimeter fence to prevent inadvertent entry to the Airport Operation Area (AOA).

Work in Vicinity of Runways and Taxiways in Use - Under the terms of this contract, it is intended that work shall be completed without disturbing the paved surface of existing runways and taxiways, unless shown otherwise on the plans.

Aircraft traffic shall not be interrupted. The Contractor shall schedule to work within 75 feet of the taxiway as directed by the Airport Management. No ruts, holes, or open trenches of 3 inches or more in depth and no objects or material 3 inches or more in height shall be permitted within the safety area when the airfield is in operation in conformance to Federal Aviation Regulation Part 139.

The Contractor is also informed that Airport Zoning Regulations dictate that a 'clear zone' be maintained 500 feet on each side of an active runway, to be known as a hazardous area. The Contractor shall comply with all regulations governing ground operations within hazardous areas. The following FAA Advisory Circulars ·or later versions and FAA Regulations specify these requirements.

AC 150/5210-5D Painting, Marking, and Lighting Vehicles Used on an Airport, dated April 2010

AC 150/5340-lM Standards for Airport Markings, dated May 2019

AC 150/5370-2G Operational Safety on Airports During Construction, dated December 2017

FAA Regulations Objects Affecting Navigable Airspace Part 77

The Contractor shall keep all personnel and equipment off the areas not specifically designated for work under this Contract. At all times when the Contractor's equipment is not in use, the equipment shall be moved outside the hazardous areas to an area designated by the Engineer. Under no condition shall equipment be parked, or material stored within the hazardous areas.

Failure on the part of the Contractor to abide by the above will result in suspension of work.

Authority of Control Tower Personnel - With the exception of actual construction methods, the airport control tower personnel will have full authority to control the Contractor's movements within the existing taxiway. When required, the Contractor shall maintain a constant radio vigil within all work areas and in addition shall keep at least one flagman on duty with the radio man. When notified by the control tower to temporarily halt operations, it shall be the duty of the flagman, through the use of appropriate methods (lighted flares shall not be used under any circumstances), to notify all operators of equipment and other personnel to cease work and move men and equipment off of hazardous areas. Contractor shall provide, at his own expense, the necessary radio and equipment including a radio equipped mobile vehicle to maintain contact with control tower personnel at all times during job performance. A transceiver operating at a frequency designated by the Engineer to communicate with the Control Tower.

Marking of Hazardous Areas - The Engineer will designate areas that are hazardous for aircraft. The Contractor shall provide red blinker lights spaced not more than 50 feet apart around all hazardous areas and areas of work within 75 feet of any taxiway. Such systems shall be subject to approval by the Engineer. The Contractor shall have personnel on call 24 hours per day for the emergency maintenance of hazard markings.

The Contractor shall provide red flags not less than 20 inches square in addition to the red blinker lights. When danger flags are made of fabric, a wire stiffener shall be used to hold the flags in an extended position. Flags shall be so mounted that they do not produce a hazard. The red danger flags shall be spaced not more than 50 feet apart around all areas of work within 75 feet of any taxiway.

All systems proposed by the Contractor for lighting and barricading shall be submitted to the Engineer for review prior to installation. The Contractor shall install all flags, lighting and barricades as required by the Engineer. Such systems shall be subject to approval by the Engineer.

Storage of Equipment and Materials - At the end of each working shift, all of the Contractor's equipment shall be withdrawn to an area designated by the Engineer. The Contractor shall park all equipment in an orderly fashion and place a sufficient number of red flasher lights to identify these areas. Materials stored within the airport shall be so placed and the work shall, at all times, be so conducted as to cause no greater obstruction to the air and ground traffic than is considered necessary by the Engineer. No runways, taxiways or roadways shall be closed or opened, except by permission of the Engineer.

Utilities - The Contractor shall provide for the protection of all utilities from damages in areas to be traversed by his vehicles and equipment. If required, buried cables and utility lines shall be protected by mounding earth over the cables or by any other method approved by the Engineer.

The Contractor shall notify representatives of the owner, agencies, and other affected organizations at least 48 hours prior to working in any area containing the facilities of these organizations.

Failure to notify the owning organization will prevent authorization to work in a specific area.

Archaeological Features - Any archaeological features such as petroglyphs, burial sites, and artifacts discovered or unearthed during the performance of the work shall immediately be brought to the attention of the Engineer and all work that would damage or destroy these features shall be discontinued. The Engineer will decide, after proper investigation, to salvage or abandon such artifacts."

8.21 OPERATION OF CONTRACTOR'S MOTOR VEHICLE AND PERSONNEL IN RESTRICTED AIR OPERATIONS AND MOVEMENT_AREAS is hereby added to the General Provisions:

"The contractor shall conform with the all sections of the "State of Hawaii, Department of Transportation, Airports Division, Contractor's Training Guide" pertaining to access and operation in the Airport Operation Area (AOA) hereinafter described as follows:

"A. Motor Vehicles in Airport Operation Area
for safety reasons, the operation of motor vehicles in the AOA must conform with all applicable State Airport rules and regulations."

B. Motor Vehicle Access Permit

Each motor vehicle operated in the AOA is required to:

1. Meet all State licensing registration and safety requirements and be specifically licensed for operation in the AOA.
2. Meet all insurance requirements.
3. Be restricted to operation by those persons qualified to drive the vehicle and in possession of a current Ramp Driver's License and applicable Motor Vehicle Operator's License.

C. The operators of motor vehicles in the AOA shall be responsible for meeting the following insurance requirements.

1. Licensed Vehicles

As a condition for authorization to enter the AOA, the Contractor shall provide evidence of vehicle liability insurance in the form of a Certificate of Insurance issued by an authorized insurance carrier. Automobile Liability and general Liability (combined single limit, Bodily Injury and Property Damage, per occurrence) shall be required in the applicable minimum limits specified below:

a. Daniel K. Inouye International Airport

(1) Standard AOA clearance.....$5,000,000

(2) Limited AOA clearance .....$1,000,000 Limited AOA clearance is defined as operations restricted to Diamond head and Ewa Concourses second level roadways and connecting third level main terminal roadway only, with entry and exit via Security Access Point "C" (Primary) and Access Point "A" (Secondary)

b. Other Airports

Standard AOA clearance..... $1,000,000
Standard AOA clearance is defined as any portion of a public Airport from

which the public is restricted by fences or appropriate signs and no leased or demised to anyone for exclusive use and shall include runways, taxiways, all ramp and apron areas, aircraft parking and storage areas, fuel storage areas, maintenance areas, and any other area of a public Airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft or used for embarkation or debarkation of passengers.

2. Unlicensed Vehicles

Airport Liability (or General Liability) shall be required in the applicable minimum limits specified below:

a. Daniel K. Inouye International Airport, Kahului Airport and Ellison Onizuka Kona International Airport at Keahole

AOA clearance.....$5,000,000

b. All other Airports

AOA clearance.....$1,000,000

3. Specifically name the State of Hawaii as additionally insured.

4. Indicate that the Airport Engineer will be provided with a 30-day written prior notice of policy cancellation or material change in coverage or conditions.

D. Operator's Permit

1. No person shall operate a motor vehicle on the AOA unless he holds and carries on his person a current Airport Motor Vehicle operator's permit issued by the State of Hawaii, Department of Transportation, Airports Division.

2. Operator's permits will only be issued to persons who apply through the Airport District Security Office and pass a written exam covering those portions of the Airport Rules and Regulation relating to the operation of vehicles in Airport Operations Areas.

E. Authorized Vehicles

1. Only vehicles considered operationally safe and necessary for the performance of this contract may be allowed to operate in the AOA.

2. All motor vehicles must be painted in such a manner so as to be easily identifiable and must carry the Contractor's name on each side. These signs may be of a temporary nature applied to the side windows or doors.

The lettering shall be in bold characters of a minimum of four (4) inches in height and one and one-half (1-1/2) inches in widths, the height of logos should be a minimum of six (6) inches.

3. The Contractor's operations on, over, across, and/or immediately adjacent to any runway and/or taxiway at a towered airport shall require the use of two-way radio communication. The Contractor shall obtain the necessary equipment at his own expense.

4. No person shall operate a motor vehicle on the AOA unless he holds and carries on his person a current Motor Vehicle Operator's Permit issued by the Airport Manager.

a. The Motor Vehicle Operator's Permit will be issued only to persons who

apply through the Airport Security Section and pass a written exam covering those portions of the Airport Rules and Regulations relating to the operation of vehicles in the AOA.

b. Permits issued may be suspended or revoked for cause at any time by the Airports Division.

F. Airport Operation Area Construction Pass

1. Issuance of Airport Operation Area (AOA) Construction Passes shall be limited to contractors, subcontractors, companies, organizations, individuals engaged in authorized and approved construction activity which requires a continuing need for entry into the AOA or Airfield Movement Areas Request letters for such passes must be made to the Airport District Manager's Office in accordance with the Contractors Training Guide or applicable District requirements.

2. As a condition for security area clearance, applicants must comply with Transportation Security Regulation 1542 which requires a ten-year background Criminal History Records Check for those individuals employed under this contract.

G. Access to Movement Areas

1. Movement areas shall mean all of the runways and taxiways of the Airport which are utilized for taxiing, takeoff, and landing of aircraft.

a. Any vehicle which requires access to the movement area shall be equipped with operational radio equipment capable of positive two-way contact with Tower/Ground Control.

b. Operators of vehicles in movement areas must possess knowledge and familiarity with restricted and airfield movement areas, operational rules, regulations, and procedures, or be under direct escort by individuals meeting all of the above requirements.

2. Vehicle Operations on Movement Areas

a. No vehicle shall proceed across any runway unless specifically cleared by Tower/Ground Control.

b. The operator of a vehicle in the movement area shall not leave his vehicle unless continuous radio contact is maintained with the Tower/Ground Control while he is away from his vehicle.

c. Any vehicle proceeding onto the movement area between the hours of sunset and sunrise shall be equipped with an overhead flashing light which is visible for one (1) mile, unless such vehicle is being escorted by another vehicle so equipped.

d. All vehicles operated on the movement area between sunrise and sunset except those being escorted, shall operate an overhead amber or red flashing beacon visible for at least one (1) mile; or display a flag at least three (3) feet square with orange and white checkered squares of not less than one (1) foot on each side.

H. Runway and Taxiway Closure

1. Requests for runway or taxiway closures, or for any work which affect operational conditions at the airport must be made in writing through the Airport Engineering Branch.

2. Temporarily closed runways require placement of a lighted "X" runway closure marker on top of the runway identification numerals at both ends of the closed runway.

3. Taxiway closures require placement of barricades with alternate orange and white markings at each end of the closed taxiway segment. Barricades must be supplemented with flashing red lights. The intensity of the lights and spacing for barricades, and lights must adequately define and delineate the hazardous area.

I. Gate Guards Furnished by Contractors

1. If a contractor is permitted by the airport to maintain operational control of an AOA Access Gate, entry through such gate shall be controlled by the posting of a gate guard.

   a. Written instruction will be provided, outlining the guard's duties to enforce those requirements and provisions prescribed by the airport's security program to include all personnel and vehicle entry and access requirements.

   b. Procedures will be established to identify the actions which will be undertaken by the guard in calling for assistance.

   c. An approved emergency communications procedure will be established.

J. Compliance

1. The contractor shall comply with all regulations and rules governing the Air Operations Areas during construction, as specified in the following or later versions:

   a. Hawaii Revised Statutes, Title 19, Administrative Rules for Public Airports.

   b. Federal Aviation Administration Advisory Circular AC 150/5340-l, Standards for Airport Markings; AC 150/5370-2, Operational Safety on Airports During Constructions.

K. Enforcement Authorization

Act 21, Section 1, Section 261-17(a), HRS; Federal Aviation Administration Regulations, Part 139, Part 107.

L. Right of Rejection or Revocation

The State of Hawaii, Airports Division, reserves the right to withhold, deny or revoke any airport security clearance, licenses or permits to any individual or organization who fails to meet the prescribed or required access area clearance criteria to include background investigation information, or fails to observe or comply with established rules, regulations, and directives.

It should be clearly understood that such denial or revocation is based solely on airport security or safety considerations and does not in any way constitute a determination by the State with regard to private employment by any individual or organization."

--------END OF SECTION------

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01005 - DESCRIPTION OF WORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

1.2 SUMMARY

The work to be performed under this Contract shall include furnishing and paying for all machinery, tools, equipment, labor, and materials necessary for Taxilane T1 Extension at Lihue Airport, including all related work as called for on the Plans and these Specifications in place, complete, and ready for use. Below is a general description of the Scope but is not limited to:

Base Bid:

a. Furnish and install all necessary storm water pollution protection and BMP's.

b. Removal of existing asphalt pavements.

c. Excavation and stockpile excess soils at the airport, and comply with Site-specific Construction-Environmental Hazard Management Plan C-EHMP. (Please note the Construction-Environmental Hazard Management Plan C-EHMP will be provided by HDOTA to the Contractor separately prior to issuance of the Construction NTP.)

d. Construct new storm drain systems including catch basins, manholes, and reinforced concrete pipes (RCP).

e. Adjust miscellaneous utility structures to new grade.

f. Construct concrete utility protection slabs for existing FAA and airfield lighting conduits.

g. Construct new aircraft tie-down anchors.

h. Construct new asphalt taxilane and apron pavements.

i. Apply slurry seal to existing pavements.

j. Providing seeding and sprigging for disturbed graded areas.

k. Provide new pavement markings and elevated reflectors.

Additive Alternate "A":

a. Transport stockpiled soils from Base Bid and dispose as solid waste at DOH or EPA Permitted Disposal Landfill.

Additive Alternate "B":

a. Transport stockpiled soils from Base Bid and dispose as hazardous waste at an approved United States Environmental Protection Agency (EPA) regulated facility.

Additive Alternate "C":

a. Remove existing FAA and airfield lighting electrical handholes.

b. Install new FAA and airfield lighting electrical handholes.

c. Install new electrical conduit duct banks and cables.

d. Coordinate with FAA during installation.

e. Demolish and construct additional new asphalt taxilane and apron pavements.

1.3 HOURS OF WORK

A. Work hours shall be as described on the Construction Phasing plans. The Contractor shall work continuously throughout the project duration. The Contractor shall apply and receive approval from the Engineer in writing of all work hours. The Contractor shall coordinate their schedule with the Engineer. If rescheduling of work or intermittent work is required, such work shall be performed at no extra cost to the State. Night work hours during seabird fallout season (September 15 - December 15) shall follow all Federal and State regulations and shall be subject to approval by the Engineer. If the Contractor elects to work overtime beyond the work hours indicated in the Construction Phasing plans, compensation for State employees and for construction management consultant as authorized by the State shall be the Contractor's obligation to pay in accordance with Section 7.5 - Overtime and Night Work and Section 7.6 - Overtime and Night Payment for State Inspection Service in the General Provisions.

B. Contractor shall clean work areas at the end of each working period. All rubbish, loose materials, etc., shall be disposed of daily. All materials shall be safely secured and stored in an area designated by the Airport Manager.

1.4 PROVISIONS FOR FIELD OFFICE/STORAGE SPACE

Pending the availability of space on airport property, the State will issue Revocable Permit(s) to the Contractor for the use of the space, assessed at a monthly fee of $25 for each Revocable Permit issued. The space(s) may be used for a field office,

staging of materials and equipment, vehicle parking or other uses subject to the approval of the State. All spaces shall be subject to the requirements of Section 01561 - CONSTRUCTION SITE POLLUTION CONTROLS.

Since space on airport property is extremely limited, the State does not guarantee that space(s) provided to the Contractor will be in close proximity to the project site. The State will make every effort to provide the Contractor with space on airport property, however, should the State determine that no space is available for such use(s), the responsibility shall then be on the Contractor to find space outside of airport property.

1.5 REQUIREMENTS

A. The Contractor shall visit the work site and verify all conditions pertinent to the Contract he and/or she is bidding on.

B. The Contractor is hereby informed that the project is within a controlled area closed to public access, the Airports Operational Area (AOA). The Contractor shall meet requirements of Section 01800, "Special Requirements for Contractors on the AOA".

1.6 COORDINATION

The Contractor shall coordinate the work of different trades and shall be solely responsible for fulfillment of requirements specified herein.

1.7 SAFETY

A. The Contractor shall take all necessary precautions to protect all his and/or her workmen and all other personnel from injuries. The rules and regulations promulgated by the Occupational Safety and Health Acts are applicable and made a part of these Specifications. The Contractor shall conduct operations in a manner that maintain airport security and safe aircraft operations at all times.

B. The Contractor shall comply with the requirements of FAA AC 150/5370-2G, "Operational Safety on Airports during Construction".

C. During the progress of the work, all debris, empty crates, waste, material drippings, etc., shall be removed by the Contractor continuously or at the end of each work shift, and the work area shall be left clean and orderly.

D. Outage: Written requests for power outage shall be submitted to the Engineer at least seven (7) days in advance or as specified in other sections of these Specifications. Outage will be restricted to non-peak operational hours.

1.8 OPERATIONS PROCEDURES DURING WORK ON THE RUNWAY OR WITHIN THE RUNWAY SAFETY AREA

A. When the runway is closed, the runway lights will be locked out to the "OFF" position. When the runway is partially closed, the runway lights in the work area will be physically blacked out in a manner acceptable to the Engineer.

B. The Contractor shall schedule his and/or her work to allow sufficient time for clean up before the runway is placed back into operation.

C. Daily excavation in the runway safety area must be restored to its original grade before placed back into operation. Stockpiles are not permitted within the runway object free area.

D. The Contractor will initiate through the Engineer and the Airports Operations Controller (AOC) the filing of a blanket airfield construction Notice to Airman (NOTAM) advising of:

1. General information of the schedule construction work, and

2. The time period (beginning and end) for the construction.

E. The Contractor will inform the Engineer when scheduled work is canceled. Generally, the Contractor will not work on the airfield when it is raining or is forecast to rain. A NOTAM should be published or cancelled when work is not scheduled.

F. The Contractor radio-equipped person shall monitor air traffic radio transmission as specified in Section 01800, "Special Requirements for Contractors on the AOA". The radio-equipped person's only duty is to monitor the radio frequency.

G. In the event of a disruption in paving operations, such as a break down in the asphalt plant or paving equipment, the Contractor must have sufficient materials available to restore the runway pavement into a safe operational runway surface by the scheduled opening time.

H. The Contractor shall keep his and/or her work force from entering the active airfield.

I. A minimum of three (3) hours prior to the beginning of each work shift, the Contractor shall coordinate with AOC to determine if work will be permitted during the upcoming shift. Due to certain weather conditions, AOC and/or ATC may cancel work shifts and require the opening of the runway for aircraft use. Therefore, the Contractor may not begin work in any area in which the asphalt pavement cannot be completed to finished grade by the end of the work shift. Weather conditions which would require cancellation of work typically occur during Kona wind conditions with certain wind velocity thresholds. Historic data from the airport shows that these conditions occur less than 10% of the time.

1.9 SPECIAL SUBMITTAL TO SUPPORT SMS REPORT

The Contractor is responsible to submit supporting documentations for Safety Management System (SMS) Report to the Engineer, when the project is located in the airside area. Supporting documentations include, but are not limited to, project schedule, project phasing plan, barricade plan, airside area project tracking plan, laydown location, and etc. Required supporting documentation shall be in accordance with FAA AC 150/5200-37 latest version, "Introduction to Safety Management System (SMS) for Airport Operators".

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION 01005

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DIVISION 2 – SITE WORK

SECTION 02101 - PREPARATION/REMOVAL OF EXISTING PAVEMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-101 - Preparation/Removal of Existing Pavements, as included as an attachment to this Section.

1.2 SUMMARY

This Section includes the requirements for Preparation/Removal of Existing Pavements, including but not necessarily limited to, demolition and removal of all existing improvements in the work area to prepare the area to receive the improvements described for this project, and hauling and disposing of demolition rubble and debris. This specification shall also include the delivery of such items which are identified to be salvaged and the disposal of all other items which are identified for demolition and removal.

1.3 REFERENCES

A. FAA Specification Item P-101 – Preparation/Removal of Existing Pavements as modified herein.

B. Section 01560, General Environmental, Health, & Safety Controls

C. Section 02152, Excavation, Subgrade, and Embankment

1.4 SUBMITTALS

A. Pavement Milling Plan

B. Asphalt crack sealing filler product information.

1.5 GENERAL REQUIREMENTS

The Contractor shall clear and demolish areas as shown on the Plans and as necessary to complete the Work. This demolition work shall be done at a distance that is sufficiently in advance of the following construction operations. In addition, the Contractor shall do the following when performing any General Construction Demolition Work:

A. Survey existing conditions and correlate the conditions and boundaries with the work required so to determine the extent of selective demolition.

   1. Identify and distinguish all structures to remain and to be removed.

B. Show the demolition Work schedule on all progress schedules.

C. Notify the Engineer of the commencement of the demolition work, allowing sufficient time for the HDOTA and the HDOTA's tenants to clear the area as required.

D. Verify that benchmarks, field survey markings, and all measurements are accurate and sufficiently precise. Verify that said benchmarks and markings are not located in an area that may be impacted by the Demolition Work, and report benchmarks and markings that conflict with the Work to the Engineer.

E. Protect all survey monuments at the Site during the course of all Work.

F. Report in writing to the Engineer temporary or intermittent prevailing conditions that will adversely affect satisfactory execution of the work of this Section. Do not proceed with work until unsatisfactory conditions either are corrected or have changed to the satisfaction of the Engineer.

G. Note all subsurface existing conditions as described in the Contract Documents and referenced studies, and notify the Engineer of all changed conditions.

H. Identify all utilities to remain and verify that utilities to be removed have been disconnected and capped.

I. Continuously survey the work as it progresses to detect hazards resulting from selective demolition activities.

J. Perform demolition to permit orderly progress of work and shown on the Plans.

K. Whenever a utility is encountered and must be removed or relocated, schedule the removal and coordinate with the Engineer and utility owner sufficiently in advance of the removal so that services to existing facilities are not disrupted.

L. Conduct demolition operations and remove debris to ensure minimum interference with adjacent occupied and in-use facilities.

M. Erect temporary protection, such as, fences, where required. All such temporary protection must meet OSHA standards.

N. Comply with the Dust and Air Pollution Management Plan, Section 01560, General Environmental, Health, & Safety Controls and all other regulations and requirements.

O. Repair demolition performed in excess of that required at no cost to the HDOTA.

P. After demolition, verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive work.

Q. Immediately report to the Engineer any soil or water that is visibly stained, discolored, shiny, oily, has evidence of burn activities, has a noticeable solvent-like or hydrocarbon odor, or appears to be slag.

PART 2 PRODUCTS

Not applicable to this section.

PART 3 EXECUTION

3.1 DEMOLISH AND REMOVE MISCELLANEOUS ITEMS

As shown on the Plan, the Contractor shall:

A. Demolish and remove existing structures, pavements, utilities, abandoned foundations, bollards and associated foundations, and other materials within the limit of demolition.

B. Remove improvements, and obstructions interfering with installation of work as indicated on the Plans.

C. Mitigate the impact of the demolition operations on adjacent occupied or in-use facilities.

3.2 REMOVE AND RE-INSTALL MISCELLANEOUS EQUIPMENT

As shown on the Plans, the Contractor shall:

A. Remove, store items in Contractor's yard, and re-install items after work is completed as shown on plan including but not limited to:

1. Wildlife cages and traps

2. Stop signs

3.3 PAVEMENT REMOVAL

When removing asphalt concrete pavement as shown on the Plans, the Contractor shall:

A. Sawcut pavement sections designated for removal as shown on the Plans or as required by the HDOTA.

1. Sawcut the matching edge of all existing pavements designated to remain in a straight and true line as shown on the Plans.

2. Protect sawcut edges from damage until the finished surface has been completed.

3. Re-sawcut damaged edges the entire length of the matching joint prior to placing the finished surface, at no additional cost to the HDOTA.

4. Take care not to over-cut so that the cuts do not run past the corners.

5. Dispose of all saw cutting water in accordance with the approved SWPPP.

B. Use equipment that is capable of removing the pavement without excessively disturbing or removing underlying or adjacent materials. Breaking pavements by means of a ball breaker or gravity hammer will not be permitted.

C. Completely remove the pavement surface and all base and subbase courses to the top of the natural subgrade unless otherwise shown on the Plans or directed in the Project Manual.

D. Separate pavement, base and subbase materials and transport clean materials to the MMS.

3.4 COLDMILL AND CRACK SEALING OF PAVEMENTS

A. When coldmilling pavement, the Contractor's grinding equipment shall:

1. Have a minimum width of 10 feet.

2. Be equipped with electronic grade control devices on both sides that will cut the surface to the grade and tolerances specified.

3. Cut vertical edges.

4. Include a positive method of dust control.

5. All joints and cracks observed after the coldmilling operation shall be cleaned and filled as per FAA Specification Item P-101, Section 101-3.2.

6. Be capable of discharging the millings in a truck or leaving them in a defined windrow.

3.5 PIPES AND CONDUIT REMOVAL

When removing pipes and conduits (pipes) as part of the General Demolition Work, the Contractor shall:

A. Except for transite pipes, for pipes to partially remain in place, cut with straight and smooth edges on a plane perpendicular to the centerline of the pipe at the boundary of the removal. As shown on the Plans, provide a watertight seal appropriate for dead-ending the pipe, or abandon the remaining pipe as per Section 3.07 of this Section.

B. Handle transite and asbestos pipes in accordance with Section 01562 Management of Contaminated Medias. Remove existing transite water pipes without cutting, to the nearest joint or coupling. Plug remaining pipe as per Section 3.6 of this Section.

3.6 UNDERGROUND STRUCTURE AND OBSTRUCTION REMOVAL

When removing structures or obstructions, the Contractor shall:

A. As indicated on the Plans, remove all structures, obstructions, and miscellaneous concrete, including all or portions drainage structures and other abandoned utility structures.

B. Where new concrete is to join existing concrete, sawcut the existing concrete to a true line with straight vertical edges free from irregularities.

C. Perform underground removal without damage to any portion of any structure that is to remain in place.

D. Transport all uncontaminated concrete pipe and manhole structures from airport property, with the rubble reduced to less than 24" maximum in any dimension.

E. Coordinate with the owners of the utilities to be removed to determine the termination, plugging or capping requirements for cutting and removal of the utility. All utility piping and conduits shall be completely removed prior to the construction of the new improvements unless noted otherwise on the plans or in the specifications or unless directed otherwise by the Engineer.

F. The Contractor shall accurately locate and protect the utilities where performing the Work.

3.7 SOIL MATERIAL EXCAVATION AND REMOVAL

The Contractor shall stockpile soil on Site as allowed on the Plans and as per Section 02152, Excavation, Subgrade, and Embankment.

3.8 EXISTING UTILITIES ABANDONMENT

The Contractor shall abandon existing utilities as noted on the Plans and seal the ends of abandoned utilities as per details shown on the plans.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-101, paragraph 101-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-101, paragraph 101-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-101, Preparation/Removal of Existing Pavements

END OF SECTION 02101

ITEM P-101 PREPARATION/REMOVAL OF EXISTING PAVEMENTS

DESCRIPTION

101-1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2 All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.1 Removal of existing pavement.

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

a. Concrete pavement removal. Full depth saw cuts shall be made perpendicular to the slab surface. The Contractor shall saw through the full depth of the slab including any dowels at the joint, removing the pavement and installing new dowels as shown on the plans and per the specifications. Where the perimeter of the removal limits is not located on the joint and there are no dowels present, the perimeter shall be saw cut the full depth of the pavement. The pavement inside the saw cut shall be removed by methods which will not cause distress in the pavement which is to remain in place. The material shall be removed and disposed off airport property. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the RPR.

The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times. Spall and underbreak repair shall be in accordance with the plans. Any underlaying material that is to remain in place, shall be recompacted and/or replaced as shown on the plans. Adjacent areas damaged during repair shall be repaired or replaced at the Contractor's expense.

b. Asphalt pavement removal. Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the perimeter of the area to be removed. The material shall be removed and disposed off airport property.

c. Repair or removal of Base, Subbase, and/or Subgrade. All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

101-3.2 Preparation of joints and cracks prior to overlay/surface treatment. Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm). If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the RPR. Fill all cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed ¼ inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

Wider cracks (over 1-1/2 inch wide (38 mm)), along with soft or sunken spots, indicate that the pavement or the pavement base should be repaired or replaced as stated below.

Cracks and joints may be filled with a mixture of emulsified asphalt and aggregate. The aggregate shall consist of limestone, volcanic ash, sand, or other material that will cure to form a hard substance. The combined gradation shall be as shown in the following table.

Gradation

Sieve Size	Percent Passing
No. 4 (4.75 mm)	100
No. 8 (2.36 mm)	90-100
No. 16 (1.18 mm)	65-90
No. 30 (600 µm)	40-60
No. 50 (300 µm)	25-42
No. 100 (150 µm)	15-30
No. 200 (75 µm)	10-20

Up to 3% cement can be added to accelerate the set time. The mixture shall not contain more than 20% natural sand without approval in writing from the RPR.

The proportions of asphalt emulsion and aggregate shall be determined in the field and may be varied to facilitate construction requirements. Normally, these proportions will be approximately one part asphalt emulsion to five parts aggregate by volume. The material shall be poured or placed into the joints or cracks and compacted to form a voidless mass. The joint or crack shall be filled to within +0 to -1/8 inches (+0 to -3 mm) of the surface. Any material spilled outside the width of the joint shall be removed from the pavement surface prior to constructing the overlay. Where concrete overlays are to be constructed, only the excess joint material on the pavement surface and vegetation in the joints need to be removed**.**

101-3.3 Removal of Foreign Substances/contaminates prior to overlay and remarking. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction.

High-pressure water may be used. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method

to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed off airport property.

101-3.4 Concrete spall or failed asphaltic concrete pavement repair.

a. Repair of concrete spalls in areas to be overlaid with asphalt. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The perimeter of the repair shall be saw cut a minimum of 2 inches (50 mm) outside the affected area and 2 inches (50 mm) deep. The deteriorated material shall be removed to a depth where the existing material is firm or cannot be easily removed with a geologist pick. The removed area shall be filled with asphalt mixture with aggregate sized appropriately for the depth of the patch. The material shall be compacted with equipment approved by the RPR until the material is dense and no movement or marks are visible. The material shall not be placed in lifts over 4 inches (100 mm) in depth. This method of repair applies only to pavement to be overlaid.

b. Asphalt pavement repair. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The failed areas shall be removed as specified in paragraph 101-3.1b. All failed material including surface, base course, subbase course, and subgrade shall be removed. Materials and methods of construction shall comply with the applicable sections of these specifications.

101-3.5 Cold milling. Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlaying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed off Airport property. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor’s Expense.

a. Patching. The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth of cut. The RPR shall layout the area to be milled with a straightedge in increments of 1-foot (30 cm) widths. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn’t have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor’s Expense.

b. Profiling, grade correction, or surface correction. The milling machine shall have a minimum width of 7 feet and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch (+0 mm and -6mm) of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck. All millings shall be removed and disposed of off the airport.

c. Clean-up. The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the

pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed off Airport property.

101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment. Existing asphalt pavements to be treated with a surface treatment shall be prepared as follows:

a. Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.

b. Repair joints and cracks in accordance with paragraph 101-3.2.

c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.

d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 Preparation of Joints in Rigid Pavement prior to resealing. Not Used.

101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the cracks and does not damage the pavement.

101-3.9.1 Preparation of Crack. Widen crack with router by removing a minimum of 1/16 inch (2 mm) from each side of crack. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

101-3.9.2 Removal of Existing Crack Sealant. Existing sealants will be removed by routing . Following routing any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

101-3.9.3 Crack Sealant. Crack sealant material and installation will be in accordance with Item P-605.

101-3.9.4 Removal of Pipe and other Buried Structures.

a. Removal of Existing Pipe Material. Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D1557**.**

b. Removal of Inlets/Manholes. Where indicated on the plans or as directed by the RPR, inlets and/or manholes shall be removed and legally disposed of off-site in a timely fashion after removal. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted to 95% of ASTM D1557, when outside of paved areas must be compacted to 90% of ASTM D1557**.**

METHOD OF MEASUREMENT

101-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

101-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02101.1	Remove Existing AC Pavement	Lump Sum
02101.2	Remove Miscellaneous Items Structures	Lump Sum
02101.3	Remove Existing Concrete Pad	Lump Sum

Payment will be made under Additive Alternate C:

Item No.	Description	Unit
02101.C1	Remove Existing AC Pavement	Lump Sum

REFERENCES

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

Advisory Circulars (AC)

AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.

ASTM International (ASTM)

ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

END OF SECTION 02101

SECTION 02152 - EXCAVATION, SUBGRADE, AND EMBANKMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-152 – Excavation, Subgrade and Embankment, as included as an attachment to this Section

1.2 SUMMARY

This Section includes the requirements for Excavation, Subgrade, and Embankment, including but not necessarily limited to, excavation, placement, and compaction of all materials within the project limits, temporary stockpiling, and hauling and disposing of unused materials and debris. This specification shall also include subgrade preparation and embankment, and the disposal of all other items which are identified as unsuitable excavation material.

1.3 REFERENCES

A. FAA Specification Item P-152 – Excavation, Subgrade and Embankment as modified herein.

B. Section 02101, Preparation/Removal of Existing Pavements

C. Section 02151, Clearing and Grubbing

1.4 SUBMITTALS

Prior to commencing the Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Excavation and Embankment Quality Control Plan: The contractor shall provide quality control plan to include all testing procedures and frequency in accordance with the requirements of Item P-152.

B. Soil Density Test Results: The Contractor shall submit all copies of test results to the Engineer for review. These shall include retests for items that failed initial testing.

C. Bracing / shoring: The Contractor shall submit bracing/shoring design as required for trench excavation signed / sealed by a registered engineer.

D. Contractor's verification of accuracy or adjustment of the existing ground survey in accordance with Item P-152-2.2.

1.5 QUALITY ASSURANCE

A. The Contractor's Quality Control of excavation and backfill work shall be considered as part of the Work.

B. The HDOTA, at its discretion, will perform Quality Analysis testing for acceptance of the excavation and backfill Work.

C. Compaction testing shall be performed per FAA Specification Item P-152, Excavation and Embankment, and as modified herein.

PART 2 PRODUCTS

Not applicable to this section.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall conform to FAA Specification Item P-152, as modified herein, for excavation, embankment, and subgrade preparation work.

3.2 EXCAVATION

Contractor have Level D personnel protection equipment (PPE's) when performing any work associated with soils excavation, handling, and construction of the temporary stockpile

3.3 BORROW EXCAVATION.

Borrow site(s) within the airport property are indicated on the plans. Borrow excavation shall be made only at these designated locations and within the horizontal and vertical limits or as directed by the Engineer. However, it is the sole responsibility of the Contractor to locate and obtain the necessary supply of acceptable fill material for the project. Any required off-site borrow site(s) outside of the airport property are subject to the approval of the Engineer, and are the responsibility of the Contractor to manage.

All borrow pits shall be opened up to expose the vertical face of various strata of acceptable material to enable obtaining a uniform product. Borrow pits shall be excavated to regular lines to permit accurate measurements, and they shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Unless otherwise shown on Plan, after excavation of the borrow site, regrade to proposed contours as shown on Plans and ensure proper drainage at a minimum of 0.5% slope with no abrupt changes in grade. Side slopes of borrow pit shall be 5:1 or flatter. All unsuitable material shall be disposed off airport property by the Contractor.

Contractor shall provide air dust, water, and soils erosion control at all times. Dispose of materials from clearing and grubbing as required per Section 02151 Clearing and Grubbing, and strip top soil material from borrow area.

3.4 TRENCH EXCAVATION.

Unless otherwise shown on the plans, typical sections or the referenced specifications, provide vertical trench and shoring as required per geotechnical report. The soil type may require temporary shoring or sloping for excavation of greater than 3-ft depth.

The Contractor shall do all temporary bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring and their removal after completion of the work shall be included in the unit price/lump sum of the associated Bid Item. Bracing / shoring shall be designed and signed / sealed by a registered engineer.

Unless otherwise specified, excavated materials that are deemed by the Engineer to be unsuitable for use in backfill or embankments shall be removed and disposed of off-site.

3.5 STOCKPILE MANAGEMENT

The Contractor is responsible for managing on soils stockpiles of material to be temporarily stored at designated locations with advance coordination with the RPR as shown on Plan. The work included in forming stockpiles shall include the delivery, operation, and retrieval of heavy equipment necessary to perform the Work. Stockpile forming shall include installation of all required BMP's, laydown and stockpile covers and pushing up soils and rubble material to stockpiles of up to 14 feet high, shall be formed for environmental Decision Unit of a maximum of 400 cubic yards per stockpile, or as directed by the RPR. Stockpiles and the general stockpile area shall be graded to drain without ponding to prevent the accumulation of water, as directed and to the satisfaction of the Engineer.

If Additive Alternate "A" or "B" is not awarded, Contractor shall be responsible to maintain the stockpile and all required BMP's for 4 months after issuance of Substantial Completion.

3.6 TESTING AND DISPOSAL OF SOIL MATERIAL TO OFFSITE FACILITIES

HDOTA will perform the testing and provide the results in a Site-specific Construction-Environmental Hazard Management Plan (C-EHMP) prescribing the requirements for disposal of any rubble or soils to be disposed off the airport in accordance with all local, State and Federal Laws, and specification section 01562 Management of Contaminated Media, Soil Disposal, and Soil Reuse.

Based on the test results, the Contractor shall be responsible to dispose of the material at an appropriate facility including but not limited to a Hawaii DOH or EPA regulated facility as non-hazardous waste, or as hazardous waste at an approved EPA regulated

facility, or at other facility as deemed necessary. The Contractor shall be responsible for additional handling of the material, trucking, and fees associated for proper disposal to the appropriate facility.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-152, paragraph 152-3.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-152, paragraph 152-4.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-152, Excavation, Subgrade, and Embankment

END OF SECTION 02152

ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

DESCRIPTION

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

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

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature which is not otherwise classified and paid for elsewhere.

Borrow excavation. Borrow excavation shall consist of approved material required for the construction of embankments or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from areas designated by the Resident Project Representative (RPR) within the limits of the airport property but outside the normal limits of necessary grading, or from areas outside the airport boundaries.

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

CONSTRUCTION METHODS

152-2.1 General. Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed in accordance with Item P-151.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the RPR.

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

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if

necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

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

Digital terrain model (DTM) files of the existing surfaces, finished surfaces and other various surfaces were used to develop the design plans.

Volumetric quantities were calculated by comparing DTM files of the applicable design surfaces and generating Triangle Volume Reports. Electronic copies of DTM files and a paper copy of the original topographic map will be issued to the successful bidder.

Existing grades on the design cross sections or DTM's, where they do not match the locations of actual spot elevations shown on the topographic map, were developed by computer interpolation from those spot elevations. Prior to disturbing original grade, Contractor shall verify the accuracy of the existing ground surface by verifying spot elevations at the same locations where original field survey data was obtained as indicated on the topographic map. Contractor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the DTM's. Contractor's verification of original ground surface, however, shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Contractor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 foot (30 mm) of the stated elevations for ground surfaces, or within 0.04 foot (12 mm) for hard surfaces (pavements, buildings, foundations, structures, etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Contractor's verification identifies discrepancies in the topographic map, Contractor shall notify the RPR in writing at least two weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the design cross sections or DTM's. Disturbance of existing grade in any area shall constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

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

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

When 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 (300 mm) below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed of at locations shown on the plans or as directed by RPR. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as unclassified excavation.

c. Over-break. Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the 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 (60 cm) 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 within the airport property are indicated on the plans. Borrow excavation shall be made only at these designated locations and within the horizontal and vertical limits as staked or as directed by the RPR. All unsuitable material shall be disposed of by the Contractor as shown on the plans. All borrow pits shall be opened to expose the various strata of acceptable material to allow obtaining a uniform product. Borrow areas shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Borrow areas shall not create a hazardous wildlife attractant.

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, unless otherwise noted in the project geotechnical report or on plans typical sections , the top 12 inches of subgrade shall be compacted to not less than 95% of maximum density for non-cohesive soils, and 90% of maximum density for cohesive soils as determined by ASTM D1557. As used in this

specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

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

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

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

152-2.7 Control Strip. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

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

152-2.8 Formation of embankments. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches (150 mm) nor more than 12 inches (300 mm) of compacted thickness.

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

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

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

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

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

The 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 D1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the contractor for every 3,000 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 90% of maximum density for cohesive soils as determined by ASTM D1557. Unless otherwise noted in the project geotechnical report or on the plans typical pavement sections, 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 95 percent of the maximum density as determined by ASTM D1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches which shall be prepared for a topsoil and sprigging in accordance with FAA specification Item T-905 and T-903.

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. The Contractor’s laboratory shall perform all density tests in the RPR’s presence and provide the test results upon completion to the RPR for acceptance. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

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

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

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the RPR.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in

lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

152-2.9 Proof rolling. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. 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 150 psi or a 15 ton Proof Roller with tires spaced not more than 32 inches (0.8 m) on-center with tires inflated to 125psi in the presence of the RPR. Apply a minimum of two 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. The subgrade under areas to be paved shall be compacted to a depth and densities as shown on the plans. When no density is shown, the subgrade shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum dry density as determined by ASTM D1557, and the subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 6 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, ASTM D1557, or procedures in AASHTO T180 Annex for correction of maximum dry density and optimum moisture for oversized particles. Tests for moisture content and compaction will be taken at a minimum of 1,000 S.Y. of subgrade. All quality assurance testing shall be done by the RPR.

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 lump sum price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

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

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

152-2.13 Surface Tolerances. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor’s expense.

- **a. Smoothness.** The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.
- **b. Grade.** The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/-0.05 feet (15 mm) of the specified grade.

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

152-2.14 Topsoil. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Item T-905. Topsoil shall be paid for as provided in Item T-905. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

152-4.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

For ALLOWANCE items in the Proposal Schedule, the allowance is an estimate and the amount shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the DOTA Engineer. The Contractor shall be allowed to include overhead, profit, insurance and/or other mark-ups, as stipulated in Section 9.5 of the 2016 General Provisions for Construction Projects, Air and Water Transportation Facilities Divisions.

In the event that a Bid Item is not used during construction, the Contractor is not eligible to receive any payment under the Bid item.

Payment will be made under Base Bid:

Item No.	Description	Unit
02152.1	Unclassified Excavation and Embankment	Lump Sum
02152.2	Unclassified Excavation and Stockpile at Airport	Lump Sum
02152.3	Unclassified Over-Excavation and Stockpile at Airport	Allowance
02152.4	8” Deep Subgrade Preparation	Lump Sum

Payment will be made under Additive Alternate A:

Item No.	Description	Unit
02152.A1	Transport and Dispose Excavated Stockpiled Soils As Solid Waste at DOH or EPA Permitted Disposal Landfill	Lump Sum
02152.A2	Transport and Dispose Over-Excavated Stockpiled Soils As Solid Waste at DOH or EPA Permitted	

	Disposal Landfill	Allowance

Payment will be made under Additive Alternate B:

Item No.	Description	Unit
02152.B1	Transport and Dispose Excavated Stockpiled Soils As Hazardous Waste at An EPA Regulated Facility	Lump Sum
02152.B2	Transport and Dispose Over-Excavated Stockpiled Soils As Hazardous Waste at An EPA Regulated Facility	Allowance

Payment will be made under Additive Alternate C:

Item No.	Description	Unit
02152.C1	Unclassified Excavation and Stockpile at Airport	Lump Sum
02152.C2	Unclassified Over-Excavation and Stockpile at Airport	Allowance
02152.C3	8” Deep Subgrade Preparation	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.

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

END OF SECTION 02152

SECTION 02209 - CRUSHED AGGREGATE BASE COURSE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-209 – Crushed Aggregate Base Course, as included as an attachment to this Section.

1.2 SUMMARY

This Section includes the requirements for furnishing and placing Crushed Aggregate Base Course as shown on the Plans.

1.3 REFERENCES

A. FAA Specification Item P-209 – Crushed Aggregate Base Course as modified herein.

B. Section 02152, Excavation, Subgrade, and Embankment

1.4 SUBMITTALS

Prior to commencing the Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Certified test reports for aggregates.

B. Samples of aggregates.

C. Quality control plan and testing procedures in accordance herein Item P-209.

PART 2 – PRODUCTS

2.1 AGGREGATES

A. Aggregates shall conform to:

FAA Specification Item P-209, Crushed Aggregate Base Course.

PART 3 – EXECUTION

A. Prior to placing crushed aggregate base, the Contractor shall compact the subgrade as required per Items P-152.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-209, paragraph 209-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-209, paragraph 209-5.1.

PART 5 – ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-209, Crushed Aggregate Base Course

END OF SECTION 02209

ITEM P-209 CRUSHED AGGREGATE BASE COURSE

DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregate base constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross-sections shown on the plans.

MATERIALS

209-2.1 Crushed aggregate base. Crushed aggregate shall consist of clean, sound, durable particles of crushed stone, crushed gravel, and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone or gravel that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

Crushed Aggregate Base Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 98% with at least one fractured face[1]	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles [2]	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

209-2.2 Gradation requirements. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

Gradation of Aggregate Base

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances[1] (Percent)
2 inch (50 mm)	100		0
1-1/2 inch (37.5 mm)	95-100		±5
1 inch (25.0 mm)	70-95		±8
3/4 inch (19.0 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40[2] (425 µm)	10-30		±5
No. 200[2] (75 µm)	0-10		±3

[1] The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

[2] The fraction of material passing the No 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 µm) sieve.

209-2.3 Sampling and Testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. Gradation requirements. The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

209-2.4 Separation Geotextile. Not used.

CONSTRUCTION METHODS

209-3.1 Control strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

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

209-3.2 Preparing underlying subgrade and/or subbase. The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

209-3.3 Production. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 209-3.5, the approved material may be transported directly to the placement.

209-3.4 Placement. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

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

209-3.5 Compaction. Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM

D1557. The moisture content of the material during placing operations shall be within ±2 percentage points of the optimum moisture content as determined by ASTM D1557. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

209-3.6 Weather limitations. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

209-3.7 Maintenance. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

209-3.8 Surface tolerances. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

209-3.9 Acceptance sampling and testing. Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1,200 square yards. Sampling locations will be determined on a random basis per ASTM D3665

a. Density. The RPR shall perform all density tests**.**

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D1557. The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be

blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

In lieu of depth tests, the Contractor may elect to survey the material, before and after placement of the base, and provide CSV file for review by the RPR. In order to employ this method, contractor shall hire the services of a licensed surveyor to survey prior to placement and after placement. Survey interval shall be no greater than a 25' x 25' and shall capture all grade breaks. CSV files shall be provided for review by the RPR. At the RPR's discretion, supplemental survey and or the use of the aforementioned depth tests may be required.

The Contractor shall remove all survey and grade hubs from the base courses prior to placing any asphalt mix pavements.

METHOD OF MEASUREMENT

209-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

209-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

For ALLOWANCE items in the Proposal Schedule, the allowance is an estimate and the amount shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the DOTA Engineer. The Contractor shall be allowed to include overhead, profit, insurance and/or other mark-ups, as stipulated in Section 9.5 of the 2016 General Provisions for Construction Projects, Air and Water Transportation Facilities Divisions.

In the event that a Bid Item is not used during construction, the Contractor is not eligible to receive any payment under the Bid item.

Payment will be made under Base Bid:

Item No.	Description	Unit
02209.1	Crushed Aggregate Base Course, 8" Thick	Lump Sum
02209.2	Crushed Aggregate Base Course, 8" Thick For Backfill of Over-Excavation Including Geogrid	Allowance

Payment will be made under Additive Alternate C:

Item No.	Description	Unit
02209.C1	Crushed Aggregate Base Course, 8" Thick	Lump Sum
02209.C2	Crushed Aggregate Base Course, 8" Thick For Backfill of Over-Excavation Including Geogrid	Allowance

REFERENCES

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

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity

ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis

American Association of State Highway and Transportation Officials (AASHTO)

M288	Standard Specification for Geosynthetic Specification for Highway Applications

END OF ITEM P-209

END OF SECTION 02209

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SECTION 02403 - ASPHALT MIX PAVEMENT, SURFACE COURSE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-403 – Asphalt Mix Pavements, Base and Surface Course, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction of Asphalt Mix Pavement Base and Surface Course of shoulders as shown on the Plans.

1.3 REFERENCES:

A. The Asphalt Institute, Manual Series No. 2 (MS-2), Mix Design Methods for Asphalt Concrete

B. FAA Specification Item P-403 – Asphalt Mix Pavement, Surface Course as modified herein.

C. Section 02101, Preparation/Removal of Existing Pavements.

D. Section 02403, Asphalt Mix Pavement, Surface Course.

E. Section 02602, Emulsified Asphalt Prime Coat.

F. Section 02603, Emulsified Asphalt Tack Coat.

1.4 SUBMITTALS

Prior to commencing the Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Job Mix Formula and Test Results: Asphalt Mix Pavement Surface job mix formula in conformance with FAA Specification Item P-403, with test reports of the parameters listed in P-403-3.3.

B. Asphalt Mix Quality Control (ACQC) Project Plan: The ACQC Project Plan shall include all testing procedures to be used for quality control and shall conform to FAA Specification Item P-403.

C. Asphalt Mix Paving Plan.

D. Asphalt Mix product information, including test reports and, if requested by the Engineer, tack coat samples of aggregates and bituminous materials.

E. Tack coat product information, including test reports and, if requested by the Engineer, tack coat samples.

F. Emulsified asphalt seal coat product information, including test reports and, if requested by the Engineer, seal coat samples.

G. During the Work of this Section, periodic Asphalt Mix field test results to the Engineer for review. These results shall include the results of retests for items that failed initial testing.

H. Quality Control Testing Laboratory Accreditation Certification, including testing personnel qualifications and lab manager certification.

I. Asphalt Crack Sealant:

1. Product information, manufacturer's specification, test reports and certificate of compliance for each type of joint sealant material and back-up material.

2. A certified copy of the manufacturer's instructions shall be furnished prior to commencement of this Work.

3. List and description of the equipment to be used and a statement from the manufacturer of the joint sealant that the proposed equipment is acceptable for installing the specified sealant. All other equipment will be approved by the Engineer prior to use on the project.

1.5 QUALITY CONTROL

The RPR will perform Quality Assurance (QA) testing for acceptance, measurement, and payment of the Work. The Contractor is responsible for hiring an approved, independent testing firm to perform standard asphalt concrete pavement testing Quality Control (QC) testing. All testing and inspection shall conform to FAA Specification Item P-403.

PART 2 – PRODUCTS

2.1 ASPHALT MIX PAVEMENT BASE AND SURFACE COURSE

Asphalt Mix Pavement Surface Course shall conform to FAA Specification Item P-403, and as modified herein.

PART 3 – EXECUTION

3.1 ASPHALT MIX PLACEMENT BASE AND SURFACE COURSE

The Contractor shall prepare, spread, and compact the surface course for asphalt mix in accordance with FAA Specification Item P-403, and as modified herein.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-403, paragraph 403-7.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-403, paragraph 403-8.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-403, Asphalt Mix Pavement, Surface Course

END OF SECTION 02403

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ITEM P-403 ASPHALT MIX PAVEMENT, SURFACE COURSE

DESCRIPTION

403-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

MATERIALS

403-2.1 Aggregate. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) sieve.

a. Coarse aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.

b. Clay ironstone, claystone, mudstone, and siltstone shall not exceed 0.2% when tested per (ASTM C 295). Clay ironstone is defined as an impure variety of iron carbonate, iron oxide, hydrous iron oxide, or combinations thereof, commonly mixed with clay, silt, or sand.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum for surface, asphalt binder, and leveling course Loss: 50% maximum for base course	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0 % maximum	ASTM C142
Percentage of Fractured Particles	Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face[1]	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles with a value of 5:1 [2]	ASTM D4791

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

b. Fine aggregate. Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0 % maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0 to 15% maximum by weight of total aggregate	ASTM D1073

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate, and ASTM C183 shall be used in sampling mineral filler.

403-2.2 Mineral filler. Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

Mineral filler Requirements

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

403-2.3 Asphalt binder. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 76-22PM.

403-2.4 Anti-stripping agent. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

COMPOSITION

403-3.1 Composition of mixture. The asphalt plant mix shall be composed of a mixture of well-graded aggregate, filler and anti-strip agent if required, and asphalt binder. The several aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

403-3.2 Job mix formula (JMF) laboratory. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF, and listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the RPR prior to start of construction.

403-3.3 Job mix formula (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the RPR for review and accepted in writing. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.

The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 403-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. Samples shall be prepared and compacted using a Marshall compactor in accordance with ASTM D6926. When high absorption aggregates (more than 2%) are used in the mix, the samples must be oven conditioned to 4 hours in accordance with Asphalt Institute MS-2 Mix Design Manual Pages 37 and 38

Should a change in sources of materials be made, a new JMF must be submitted to the RPR for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the RPR and a new or modified JMF is required for whatever reason, the

subsequent cost of the new or modified JMF, including a new control strip when required by the RPR, will be borne by the Contractor.

The RPR may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The submitted JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 403-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 403-2.4.
- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 403-2.1 and 403-2.2.
- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the JMF.
- Specific Gravity and absorption of each course and fine aggregate.
- Percent natural sand.
- Percent fractured faces.
- Percent by weight of flat particles**,** elongated particles, and flat and elongated particles (and criteria).
- Percent of asphalt.
- Number of blows or gyrations.
- Laboratory mixing and compaction temperatures.
- Supplier recommended mixing and compaction temperatures.
- Plot of the combined gradation on the 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Asphalt Film Thickness.

- Dust to Asphalt Ratio.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.
- Percentage and properties (asphalt content, asphalt binder properties, and aggregate properties) of reclaimed asphalt pavement (RAP) in accordance with paragraph 403-3.4, Reclaimed Hot-Mix Asphalt, if RAP is used**.**
- Fine Aggregate Angularity

Table 1. Asphalt Design Criteria

Test Property	Value	Test Method
Number of blows/gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
TSR[1]	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA)[2,3]	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature
Asphalt Film Thickness[4]	9 microns	

[1] Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

[2] AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

[3] Where APA not available, use Hamburg wheel test (AASHTO T 324) 10 mm@ 20,000 passes at 50°C.

[4] The film thickness shall be calculated at each asphalt content evaluated for mix design. The value shall be derived using the asphalt content and the surface area of aggregate using computational methods described in the National Center for Asphalt Technology (NCAT) Report 98-1, "A Critical Review of VMA Requirements in Superpave", except that the effective asphalt content shall be used in the computation.

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply, be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve
1 inch (25.0 mm)	--
3/4 inch (19.0 mm)	100
1/2 inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 µm)	18-38
No. 50 (300 µm)	11-27
No. 100 (150 µm)	6-18
No. 200 (75 µm)	3-6
Voids in Mineral Aggregate (VMA)[1]	15
Asphalt Percent:	
Stone or gravel	5.0-7.5
Recommended Minimum Construction Lift Thickness	2 inch

[1]To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

403-3.4 Reclaimed Asphalt Pavement (RAP). Reclaimed asphalt pavement shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt. Recycled asphalt shingles (RAS) shall not be allowed. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP chunk size shall not exceed 1-1/2 inches (38 mm). The reclaimed asphalt mix shall be designed using procedures contained in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D2172 using the appropriate dust correction procedure. The JMF shall meet the requirements of paragraph 403-3.3. RAP should only be used for shoulder surface course mixes and for any intermediate courses. The use of RAP containing Coal Tar shall not be allowed. Coal Tar surface treatments must be removed prior to recycling underlying asphalt material. The amount of RAP shall be limited to 20 percent.

In addition to the requirements of paragraph 403-3.3, the JMF shall indicate the percent of reclaimed asphalt pavement and the percent and grade of new asphalt binder.

For the PG graded asphalt binder selected in paragraph 403-2.3, adjust as follows:

a. For 0-20% RAP, there is no change in virgin asphalt binder content.

403-3.5 Control strip. Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the RPR. The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 403-5.1, has been accepted, in writing, by the RPR.

The control strip will consist of at least 250 tons (227 metric tons) or 1/2 sublot, whichever is greater. The control strip shall be placed in two lanes of the same width and depth to be used in production with a longitudinal cold joint. The cold joint must be cut back in accordance with paragraph 403-4.13 using the same procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F (71°C). The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip shall be evaluated for acceptance as a single lot in accordance with the acceptance criteria in paragraph 403-6.1 and 403-6.2.

The control strip will be considered acceptable by the RPR if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 403-5.5a; and Mat density greater than or equal to 94%, air voids 3.5% +/- 1%, joint density greater than or equal to 92%.

If the control strip is unacceptable, necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made and another control strip shall be placed. Unacceptable control strips shall be removed and an acceptable control strip provided at the Contractor's sole expense.

The control strip will be considered one lot for payment based upon the average of a minimum of 3 samples (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 403-8.1**.**

CONSTRUCTION METHODS

403-4.1 Weather limitations. The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the RPR, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum)	
	Degrees F	Degrees C
3 inches (7.5 cm) or greater	40	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

403-4.2 Asphalt plant. Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items:

a. Inspection of plant. The RPR, or RPR's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

b. Storage bins and surge bins. The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the RPR determines there is an excessive heat loss, segregation or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

403-4.3 Aggregate stockpile management. Aggregate stockpiles shall be constructed in such a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the concrete batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

403-4.4 Hauling equipment. Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the RPR. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

403-4.4.1 Material transfer vehicle (MTV). Material transfer Vehicles shall be required due to the improvement in smoothness and decrease in both physical and thermal segregation. To transfer the material from the hauling equipment to the paver, use a self-propelled, material transfer vehicle with a swing conveyor that can deliver material to the paver without making contact with the paver. The MTV shall be able to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. The Material Transfer Vehicle will have remixing and storage capability to prevent physical and thermal segregation**.**

403-4.5 Asphalt pavers. Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

If the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.11.

The auger screw shall extend to within 10-inches of the end of the screed.

403-4.6 Rollers. The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

403-4.6.1 Density device. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall also supply a qualified technician during all paving operations to calibrate the density gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the RPR upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

403-4.7 Preparation of asphalt binder. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt material to the mixer at a uniform temperature. The temperature of the unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

403-4.8 Preparation of mineral aggregate. The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

403-4.9 Preparation of asphalt mixture. The aggregates and the asphalt binder shall be weighed or metered and introduced into the mixer in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

403-4.10 Application of Prime and Tack Coat. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A prime coat in accordance with Item P-602 shall be applied to aggregate base prior to placing the asphalt mixture**.**

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

403-4.11 Laydown plan, transporting, placing, and finishing. Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width

to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the RPR.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to RPR that every lot of each lift meets the grade tolerances of paragraph 401-6.2e before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the RPR. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 12.5 feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension. The auger screw shall extend to within 10-inches of the end of the screed.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 1 foot (30 cm); however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet (3 m) from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m).On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The RPR may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated asphalt mixture. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the RPR, and if it can be demonstrated in the laboratory, in the presence of the RPR, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the RPR, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet (3 m) long.

403-4.12 Compaction of asphalt mixture. After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any

surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed**.**

403-4.13 Joints. The formation of all joints shall be made in such a manner as to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which are have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. An asphalt tack coat or other product approved by the RPR shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

403-4.14 Saw-cut grooving. Saw-cut grooving is not required.

403-4.15 Diamond grinding. Diamond grinding shall be completed prior to pavement grooving. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with a minimum of 55 to 60 blades per 12 inches (300 mm) of cutting head width; grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that causes ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted.

Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per FAA Item

P-608 or other surface treatment as directed by RPR to all areas that have been subject to grinding.

Grinding and surface treatment shall be at the sole expense of the Contractor.

403-4.16 Nighttime Paving Requirements. The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the RPR prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

CONTRACTOR QUALITY CONTROL (CQC)

403-5.1 General. The Contractor shall develop a CQCP in accordance with FAA Item C-100. No partial payment will be made for materials that are subject to specific QC requirements without an approved CQCP.

403-5.2 Contractor quality control (QC) facilities. The Contractor shall provide or contract for testing facilities in accordance with FAA Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected**.**

403-5.3 Quality Control (QC) testing. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP**.**

a. Asphalt content. A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

b. Gradation. Aggregate gradations shall be determined a minimum of twice per lot from mechanical analysis of extracted aggregate in accordance with ASTM D5444 and ASTM C136, and ASTM C117.

c. Moisture content of aggregate. The moisture content of aggregate used for production shall be determined a minimum of once per lot in accordance with ASTM C566.

d. Moisture content of asphalt. The moisture content of the asphalt shall be determined once per lot in accordance with AASHTO T329 or ASTM D1461.

e. Temperatures. Temperatures shall be checked, at least four times per lot, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

f. In-place density monitoring. The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.

g. Smoothness for Contractor Quality Control.

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot "straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot straightedge approved by the RPR. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using the FAA profile program, ProFAA, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement and between the start and stop of lanes place shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day's production placed. Transverse measurements will be taken perpendicular to the pavement centerline each 50 feet (15 m) or more often as determined by the RPR. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests will be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 403-4.15 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3) Areas that have been ground shall be sealed with a surface treatment in accordance with FAA Item P-608 or other surface treatment as directed by RPR . To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant

areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

h. Grade. Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to the placement of the first lift and then prior to and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet (30 mm) laterally . The documentation will be provided by the Contractor to the RPR within 24 hours.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 403-4.15.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus ½ inch and replacing with new material. Skin patching is not allowed.

403-5.4 Sampling. When directed by the RPR, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

403-5.5 Control charts. The Contractor shall maintain linear control charts both for individual measurements and range (i.e., difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day shall be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the RPR and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the RPR may suspend production or acceptance of the material.

a. Individual measurements. Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the JMF target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

Control Chart Limits for Individual Measurements

Sieve	Action Limit	Suspension Limit
3/4 inch (19.0 mm)	±6%	±9%
1/2 inch (12.5 mm)	±6%	±9%
3/8 inch (9.5 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (300 µm)	±3%	±4.5%
No. 200 (75 µm)	±2%	±3%
Asphalt Content	±0.45%	±0.70%
Minimum VMA	-0.5%	-1.0%

b. Range. Control charts for range shall be established to control process variability for the test parameters and Suspension Limits listed below. The range shall be computed for each lot as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of n = 2. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for n = 3 and by 1.27 for n = 4.

Control Chart Limits Based on Range
(n = 2)

Sieve	Suspension Limit
1/2 inch (12.5 mm)	11%
3/8 inch (9.5 mm)	11%
No. 4 (4.75 mm)	11%
No. 16 (1.18 mm)	9%
No. 50 (300 µm)	6%
No. 200 (75 µm)	3.5%
Asphalt Content	0.8%

c. Corrective action. The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain sets of rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

(1) One point falls outside the Suspension Limit line for individual measurements or range; or

(2) Two points in a row fall outside the Action Limit line for individual measurements.

403-5.6 Quality control (QC) reports. The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with the CQCP described in FAA Item C-100.

MATERIAL ACCEPTANCE

403-6.1. Quality Assurance Acceptance sampling and testing. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the RPR at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

a. Quality Assurance (QA) testing laboratory. The QA testing laboratory performing these acceptance tests will be accredited in accordance with ASTM D3666. The QA laboratory accreditation will be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing will be listed on the lab accreditation.

b. Lot Size. A standard lot will be equal to one day's production divided into approximately equal sublots of between 400 to 600 tons. When only one or two sublots are produced in a day's production, the sublots will be combined with the production lot from the previous or next day.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant.

c. Asphalt air voids. Plant-produced asphalt will be tested for air voids on a sublot basis.

(1) Sampling. Material from each sublot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 60 minutes nor more than 90 minutes to maintain the material at or above the compaction temperature as specified in the JMF.

(2) Testing. Air voids will be determined for each sublot in accordance with ASTM D3203 for a set of three compacted specimens prepared in accordance with ASTM D6926.

d. In-place asphalt mat and joint density. Each sublot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).

(1) Sampling. The Contractor will cut minimum 5 inches (125 mm) diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the RPR.

(2) Bond. Each lift of asphalt shall be bonded to the underlying layer. If cores reveal that the surface is not bonded, additional cores shall be taken as directed by the RPR to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the RPR.

(3) Thickness. Thickness of each lift of surface course will be evaluated by the RPR for compliance to the requirements shown on the plans after any necessary corrections for grade. Measurements of thickness will be made using the cores extracted for each sublot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch (6 mm) less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or sublot shall be corrected by the Contractor at his expense by removing the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the RPR to circumscribe the deficient area.

(4) Mat density. One core shall be taken from each sublot. Core locations will be determined by the RPR in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint. The bulk specific

gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each sublot sample by the TMD for that sublot.

(5) Joint density. One core centered over the longitudinal joint shall be taken for each sublot which contains a longitudinal joint. Core locations will be determined by the RPR in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

403-6.2 Acceptance criteria.

a. General. Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, and grade.

b. Air voids. Acceptance of each lot of plant produced material for air voids will be based upon the average air void from the sublots. If the average air voids of the lot are equal to or greater than 2% and equal to or less than 5%, then the lot will be acceptable. If the average is below 2% or greater than 5%, the lot shall be removed and replaced at the Contractor's expense.

c. Mat density. Acceptance of each lot of plant produced material for mat density will be based on the average of all of the densities taken from the sublots. If the average mat density of the lot so established equals or exceeds 94%, the lot will be acceptable. If the average mat density of the lot is below 94%, the lot shall be removed and replaced at the Contractor's expense.

d. Joint density. Acceptance of each lot of plant produced asphalt for joint density will be based on the average of all of the joint densities taken from the sublots. If the average joint density of the lot so established equals or exceeds 92%, the lot will be acceptable. If the average joint density of the lot is less than 92%, the Contractor shall stop production and evaluate the method of compacting joints. Production may resume once the reason for poor compaction has been determined and appropriate measures have been taken to ensure proper compaction.

e. Grade. The final finished surface of the pavement of the completed project shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline, ± 10 feet of centerline**]**, and edge of runway and taxiway pavements.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the sublot shall not be more than 95%.

403-6.3 Resampling Pavement for Mat Density.

a. General. Resampling of a lot of pavement will only be allowed for mat density and then, only if the Contractor requests same in writing, within 48 hours after receiving the written test results from the RPR. A retest will consist of all the sampling and testing procedures contained in paragraphs 403-6.1. Only one resampling per lot will be permitted.

(1) A redefined mat density will be calculated for the resampled lot. The number of tests used to calculate the redefined mat density will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

b. Payment for resampled lots. The redefined mat density for a resampled lot will be used to evaluate the acceptance of that lot in accordance with paragraph 403-6.2.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded and density determined using the remaining test values.

METHOD OF MEASUREMENT

403-7.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

403-8.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02403.1	Asphalt Mix Pavement, Surface Course, 4" Thick	Lump Sum

Payment will be made under Additive Alternate C:

Item No.	Description	Unit
02403.C1	Asphalt Mix Pavement, Surface Course, 4" Thick	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.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

ASTM C117	Standard Test Method for Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C183	Standard Practice for Sampling and the Amount of Testing of Hydraulic Cement
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Bituminous Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Bituminous Paving Mixtures
ASTM D1074	Standard Test Method for Compressive Strength of Bituminous Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods

ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4125	Standard Test Methods for Asphalt Content of Bituminous mixtures by the Nuclear Method
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5581	Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (6 inch-Diameter Specimen)
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6307	Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)

ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E2133	Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
AASHTO T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

Asphalt Institute (AI)

MS-2	Mix Design Manual, 7th Edition
MS-26	Asphalt Binder Handbook AI State Binder Specification Database

FAA Orders

5300.1	Modifications to Agency Airport Design, Construction, and Equipment Standards

Federal Highway Administration (FHWA)

Long Term Pavement Performance Binder program

Software

FAARFIELD

END OF ITEM P-403

END OF SECTION 02403

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SECTION 16108 - UNDERGROUND POWER CABLE FOR AIRPORTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item L-108 - Underground Power Cable For Airports, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the installation of underground power cables as shown on the Plans.

1.3 REFERENCES

A. FAA Specification Item L-108 – Underground Power Cable For Airports as modified herein.

B. Section 02153, Controlled Low Strength Material.

C. Section 16110, Airport Underground Electrical Duct Banks and Conduits.

D. Section 02610, Concrete for Miscellaneous Structures.

E. American Society for Testing and Materials (ASTM), standards and tests referred to in the attached FAA Specification Items.

F. American Association of State Highway and Transportation Officials (AASHTO) standards and tests referred to in the attached FAA Specification Items.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

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

PART 2 PRODUCTS

2.1 UNDERGOUND POWER CABLES

Underground power cables shall conform to Section 16108 Underground Power Cable for Airports, FAA Item L-108.

PART 3 EXECUTION

3.1 UNDERGROUND POWER CABLES

The Contractor shall install underground power cables in accordance with FAA Specification Item L-108, modified and as shown on the plans.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item L-108, paragraph 108-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item L-108, paragraph 108-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. Item L-108, Underground Power Cable for Airports

END OF SECTION 16108

ITEM L-108 UNDERGROUND POWER CABLE FOR AIRPORTS

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing power cables that are 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, 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,.

EQUIPMENT AND MATERIALS

108-2.1 General.

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

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

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

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

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

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or

replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, *Maintenance Airport Visual Aid Facilities*, paragraph 5.1.3.1, Insulation Resistance Test.

108-2.2 Cable. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type C, 5,000 volts, non-shielded, with ethylene propylene insulation, cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type THWN-2, 75°C for installation in conduit and RHW-2, 75°C for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, THWN-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of THWN-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

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

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

108-2.3 Bare copper wire (counterpoise, bare copper wire ground and ground rods). Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6AWG bare solid copper wire for counterpoise and/or No. 6 AWG insulated stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire. For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

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

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

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

b. The field-attached plug-in splice. Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.

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

d. The taped or heat-shrink splice. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

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

108-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Section 02610, 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 Section 02153, Item P-153, Controlled Low Strength Material.

108-2.8 Cable identification tags. Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

108-2.9 Tape. Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as

manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

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

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

108-2.12 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches 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 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 vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of

sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch in size. The cable circuit identification shall match the circuits noted on the construction plans.

108-3.2 Installation in duct banks or conduits. This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

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

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

Duct banks or conduits shall be installed as a separate item per Section 16110, Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the

Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

108-3.3 Installation of direct-buried cable in trenches. Not Used.

108-3.4 Cable markers for direct-buried cable. Not Used.

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 used for airfield lighting cable home runs and be made by using crimp connectors for jointing conductors. Cast splices shall be made in manholes and handholes. 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 used in base cans and junction cans where connections are made to isolation transformers and at the ALV disconnect cabinet, 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 on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches 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. No heat shrink shall be applied when installed within the ALV disconnect cabinet.

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 on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches 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 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 over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

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

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

108-3.6 Bare counterpoise wire installation for lightning protection and grounding. If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables.

a. Equipotential. The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc – all components - are bonded together and bonded to the vault power system ground loop/electrode.

Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. The counterpoise is centered over the cable/conduit/duct to be protected.

The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:

(1) The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.

(2) The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90 degree angle).

The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.

All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.

All components rise and fall at the same potential; with no potential difference, no damaging arcing and no damaging current flow.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Equipotential Method of lightning protection.

Reference FAA STD-019E, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment, Part 4.1.1.7.

b. Isolation. Not Used.

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

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

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

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

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

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

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

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

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

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

108-3.9 Exothermic bonding. Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

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

a. All slag shall be removed from welds.

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

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

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

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

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

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

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

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

e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than **500** megohms. Verify continuity of all series airfield lighting circuits prior to energization.

f. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms.

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

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

i. That the impedance to ground of each ground rod does not exceed **25** ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

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

There are no approved "repair" procedures for items that have failed testing other than complete replacement.

METHOD OF MEASUREMENT

108-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

108-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Additive Alternate "C":

Item No.	Description	Unit
16108.C1	No.8 AWG, 5 kV, L-824, Type C Cable, Installed in Duct Bank or Conduit	Lump Sum
16108.C2	No. 6 AWG, Insulated, Stranded Equipment Ground, Installed in Duct Bank or Conduit	Lump Sum
16108.C3	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed Above the Duct Bank or Conduit, Including Connections/Terminations	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 150/5340-26	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

END OF SECTION 16108

SECTION 16110 - AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

PART 1 GENERAL

1.1 RELATED SECTIONS:

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item L-110 – Airport Underground Electrical Duct Banks and Conduits, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction underground electrical duct banks and conduits as shown on the Plans.

1.3 REFERENCES:

A. FAA Specification Item L-110 – Airport Underground Electrical Duct Banks and Conduits as modified herein.

B. Section 02152, Excavation Subgrade and Embankment

C. Section 02153, Controlled Low Strength Material

D. American Society for Testing and Materials (ASTM), standards and tests referred to in the attached FAA Specification Items.

E. American Association of State Highway and Transportation Officials (AASHTO) standards and tests referred to in the attached FAA Specification Items.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

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

PART 2 PRODUCTS

2.1 UNDEGROUND ELECTRICAL DUCT BANKS AND CONDUITS

Equipment shall conform to Section 16110 Airport Underground Electrical Duct Banks and Conduits, FAA Item L-110.

PART 3 EXECUTION

3.1 INSTALLATION OF UNDERGROUND DUCT BANKS AND CONDUITS

The Contractor install underground duct banks and conduits in accordance with FAA Specification Item L-110, modified and as shown on the plans.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item L-110, paragraph 110-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item L-110, paragraph 110-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. Item L-110, Airport Underground Electrical Duct Banks and Conduits

ITEM L-110 AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 General.

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

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

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

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

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

110-2.2 Steel conduit. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth."

110-2.3 Plastic conduit. Plastic conduit and fittings-shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I–Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II–Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 Split conduit. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 Conduit spacers. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

110-2.7 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR

approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 Flowable backfill. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Section 02153, Item P-153, Controlled Low Strength Material.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 General. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches 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 per 100 feet. On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches below the subgrade; in other locations, the top of the duct bank or underground conduit shall be be not less than 18 inches 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 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 part of a duct bank, shall be provided with a 200-pound test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as 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.

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

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

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Section 02152, 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 Section 16110, 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 Section 02152, 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 below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet beyond the edges of the pavement or 3 feet beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the 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 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 wide tape, 8 inches minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch wide tape only for single conduit runs. Utilize the 6-inch wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the 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. Not Used.

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 square and 4 - 6 inches thick extending approximately one inch above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (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 high and 3 inches wide with width of stroke 1/2 inch and 1/4 inch deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 Backfilling for conduits. For conduits, 3 inches of concrete shall be placed around the conduits ducts. 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 in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.6 Backfilling for duct banks. After the concrete has cured, the remaining trench shall be backfilled and compacted per Section 02152, Item P-152 “Excavation and Embankment” except that the material used for backfill shall be select material not larger than 4 inches 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 of duct bank or one work period’s construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.7 Restoration. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include all turfing to match existing surrounding areas as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 Ownership of removed cable. Contractor

METHOD OF MEASUREMENT

110-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

110-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

In the event that a Bid Item is not used, the Contractor is not eligible to receive any payment under this Bid item.

Payment will be made under Base Bid:

Item No.	Description	Unit
16115.1	Utility Protection Slab	Lump Sum

Payment will be made under Additive Alternate "C":

Item No.	Description	Unit
16115.C1	2-4" Electrical Ductbank, Concrete Encased	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 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

END OF SECTION 16110

SECTION 16115 - ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item L-115 – Electrical Manholes and Junction Structures, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction of electrical handholes as shown on the Plans.

1.3 REFERENCES:

A. FAA Specification Item L-115 – Electrical Manholes and Junction Structures as modified herein.

B. Section 02153, Controlled Low Strength Material (CLSM)

C. Section 02610, Concrete for Miscellaneous Structures

D. American Society for Testing and Materials (ASTM), standards and tests referred to in the attached FAA Specification Items.

E. American Association of State Highway and Transportation Officials (AASHTO) standards and tests referred to in the attached FAA Specification Items.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Product information for handholes. Provide at minimum the following:

1. For cast-in-place structures – Provide a concrete mix design in accordance with Section 02610, Concrete for Miscellaneous Structures.

2. Products and materials data and shop drawings, including reinforcement, steps, frame and cover.

3. Manufacturer’s calculations for precast concrete structures, signed and sealed by a licensed Engineer.

PART 2 PRODUCTS

2.1 MANHOLES AND JUNCTION STRUCTURES

Handholes shall conform to Section 16115 Electrical Manholes and Junction Structures, FAA Item L-115.

PART 3 EXECUTION

3.1 ADJUSTMENT OF HANDHOLES

The Contractor shall adjust to grade existing underground handholes in accordance with FAA Specification Item L-115, modified and as shown on the plans.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item L-115, paragraph 115-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item L-115, paragraph 115-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. Item L-115, Electrical Manholes and Junction Structures

ITEM L-115 ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (handholes, pull boxes, junction cans, etc.) installed 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 sections with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel,, appurtenances, grounding, testing, dewatering and restoration of surfaces to the satisfaction of the RPR including removal of existing manholes and junction structures as shown on the plans.

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 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 Section 02610, Item P-610, Concrete for Miscellaneous Structures.

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 shall be designed to withstand 32,000 lbs truck wheel load, unless otherwise shown on the plans.

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 boxes. Not Used.

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. Concrete shall be proportioned, placed, and cured per 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 the traffic loading as indicated on Plan.

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.

Each manhole shall be provided with a “DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER” safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

115-2.8 Ladders. Not Used.

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. Not Used.

115-2.13 Plastic conduit. Plastic conduit shall comply with Section 16110, Item L-110, Airport Underground Electrical Duct Banks and Conduits.

115-2.14 Conduit terminators. Not Used.

115-2.15 Pulling-in irons. Not Used

115-2.16 Ground rods. Ground rods shall be one piece, copper or **[** copper clad steel **].** 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 long nor less than 5/8 inch 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 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 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. 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 manholes, handhole and pull boxes. 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.

115-3.5 Installation of ladders. Not Used.

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 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 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.

Existing ground bus shall be bonded to all 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. Not Used.

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 Junction structure elevation adjustments. The Contractor shall adjust the tops of existing junction structures 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 and cover on the junction structure or access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the junction structure 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 replace the top section 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. Not Used

METHOD OF MEASUREMENT

115-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

115-5.2 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Additive Alternate "C:

Item No.	Description	Unit
16115.C1	Remove Existing Electrical Handhole and Conduit, and Pull Back Cables	Lump Sum
16115.C2	Electrical Handhole, H-20 Traffic Rated	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.

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

END OF SECTION 16115

PROPOSAL TO THE

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

PROJECT:	**TAXILANE T1 EXTENSION** **LIHUE AIRPORT** **LIHUE, KAUAI, HAWAII**
STATE PROJECT NO.:	**CK1627-33**
COMPLETION TIME:	All work under this Contract shall be completed within three hundred and sixty-five (365) CALENDAR DAYS from the date indicated in the Notice to Proceed from the State.
LIQUIDATED DAMAGES:	THREE THOUSAND DOLLARS ($3,000) for each and every Calendar Day which the Contractor has delayed the completion of this project.
STATE PROJECT MANAGER:	Maybelle Lee Department of Transportation, Airports 400 Rodgers Boulevard, Suite 700 Honolulu, HI 96819 Email: Maybelle.p.lee@hawaii.gov phone: 808-838-8890
ELECTRONIC SUBMITTAL:	Bidders shall submit and upload the complete Proposal to HIePRO prior to the bid opening date and time. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall refer to SPECIAL PROVISIONS 2.8 PREPARATION AND DELIVERY OF BID for complete details. FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

Director of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

The undersigned Bidder declares the following:

1. It has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal.

2. It has not been assisted or represented on this matter by any individual who has, in a State capacity, been involved in the subject matter of this contract within the past two years.

3. It has not and will not, either directly or indirectly offered or given a gratuity (i.e. an entertainment or gift) to any State or County employee to obtain a contract or favorable treatment under a contract.

The undersigned Bidder further agrees to the following:

1. If this proposal is accepted, it shall execute a contract with the Department to provide all necessary labor, machinery, tools, equipment, apparatus and any other means of construction, to do all the work and to furnish all the materials specified in the contract in the manner and within the time therein prescribed in the contract, and that it shall accept in full payment therefore the sum of the unit and/or lump sum prices as set forth in the attached proposal schedule for the actual quantities of work performed and materials furnished and furnish satisfactory security in accordance with Section 103D-324, Hawaii Revised Statutes, within 10 days after the award of the contract or within such time as the Director of Transportation may allow after the undersigned has received the contract documents for execution, and is fully aware that non-compliance with the aforementioned terms will result in the forfeiture of the full amount of the bid guarantee required under Section 103D-323, Hawaii Revised Statutes.

2. That the quantities given in the attached proposal schedule are approximate only and are intended principally to serve as a guide in determining and comparing the bids.

3. That the Department does not either expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Director of Transportation, and that all increased or decreased quantities of work shall be performed at the unit prices set forth in the attached proposal schedule except as provided for in the specifications.

4. In case of a discrepancy between unit prices and the totals in said Proposal Schedule, the unit prices shall prevail.

5. Agrees to begin work within 10 working days after the date of notification to commence with the work, which date is in the notice to proceed, and shall finish the entire project within the time prescribed.

6. The Director of Transportation reserves the right to reject any or all bids and to waive any defects when in the Director's opinion such rejections or waiver will be for the best interest of the public.

7. The undersigned Bidder further agrees to the following: Pursuant to HAR §3-122-13(e), any contractor (including consultants) paid for services to develop or prepare specifications or work statements shall be precluded from submitting an offer or receiving a contract for that particular solicitation. This includes the preparation of reports relied upon by HDOT in the development of the project scope.

The Bidder acknowledges receipt of and certifies that it has completely examined the following listed items: the Hawaii Department of Transportation, Air and Water Transportation Facilities Division General Provisions for Construction Projects dated 2016, the Notice to Bidders, the Special Provisions, if any, the Technical Provisions, the Proposal, the Contract and Bond Forms, and the Project Plans.

In accordance with Section 103D-323, Hawaii Revised Statutes, this proposal is accompanied with a bid security in the amount of 5% of the total amount bid, in the form checked below. (Check applicable bid security submitted with bid.)

_____ Surety Bid Bond (Use standard form),

_____ Cash,

_____ Cashier's Check,

_____ Certified Check, or

_____ _____.
(Fill in other acceptable security.)

The undersigned Bidder acknowledges receipt of any addendum issued by the Department by recording in the space below the date of receipt.

Addendum No. 1 _____ Addendum No. 3 _____

Addendum No. 2 _____ Addendum No. 4 _____

In accordance with Section 103D-302, Hawaii Revised Statutes, the undersigned as Bidder, has listed the name of each person or firm, who will be engaged by the Bidder on the project as a Subcontractor or Joint Contractor and the nature of work to be done by each. **The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Subcontractor or Joint Contractor.** For each listed firm, the Bidder declares the respective firm is a Subcontractor or Joint Contractor and is subject to evaluation as a Subcontractor or Joint Contractor. It is understood that failure to comply with the aforementioned requirements may be cause for rejection of the bid submitted.

Name of Subcontractor	Nature and Scope of Work
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Name of Joint Contractor	Nature and Scope of Work
1.	
2.	
3.	

NOTES:

"None" or if left blank indicates no Subcontractor or Joint Contractor.

If more space is needed, attach additional sheets.

The undersigned hereby certifies that the bid prices contained in the attached proposal schedule have been carefully checked and are submitted as correct and final.

This declaration is made with the understanding that the undersigned is subject to the penalty of perjury under the laws of the United States and is in violation of the Hawaii Penal Code, Section 710-1063, unsworn falsification to authorities, of the Hawaii Revised Statutes, for knowingly rendering a false declaration.

_____
Bidder (Company Name)

By_____
Authorized Signature

_____
Print Name and Title

_____

_____
Business Address

_____
Business Telephone

_____
Date

_____
Contact Person (If different from above)

Phone:_____ Email:_____

NOTE:

If Bidder is a CORPORATION, the legal name of the corporation shall be set forth above, the corporate seal affixed, together with the signature(s) of the officer(s) authorized to sign contracts for the corporation. Please attach to this page current (not more than six months old) evidence of the authority of the officer(s) to sign for the corporation.

If Bidder is a PARTNERSHIP, the true name of the partnership shall be set forth above, with the signature(s) of the general partner(s). Please attach to this page current (not more than six months old) evidence of the authority of the partner authorized to sign for the partnership.

If Bidder is an INDIVIDUAL, the bidder's signature shall be placed above.

If signature is by an agent, other than an officer of a corporation or a partner of a partnership, a POWER OF ATTORNEY must be on file with the Department before opening bids or submitted with the bid. Otherwise, the Department may reject the bid as irregular and unauthorized.

PREFERENCES

Bidders agree that preferences shall be taken into consideration to determine the low bidder in accordance with said Sections and the rules promulgated, however, the award of contract will be in the amount of the bid offered exclusive of any preferences.

A. HAWAII PRODUCTS PREFERENCE

In accordance with ACT 174, SLH 2022, effective June 27, 2022, Hawaii Products Preference shall not apply to solicitations for public works construction. Therefore, the Hawaii Products Preference shall not apply to this project.

B. APPRENTICESHIP PROGRAMS PREFERENCE

In accordance with ACT 17, SLH 2009 – Apprenticeship Program, a 5% bid adjustment for bidders that are parties to apprenticeship agreements pursuant to Hawaii Revised Statutes (HRS) Section 103-55.6 may be applied to the bidder's price for evaluation purposes.

Any bidder seeking this preference must be a party to an apprenticeship agreement registered with the Department of Labor and Industrial Relations at the time the offer is made for each apprenticeable trade the bidder will employ to construct the public works projects for which the offer is being made.

The bidder is responsible for complying with all submission requirements for registration of its apprenticeship program before requesting the preference.

( ) Yes, I wish to be considered for the Apprenticeship Programs Preference. I have included Certification Form(s) 1 with my bid.

C. RECYCLED PRODUCT PREFERENCE

Recycled product preference shall not apply to this proposal.

TAXILANE T1 EXTENSION
LIHUE AIRPORT
KAUAI, HAWAII
STATE PROJECT NO. CK1627-33

PROPOSAL SCHEDULE – BASE BID

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
01040.1	Unforeseen Conditions	Allowance		Allowance	$ 200,000.00
01040.2	Utility Locating and Potholing	Allowance		Allowance	$ 150,000.00
01561.1	Construction Site Pollution Controls	LS	LS	LS	$
01562.1	Additional Management of Contaminated Medias, Soils Disposal, and Soils Reuse	Allowance		Allowance	$ 200,000.00
01700.1	Mobilization (not to exceed 6% of sum of all items, excluding this item and all allowances)	LS	LS	LS	$
01800.1	Special Requirements for Contractors on the AOA	LS	LS	LS	$
01800.2	Biological Bird Monitoring	Allowance		Allowance	$ 150,000.00
01900.1	Project Survey and Stakeout	LS	LS	LS	$
02101.1	Remove Existing AC Pavements	LS	LS	LS	$
02101.2	Remove Miscellaneous Structures	LS	LS	LS	$
02101.3	Remove Existing Concrete Pad	LS	LS	LS	$
02151.1	Clearing and Grubbing	LS	LS	LS	$
02152.1	Unclassified Excavation and Embankment	LS	LS	LS	$
02152.2	Unclassified Excavation and Stockpile at Airport	LS	LS	LS	$
02152.3	Unclassified Over-Excavation and Stockpile at Airport	Allowance		Allowance	$ 130,000.00
02152.4	8” Deep Subgrade Preparation	LS	LS	LS	$
02209.1	Crushed Aggregate Base Course, 8” Thick	LS	LS	LS	$
02209.2	Crushed Aggregate Base Course, 8” Thick For Backfill of Over-Excavation Including Geogrid	Allowance		Allowance	$ 70,000.00
02403.1	Asphalt Mix Pavement, 4” Thick, Surface Course	LS	LS	LS	$
02605.1	Clean and Fill Existing Cracks, 0.5” to 1.5” Wide	Allowance		Allowance	$ 30,000.00
02620.1	Permanent Pavement Markings and Striping	LS	LS	LS	$
02620.2	Temporary Pavement Markings and Striping	LS	LS	LS	$
02620.3	Remove Pavement Markings and Striping	LS	LS	LS	$
02620.4	Elevated Edge Retro-Reflective Marker	LS	LS	LS	$
02626.1	Emulsified Asphalt Slurry Seal Treatment	LS	LS	LS	$
02701.1	Reinforced Concrete Pipe, 12" Diameter, Class III	LS	LS	LS	$

02701.2	Reinforced Concrete Pipe, 18" Diameter, Class III	LS	LS	LS	$ _____
02751.1	Catch Basin, 2' x 3', H-20 Traffic Rated, Type G1	LS	LS	LS	$ _____
02751.2	Catch Basin, 2' x 3', H-20 Traffic Rated	LS	LS	LS	$ _____
02751.3	Manhole, 4' x 4', H-20 Traffic Rated	LS	LS	LS	$ _____
02751.4	Connect to Existing Storm Drain Structure	LS	LS	LS	$ _____
02751.5	Adjust Water Valve to Grade and Install H-20 Traffic Rated Valve Box	LS	LS	LS	$ _____
02903.1	Sprigging	LS	LS	LS	$ _____
02905.1	Topsoil	LS	LS	LS	$ _____
16110.1	Utility Protection Slab	LS	LS	LS	$ _____

TOTAL AMOUNT (BASE BID) $ _____

PROPOSAL SCHEDULE – ADDITIVE ALTERNATE "A"

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
02152.A1	Transport and Dispose Excavated Stockpiled Soils As Solid Waste at DOH or EPA Permitted Disposal Landfill	LS	LS	LS	$ _____
02152.A2	Transport and Dispose Over-Excavated Stockpiled Soils As Solid Waste at DOH or EPA Permitted Disposal Landfill	Allowance		Allowance	$ 200,000.00

TOTAL AMOUNT (ADDITIVE ALTERNATE "A") $ _____

PROPOSAL SCHEDULE – ADDITIVE ALTERNATE "B"

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
02152.B1	Transport and Dispose Excavated Stockpiled Soils As Hazardous Waste at An EPA Regulated Facility	LS	LS	LS	$ _____
02152.B2	Transport and Dispose Over-Excavated Stockpiled Soils As Hazardous Waste at An EPA Regulated Facility	Allowance		Allowance	$ 400,000.00

TOTAL AMOUNT (ADDITIVE ALTERNATE "B") $ _____

PROPOSAL SCHEDULE – ADDITIVE ALTERNATE "C"

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
02101.C1	Remove Existing AC Pavements	LS	LS	LS	$ _____
02152.C1	Unclassified Excavation and Stockpile at Airport	LS	LS	LS	$ _____
02152.C2	Unclassified Over-Excavation and Stockpile at Airport	Allowance		Allowance	$ 3,000.00
02152.C3	8" Deep Subgrade Preparation	LS	LS	LS	$ _____
02209.C1	Crushed Aggregate Base Course, 8" Thick	LS	LS	LS	$ _____
02209.C2	Crushed Aggregate Base Course, 8" Thick For Backfill of Over-Excavation Including Geogrid	Allowance		Allowance	$ 2,000.00
02403.C1	Asphalt Mix Pavement, 4" Thick, Surface Course	LS	LS	LS	$ _____
16108.C1	No.8 AWG, 5 kV, L-824, Type C Cable, Installed in Duct Bank or Conduit	LS	LS	LS	$ _____
16108.C2	No. 6 AWG, Insulated, Stranded Equipment Ground, Installed in Duct Bank or Conduit	LS	LS	LS	$ _____
16108.C3	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed Above the Duct Bank or Conduit, Including Connections/Terminations	LS	LS	LS	$ _____
16110.C1	2-4" Electrical Ductbank, Concrete Encased	LS	LS	LS	$ _____
16115.C1	Remove Existing Electrical Handhole and Conduit, and Pull Back Cables	LS	LS	LS	$ _____
16115.C2	Electrical Handhole, H-20 Traffic Rated	LS	LS	LS	$ _____

TOTAL AMOUNT (ADDITIVE ALTERNATE "C") $_____

BID SUMMARY PROPOSAL SCHEDULE

TOTAL AMOUNT (BASE BID)	$ _____
TOTAL AMOUNT (ADDITIVE ALTERNATE "A")	$ _____
TOTAL AMOUNT (ADDITIVE ALTERNATE "B")	$ _____
TOTAL AMOUNT (ADDITIVE ALTERNATE "C")	$ _____
TOTAL AMOUNT FOR COMPARSION OF BIDS	$ _____

Notes:
The bid prices herein shall include all labor, materials, equipment, and incidentals necessary to construct all items in place, including installation and testing of equipment, complete and ready for operation, all in accordance with the specifications.

Note 1: Bid shall include all Federal, State, County and other applicable taxes and fees.

Note 2: Bidders shall complete all unit prices and amounts. Failure to do so shall be grounds for rejection of bid.

Note 3: Bidders are required to bid on all items in the BASE BID and all items of the ADDITIVE ALTERNATE "A", ADDITIVE ALTERNATE "B", and ADDITIVE ALTERNATE "C" to be considered responsive.

Note 4: State reserves the right to reject any or all Bids and to waive any defects in said Bids in the best interest of the State.

Note 5: Submission of a Bid is a warranty that the bidder has made an examination of the project site and is fully aware of all conditions to be encountered in performing the work and the requirements of the plans and specifications.

Note 6: The bidder's attention is directed to Section 2.11 – BID SECURITY of the "General Provisions", as amended by the Special Provisions.

Note 7: Bidders shall be paid for actual work performed as directed by the Engineer for allowance items. Bidders will not be paid overhead and profit for unused allowance funds.

Note 8: Evaluating Bids with Additive Alternates:

Bids will be evaluated based on the total price of the BASE BID plus Additive Alternates, in the priority order listed, up to the point that the total bid does not exceed the Project Control Budget.

Priority Order:

1. Base Bid
2. Additive Alternate “A”
3. Additive Alternate “B”
4. Additive Alternate “C”

The evaluation process will proceed as follows:

a. Prior to opening bids, the State will announce the project control budget on HIePRO.

b. Each bidder’s BASE BID will be considered first.

c. Additive Alternates will be added in priority order to the BASE BID, as long as the total bid amount remains within the established Project Control Budget.

d. The bidder with the lowest aggregate amount, within the project control budget, for the BASE BID plus ADDITIVE ALTERNATE(S) in their precedence order, is the lowest responsible bidder.

Note 9: If the TOTAL AMOUNT (BASE BID) exceeds the funds available for the project, then the State reserves the right to negotiate with the lowest, responsive, responsible bidder as permitted under Section 103D-302, Hawaii Revised Statutes (HRS), to further reduce the scope of work and award a contract thereafter.

Note 10: **Bidders shall submit and upload the complete proposal in HIePRO pior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall not include confidential and/or proprietary documents with the proposal. The record of each bidder and respective bid shall be open to public inspection.** Original (wet ink) proposal documents are not required to be submitted. **Contract award shall be based on evaluation of proposals submitted and uploaded to HIePRO.**

FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

If there is a conflict between this specification document and the HIePRO solicitation, the specifications shall govern and control, unless otherwise specified.

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2	G-002	DRAWING INDEX
3	G-003	KEY MAP
4	G-004	ABBREVIATIONS & LEGEND
5	G-005	GENERAL NOTES 1 OF 2
6	G-006	GENERAL NOTES 2 OF 2
7	G-007	SURVEY CONTROL LAYOUT
8	G-008	GENERAL PROJECT DESCRIPTION
9	PH001	CONSTRUCTION SEQUENCING SCHEDULE
10	PH002	CONTRACTOR ACCESS, STAGING AREAS, AND HAUL ROUTES
11	PH101	PHASE 1 (2000 TO 0500)
12	PH102	PHASE 1 (2000 TO 0500) - ENLARGED 1
13	PH103	PHASE 1 (2000 TO 0500) - ENLARGED 2
14	PH104	PHASE 1 (2000 TO 0500) - ENLARGED 3
15	PH105	PHASE 1 (0500 to 2000)
16	PH201	PHASE 2A AND 2B (2000 TO 0500)
17	PH202	PHASE 2A AND 2B (2000 TO 0500) - ENLARGED 1
18	PH203	PHASE 2A AND 2B (2000 TO 0500) - ENLARGED 2
19	PH204	PHASE 2A AND 2B (2000 TO 0500) - ENLARGED 3
20	PH205	PHASE 2A AND 2B (0500 TO 2000)
21	PH301	PHASE 3 (2000 TO 0500)
22	PH302	PHASE 3 (2000 TO 0500) - ENLARGED 1
23	PH303	PHASE 3 (2000 TO 0500) - ENLARGED 2
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48	C-513	WATER DETAILS
49	C-601	HORIZONTAL CONTROL AND PAVEMENT MARKING PLAN 1 OF 3
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54	E-001	ELECTRICAL GENERAL NOTES, ABBREVIATIONS AND SYMBOL LIST
55	E-101	ELECTRICAL PLAN
56	E-101A	ELECTRICAL PLAN ADDITIVE ALTERNATE C ⚠1
57	E-110	ELECTRICAL DETAILS
58	E-110A	ELECTRICAL DETAILS ADDITIVE ALTERNATE C ⚠1

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

Duke Young
04/30/2028
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
HT	MP	KK	DY

NO.	DATE	REVISIONS
⚠1	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

DRAWING INDEX

DATE :
04/13/2026
SHEET :
2 OF 58 SHEETS

DWG. NO.
G-002

C:\USERS\PHAMMONEDRIVE - AECOM\60733880 CS1337-18 KAUAI DISTRICT DESIGN - DOCUMENTS\300-900\900_CAD_GIS\910_CAD\01-GENERAL SHEETS\SHEETS\G-002.DWG

ABBREVIATIONS:

ABBREVIATIONS, THROUGHOUT THE PLANS ARE ABBREVIATIONS WHICH ARE IN COMMON USE. THE LIST OF ABBREVIATIONS PROVIDED IS NOT INTENDED TO BE COMPLETE OR REPRESENTATIVE OF CONDITIONS OR MATERIALS ACTUALLY USED ON THE PROJECT. THE TECHNICAL REPRESENTATIVE WILL DEFINE THE INTENT OF ANY ABBREVIATIONS IN QUESTION.

ACFT	AIRCRAFT
ADG	AIRPLANE DESIGN GROUP
AFLV	AIRFIELD LOW VOLTAGE
AFHV	AIRFIELD HIGH VOLTAGE
AOA	AIRPORT OPERATIONS AREA
AOC	AIRPORT OPERATIONS CONTROL
ARFF	AIRCRAFT RESERVE FIRE FIGHTING
ASR	AIRPORT SURVEILLANCE RADAR
ATBC	ASPHALT TREATED BASE COURSE
ATCT	AIR TRAFFIC CONTROL TOWER
BMP	BEST MANAGEMENT PRACTICES
CB	CATCH BASIN
CLR	CLEAR
CSO	CONTRACTOR SECURITY OFFICER
CSPP	CSPP CONSTRUCTION SAFETY AND PHASING PLAN
CTAF	COMMON TRAFFIC ADVISORY FREQUENCY
(E), EX, EXIST	EXISTING
EL, ELEV	ELEVATION
EP	EDGE OF PAVEMENT
ES	EDGE OF SHOULDER
FAA	FEDERAL AVIATION ADMINISTRATION
FG	FINISHED GRADE
FOD	FOREIGN OBJECT DEBRIS
FT	FEET/FOOT
HDOT-A	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION - AIRPORTS
HH	HANDHOLE
ILS	INSTRUMENT LANDING SYSTEM
IN	INCH
LIH	LIHUE AIRPORT
LT	LEFT
LF	LINEAR FEET
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM/MINUTE
(N)	NEW
NOTAM	NOTICE TO AIRMEN
PAPI	PRECISION APPROACH PATH INDICATORS
RCB	REINFORCED CONCRETE BOX
REIL	RUNWAY END IDENTIFIER LIGHTS
RMP	RADIO MONITORING PERSONNEL
ROFA	RUNWAY OBJECT FREE AREA
RT	RIGHT
RSA	RUNWAY SAFETY AREA
RWY	RUNWAY
SAWS	STAND ALONE WEATHER STATION (BACK UP FOR ASOS)
SF	SQUARE FOOT/FEET
SL	SLOPE
SP	SPECIAL PROVISIONS
SPEC	SPECIFICATIONS
SPHPS	SURFACE PAINTED HOLD POSITION SIGN
STA	STATION
TOFA	TAXIWAY OBJECT FREE AREA
TSA	TAXIWAY SAFETY AREA
TYP	TYPICAL
T/L	TAXILANE
TW, TWY	TAXIWAY
VSR	VEHICLE SERVICE ROAD
WV	WATER VALVE

SYMBOLS:

&	AND
∠	ANGLE
±	APPROXIMATE
@	AT
℄	BOUNDARY LINE
℄	CENTERLINE
°	DEGREE
Ø	DIAMETER
=	EQUALS
℄	FLOW LINE
#	NUMBER
%	PERCENT
℄	PROPERTY LINE

LEGEND

- EXISTING CONTOURS (135)
- EXISTING AOA ROADWAY
- EXISTING AOA PERIMETER FENCE (X X)
- EXISTING MARKINGS
- EXISTING STORM DRAIN LINE (SD)
- CENTERLINE OF EXISTING DITCH/SWALE
- EXISTING SANITARY SEWER LINE (SS)
- EXISTING WATER LINE (W)
- EXISTING STORM INLET
- EXISTING RUNWAY END IDENTIFICATION LIGHTS
- EXISTING ELECTRICAL TRANSFORMER / BREAKER STATION (B)
- EXISTING ELECTRICAL JUNCTION BOX (J)
- EXISTING ELECTRICAL HANDHOLE (H)
- EXISTING TAXIWAY EDGE LIGHTS AND UNDERGROUND CIRCUITRY
- EXISTING AIRFIELD SIGN
- EXISTING ELECTRICAL CONDUIT (E)
- EXISTING FEDERAL AVIATION ADMINISTRATION CONDUIT (FAA)
- LIMIT OF GRADING
- LIMITS OF SURVEY
- FLOWLINE
- EXISTING CONTOURS (110)
- PROPOSED CONTOURS 110
- EXISTING STORM DRAIN LINE (SD)
- PROPOSED STORM DRAIN LINE SD
- RIDGE LINE
- DITCH/SWALE FLOW PATH
- PROPOSED SPOT ELEVATION 100.00
- EXISTING SPOT ELEVATION (100.00)
- BLACK-OUT / OBLITERATE MARKING
- TAXIWAY OBJECT FREE AREA (TOFA)
- EXISTING STORM SEWER LINE (SD)
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER MANHOLE
- COMPOST FILTER SOCK, SEE DETAIL 2/C-010 (CFS)
- DRAINAGE INLET / MANHOLE PROTECTION, SEE DETAIL 1/C-010
- SURFACE FLOW ARROW
- CONTRACTOR STAGING AREA
- REMOVE AC PAVEMENT, FULL DEPTH
- REMOVE CONCRETE PAD, FULL DEPTH
- CLEAR AND GRUB EXISTING VEGETATION
- REMOVE AC PAVEMENT, FULL DEPTH. ADDITIVE ALTERNATE "C" (1)
- BLACK-OUT / OBLITERATE MARKING
- TAXILANE PAVEMENT
- COMPACTED SOIL / TOPSOILS AND SPRIGGING
- SLURRY SEAL COAT
- TAXILANE PAVEMENT, ADDITIVE ALTERNATE "C" (1)

SEE SHEET E1.02 FOR ELECTRICAL LEGENDS

DEMOLITION KEY NOTES:

1. PROTECT IN PLACE
2. REMOVE AC PAVEMENT, FULL DEPTH
3. REMOVE CONCRETE PAD, FULL DEPTH
4. SAW-CUT AC PAVEMENT, FULL DEPTH
5. CLEAR AND GRUB EXISTING VEGETATION
6. IF ADDITIVE ALTERNATE "C" (1) IS AWARDED REFER TO DRAWING E-101 FOR DISPOSITION
7. NOT USED
8. REMOVE BOLLARD AND FOUNDATION
9. BLACK OUT/OBLITERATE EXISTING MARKING, REFER TO PHASING DRAWINGS
10. RELOCATE SURVEY CONTROL MARK, SEE GENERAL DEMOLITION NOTE 8
11. CAP AND LOWER WATER RISER PIPE, REFER TO PAVING PLANS
12. CONTRACTOR SHALL FIELD VERIFY WATER VALVE STATUS PRIOR TO CONSTRUCTION. ADJUST TO GRADE AND REFER TO PAVING PLANS. SEE GENERAL DEMOLITION NOTES 3 AND 11

PAVEMENT MARKING KEY NOTES:

1. TAXILANE CENTERLINE MARKING PER DETAIL 1/C-610
2. TIE-DOWN MARKING PER DETAIL 1/C-611
3. 4" THICK SOLID RED LINE STRIPING MARKING
4. HELICOPTER PARKING MARKING PER DETAIL 5/C-610
5. INTERMEDIATE HOLDING POSITION MARKING PER DETAIL 4/C-610
6. STOP BAR MARKING PER DETAIL 3/C-610
20. TAXILANE EDGE MARKING PER DETAIL 3/C-611
21. TAXILANE SHOULDER MARKING PER DETAIL 4/C-611
25. PAINT TAXILANE GREEN SHOULDER
26. INSTALL ELEVATED EDGE RETROREFLECTOR MARKER PER DETAIL 5/C-611

PAVING KEY NOTES:

7. CONSTRUCT TAXILANE PAVEMENT PER DETAIL 1/C-410
8. ADJUST TO FINISHED GRADE AND CONVERT TO H-20 LOAD RATED WATER VALVE MANHOLE PER DETAIL 1/C-513
9. PLACE AND COMPACT SOILS TO 90% AND 95% GRADE AS SHOWN ON PLAN
10. INSTALL TOPSOILS AND SPRIGGING FOR AREAS AS SHOWN ON PLAN
11. APPLY EMULSIFIED ASPHALT SLURRY SEAL TREATMENT (P-626)
23. ADJUST TO FINISHED GRADE AND CONVERT TO H-20 LOAD RATED WATER VALVE BOX PER DETAIL 2/C-513
24. CAP AND LOWER RISER PIPE BELOW PAVEMENT AND INSTALL H-20 LOAD RATED WATER VALVE BOX PER DETAIL 2/C-513

DRAINAGE KEY NOTES:

12. CONSTRUCT 12" RCP, CLASS III PER DETAIL 2/C-512
13. CONSTRUCT 18" RCP, CLASS III PER DETAIL 2/C-512
14. CONSTRUCT H-20 TRAFFIC RATED CATCH BASIN PER DETAIL 1/C-511, SIZE AS SHOWN
15. CONSTRUCT CATCH BASIN TYPE G1 PER DETAIL 1/C-510, SIZE AS SHOWN
16. CONSTRUCT H-20 TRAFFIC RATED MANHOLE PER DETAIL 2/C-511, SIZE AS SHOWN
17. GRADE DIRT SWALE
18. JOIN PIPE TO EXISTING CATCH BASIN PER DETAIL 1/C-512
19. FOR DISPOSITION, REFER TO DRAWING C-302
22. INSTALL ELECTRICAL HANDOLES, REFER TO DRAWING E-101

SECTION NUMBER — A — ##### — SHEET WHERE SECTION IS SHOWN

SECTION SYMBOL

DETAIL NUMBER — 1 — ##### — SHEET WHERE DETAIL IS SHOWN

DETAIL SYMBOL

FAA SPECIFICATION NUMBER — P-401

SPECIFICATION REFERENCE

MATCHLINE STA: XXX+XX (SEE SHEET CX.XX)

ADJOINING STATION NUMBER — ADJOINING SHEET NUMBER

MATCHLINE DESIGNATION

DETAIL TITLE — TAXILANE PAVEMENT DETAIL — SCALE: N.T.S. — DETAIL NUMBER — 1 — #####

DETAIL TITLE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

Duke Young
04/30/2028
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
HT	MP	KK	DY

NO.	DATE	REVISIONS
1	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

ABBREVIATIONS & LEGEND

DATE :
04/13/2026
SHEET :
4 OF 58 SHEETS

DWG. NO.
G-004

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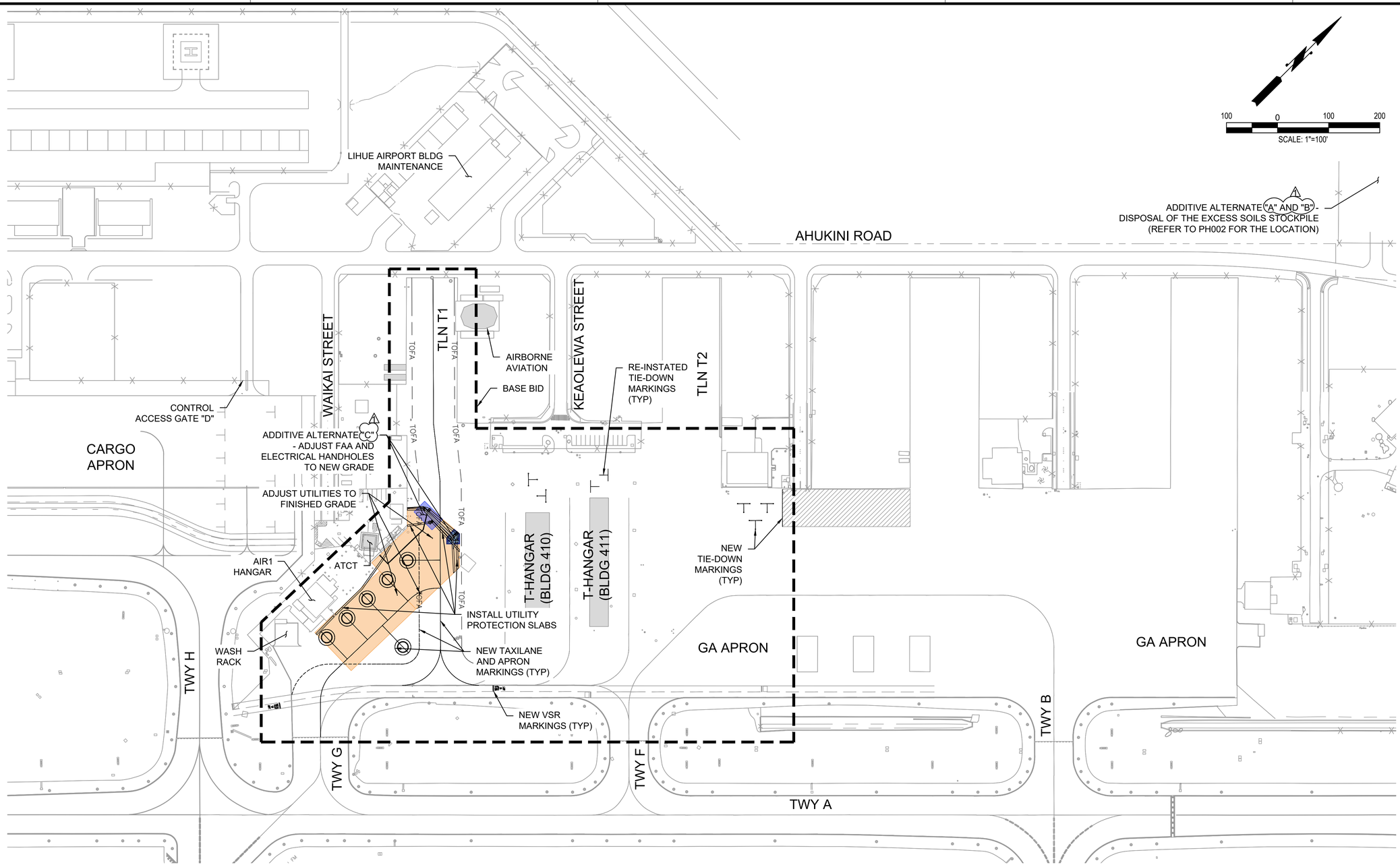

LEGEND

- TOFA — TAXIWAY OBJECT FREE AREA
- PROJECT WORK AREA
- BASE BID
- ADDITIVE ALTERNATE "C"

GENERAL PROJECT DESCRIPTION

1. THIS DRAWING DEPICTS THE GENERAL WORK OF THE PROJECT LIMITS FOR REFERENCE ONLY. THE WORK SHOWN IS NOT INTENDED TO BE, NOR IS ALL INCLUSIVE.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

Duke Young
04/30/2028
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ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

GENERAL PROJECT DESCRIPTION

DATE :	DWG. NO.
04/13/2026	G-008
SHEET :	
8 OF 58 SHEETS	

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PHASING SCHEDULE

	DURATION (CALENDAR DAYS)	W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	W 10	W 11	W 12	W 13	W 14	W 15	W 16	W 17	W 18	W 19	W 20	W 21	W 22	W 23	W 24	W 25	W 26	W 27	W 28	W 29	W 30	W 31	W 32	W 33	W 34	W 35	W 36	W 37	W 38	W 39	W 40	W 41	W 42
PHASE 0: MOBILIZATION	63	■	■	■	■	■	■	■	■	■																																	
PHASE 1	14										■	■																																
PHASE 2A AND 2B (SEE PHASING NOTE 5)	119												■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■														
PHASE 3	7																													■													
PHASE 4 - FINAL STRIPING (SEE PHASING NOTE 4)	63																														■	■	■	■	■	■	■	■	■				

LEGEND

■ NIGHT TIME WORK - 2000 TO 0500 HST, SEVEN (7) CALENDAR DAYS PER WEEK

PHASING NOTES:

1. ALL DURATIONS ARE IN CALENDAR DAYS.
2. PHASE 0 WILL CONSIST OF ADMINISTRATIVE WORK, ON-SITE MOBILIZATION, LOCATING UNDERGROUND UTILITIES AND PERFORMING POTHOLES, INSTALLATION OF STORM WATER PROTECTION MEASURES, SITE INVESTIGATIONS, ELECTRICAL INVESTIGATIONS, UTILITY LOCATING WITHIN THE INFIELD AREAS, PREPARATION OF HAUL ROUTE, AND TOPOGRAPHIC SURVEY OF THE EXISTING PAVEMENTS AND EXISTING STRIPING.
3. PHASE 0: ALL ON-SITE ACTIVITIES THAT AFFECT THE AIRFIELD AND APRON MUST BE PERFORMED DURING NIGHT TIME.
4. COMPLETE PUNCH LIST, AND PERFORM FINAL PAVEMENT MARKINGS AND STRIPING AFTER PAVEMENT CURING OF 30 DAYS.
5. IF BID ADDITIVE ALTERNATE C IS AWARDED, PHASE 2A AND 2B DURATION SHALL BE 154 CALENDAR DAYS.

GENERAL PHASING NOTES:

1. WORK WITHIN THE AOA WILL NOT BE PERMITTED UNTIL THE AIRPORT HAS ISSUED A NOTICE TO PROCEED (NTP), AND PRE-CONSTRUCTION SUBMITTALS HAVE BEEN APPROVED. THE CONTRACTOR SHALL COMPLETE PHASES IN THE GENERAL SEQUENCE AND WITHIN THE TIME ALLOWED FOR EACH PHASE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
2. WORK ASSOCIATED IN ALL PHASES SHALL ONLY BE PERFORMED DURING WORK WINDOWS DENOTED BY THE NUMBER OF WORKING DAYS ON THE TIMELINE. THE CONTRACTOR MUST REQUEST APPROVAL BY THE RPR ENGINEER AT LEAST 72 HOURS BEFORE THE START OF EACH WORK WINDOW.
3. THE CONTRACTOR SHALL NOT MOVE PERSONNEL, VEHICLES, EQUIPMENT OR MATERIAL ONTO THE MOVEMENT AREAS OF THE AOA WITHOUT THE RPR ENGINEER'S PRIOR APPROVAL.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING, DEPLOYING, MAINTAINING, RELOCATING, AND REMOVING THE NECESSARY LOW PROFILE BARRICADES AS SHOWN ON THE PLANS AND AS DIRECTED BY THE RPR ENGINEER.
5. WORK HOURS AND CLOSURE TIMES MAY BE SUBJECT TO CHANGE BASED ON ACTUAL AIRCRAFT OPERATIONS FOR THE LAST SCHEDULED ARRIVAL AND DEPARTURE.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

04/30/2028
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HT	MP	KK	DY

NO.	DATE	REVISIONS
1	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

CONSTRUCTION SEQUENCING SCHEDULE

DATE :
04/13/2026
SHEET :
9 OF 58 SHEETS

DWG. NO.
PH001

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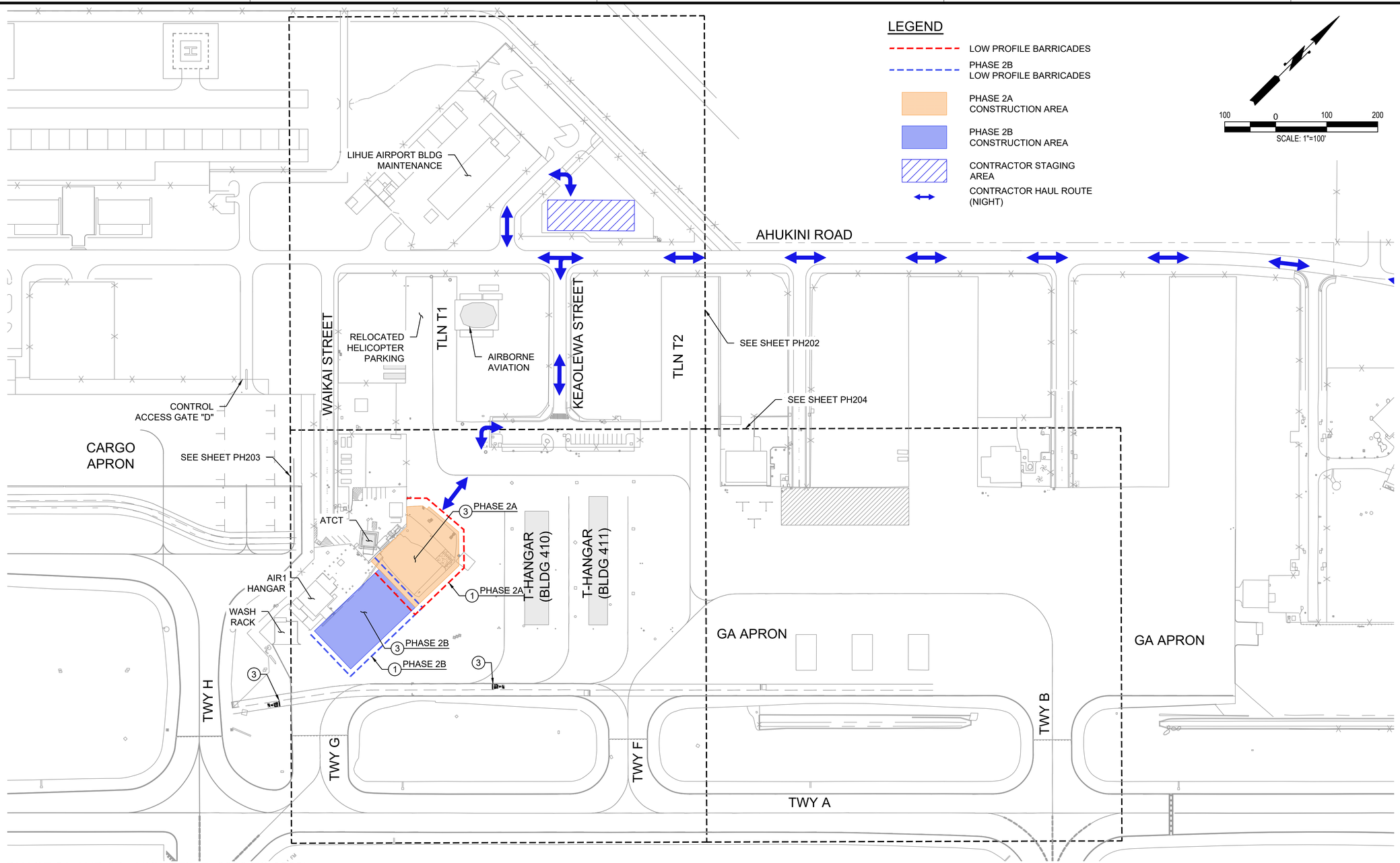

PHASE 2A AND 2B - NIGHTTIME (2000 TO 0500)

DURATION/WORK HOURS:

EIGHTY FIVE (85) WORKING NIGHTS / 2000 TO 0500 HST.

IF BID ADDITIVE ALTERNATE C IS AWARDED, PHASE 2A AND 2B DURATION SHALL BE 154 CALENDAR DAYS. ⚠

PHASE 2A AND PHASE 2B SHALL NOT BE PERFORMED CONCURRENTLY.

UPON COMPLETION OF PHASE 2A, CONTRACTOR SHALL CLEAN THE SITE, REMOVE 2A LOW-PROFILE BARRICADES, AND REOPEN PHASE 2A AREA FOR HELICOPTER PARKING.

NON-STANDARD CONDITIONS:

NONE

CONSTRUCTION WORK PRIORITIES:

1. CONSTRUCT UTILITIES, STORM DRAINS, AND PAVEMENT ⚠ IMPROVEMENTS (REFER TO CIVIL PLANS)
2. IF ADDITIVE ALTERNATE C IS AWARDED, CONSTRUCT NEW AIRFIELD LIGHTING ELECTRICAL HANDHOLES, DUCTBANKS AND PULL AND SPLICE NEW ELECTRICAL CABLES.

ATCT/OPERATION NOTES:

NONE

PHASING CONSTRUCTION NOTES:

(1) INSTALL LOW PROFILE BARRICADES PER DETAIL 1/PH501

(3) REFER TO CIVIL PLANS

AIRFIELD NOTAMS:

1. VSR CLOSED BETWEEN TAXIWAY H AND TAXIWAY F. USE VSR DETOUR.
2. IF ADDITIVE ALTERNATE C IS AWARDED, THE FOLLOWING NOTAMS ⚠ WILL APPLY FOR 2 CALENDAR DAYS FROM 0900 TO 1700:
   - CIRCUIT R1: RWY 17-35 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT R2: RWY 3-21 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T1: TWY B SOUTH OF TWY D & TWY C EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T2: TWY A EAST OF TWY G, TWY B NORTH OF TWY D, TWY D BETWEEN RWY 3 & RWY 17 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T3: TWY A WEST OF TWY F, TWY D NORTH OF RWY 3-21, TWY H, TWY J, TWY K, TWY L & TWY M EDGE LIGHTS OUT OF SERVICE.
   - FAA FACILITIES OUT OF SERVICE INCLUDING THE RWY 35 LOCALIZER, RWY 21 PAPI, AND RWY 21 REILS.
3. IF ADDITIVE ALTERNATE C IS AWARDED, CONTRACTOR SHALL ⚠ COORDINATE WITH FAA FOR ANY ELECTRICAL LINE DISTRIBUTION CABLES SHUTDOWN.

PHASING NOTES:

1. DURING ACTIVE CONSTRUCTION, THE CONTRACTOR SHALL CONTINUOUSLY MONITOR THE WORK AREA TO REMOVE ANY FOD.
2. PRIOR TO THE END OF EACH SHIFT, THE CONTRACTOR SHALL THOROUGHLY FOD SWEEP AND CLEAN THE PAVEMENT SURFACE BEFORE REOPENING THE TAXILANE/APRON.
3. MAINTAIN ACCESS TO AIR1 HANGAR AND WASH RACK.
4. IF ADDITIVE ALTERNATE C IS AWARDED, CONTRACTOR SHALL ⚠ MAINTAIN THE EXISTING AIRFIELD CIRCUITS, AND FIRST CONSTRUCT THE NEW AIRFIELD LIGHTING HANDHOLES AND CONDUITS TO BE READY FOR CUTOVER AND MINIMIZE THE OUTAGE.
5. CONTRACTOR SHALL COORDINATE WITH LIH OPS AND FAA TECH OPS A MINIMUM OF 10 WORKING DAYS IN ADVANCE WHEN ⚠ WORKING NEAR FAA UTILITY LINES AND HANDHOLES.
6. IF ADDITIVE ALTERNATE C IS AWARDED, THE SHUTDOWN OF FAA FACILITIES MUST BE COORDINATE WITH THE FAA A MINIMUM OF 60 CALENDAR DAYS IN ADVANCE.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

Duke Young
04/30/2028
Licensed Expiration Date

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DSGN.	DRWN.	CHKD.	APPD.
HT	MP	KK	DY

NO.	DATE	REVISIONS
⚠	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

PHASE 2A AND 2B
(2000 TO 0500)

DATE : **04/13/2026**
SHEET : 16 OF 58 SHEETS

DWG. NO. **PH201**

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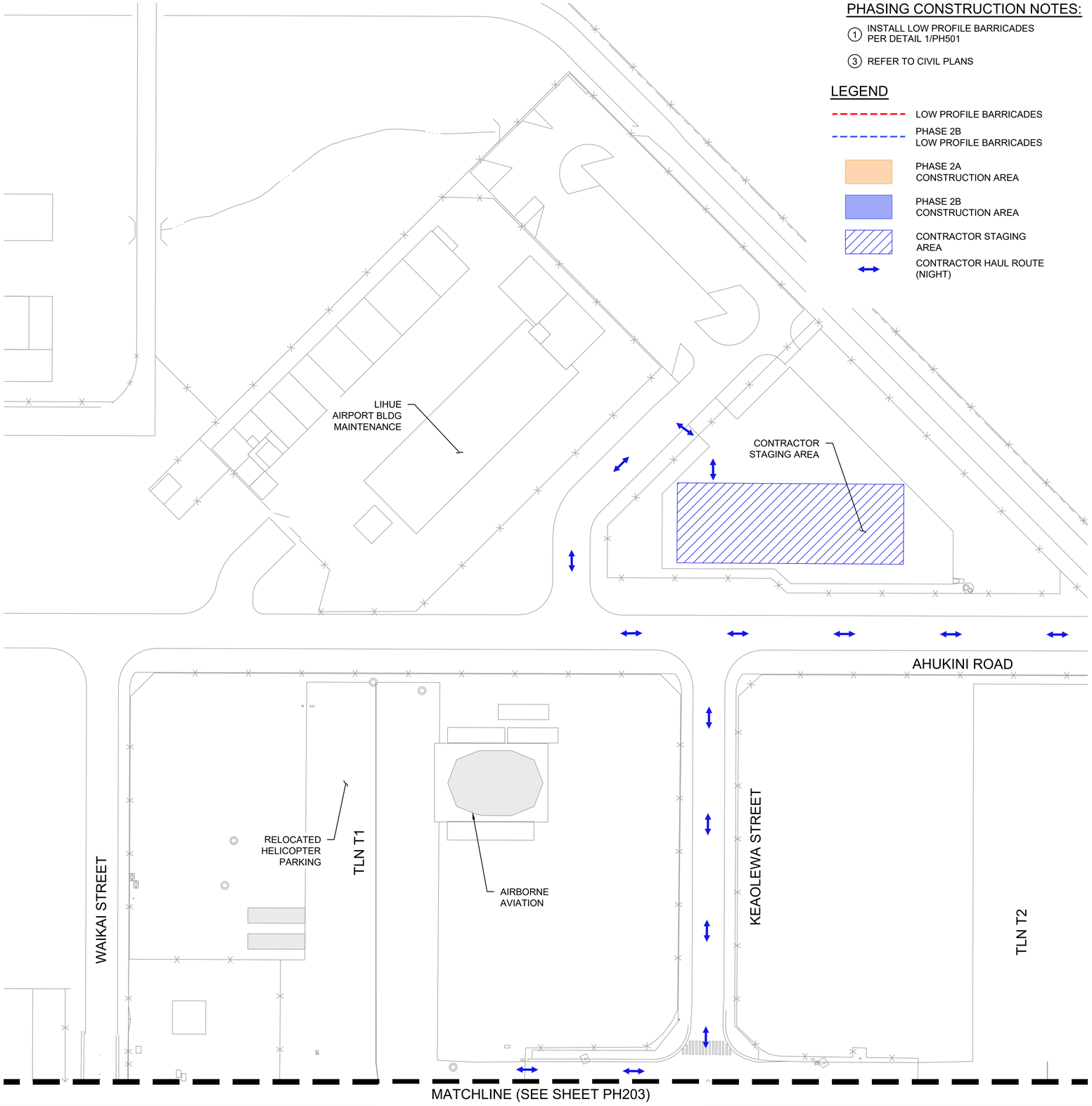

PHASING CONSTRUCTION NOTES:

(1) INSTALL LOW PROFILE BARRICADES PER DETAIL 1/PH501

(3) REFER TO CIVIL PLANS

LEGEND

- LOW PROFILE BARRICADES
- PHASE 2B LOW PROFILE BARRICADES
- PHASE 2A CONSTRUCTION AREA
- PHASE 2B CONSTRUCTION AREA
- CONTRACTOR STAGING AREA
- CONTRACTOR HAUL ROUTE (NIGHT)

PHASE 2A AND 2B - NIGHTTIME (2000 TO 0500)

DURATION/WORK HOURS:

EIGHTY FIVE (85) WORKING NIGHTS / 2000 TO 0500 HST

IF BID ADDITIVE ALTERNATE C IS AWARDED, PHASE 2A AND 2B DURATION SHALL BE 154 CALENDAR DAYS. (1)

PHASE 2A AND PHASE 2B SHALL NOT BE PERFORMED CONCURRENTLY.

UPON COMPLETION OF PHASE 2A, CONTRACTOR SHALL CLEAN THE SITE, REMOVE 2A LOW-PROFILE BARRICADES, AND REOPEN PHASE 2A AREA FOR HELICOPTER PARKING.

CONSTRUCTION WORK PRIORITIES:

1. CONSTRUCT UTILITIES, STORM DRAINS, AND PAVEMENT IMPROVEMENTS (REFER TO CIVIL PLANS).
2. IF ADDITIVE ALTERNATE C IS AWARDED, CONSTRUCT NEW (1) AIRFIELD LIGHTING ELECTRICAL HANDHOLES, DUCTBANKS AND PULL AND SPLICE NEW ELECTRICAL CABLES.

AIRFIELD NOTAMS:

1. VSR CLOSED BETWEEN TAXIWAY H AND TAXIWAY F. USE VSR DETOUR.
2. IF ADDITIVE ALTERNATE C IS AWARDED, THE FOLLOWING NOTAMS WILL (1) APPLY FOR 2 CALENDAR DAYS FROM 0900 TO 1700:
   - CIRCUIT R1: RWY 17-35 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT R2: RWY 3-21 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T1: TWY B SOUTH OF TWY D & TWY C EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T2: TWY A EAST OF TWY G, TWY B NORTH OF TWY D, TWY D BETWEEN RWY 3 & RWY 17 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T3: TWY A WEST OF TWY F, TWY D NORTH OF RWY 3-21, TWY H, TWY J, TWY K, TWY L & TWY M EDGE LIGHTS OUT OF SERVICE.
   - FAA FACILITIES OUT OF SERVICE INCLUDING THE RWY 35 (1) LOCALIZER, RWY 21 PAPI, AND RWY 21 REILS.
3. IF ADDITIVE ALTERNATE C IS AWARDED, CONTRACTOR SHALL COORDINATE WITH FAA FOR ANY ELECTRICAL LINE DISTRIBUTION CABLES SHUTDOWN.

ATCT/OPERATION NOTES:

NONE

NON-STANDARD CONDITIONS:

NONE

PHASING NOTES:

1. DURING ACTIVE CONSTRUCTION, THE CONTRACTOR SHALL CONTINUOUSLY MONITOR THE WORK AREA TO REMOVE ANY FOD.
2. PRIOR TO THE END OF EACH SHIFT, THE CONTRACTOR SHALL THOROUGHLY FOD SWEEP AND CLEAN THE PAVEMENT SURFACE BEFORE REOPENING THE TAXILANE/APRON.
3. MAINTAIN ACCESS TO AIR1 HANGAR AND WASH RACK.
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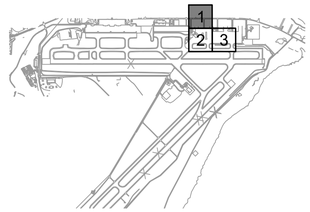
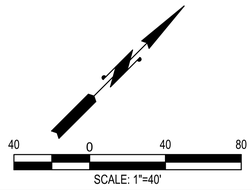
5. CONTRACTOR SHALL COORDINATE WITH LIH OPS AND FAA TECH OPS A MINIMUM OF 10 WORKING DAYS IN ADVANCE WHEN WORKING NEAR (1) FAA UTILITY LINES AND HANDHOLES.
6. IF ADDITIVE ALTERNATE C IS AWARDED, THE SHUTDOWN OF FAA FACILITIES MUST BE COORDINATE WITH THE FAA A MINIMUM OF 60 CALENDAR DAYS IN ADVANCE.





STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

Duke Young
04/30/2028
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
HT	MP	KK	DY

NO.	DATE	REVISIONS
1	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE

APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

PHASE 2A AND 2B
(2000 TO 0500)
- ENLARGED 1

DATE :
04/13/2026
SHEET :
17 OF 58 SHEETS

DWG. NO.
PH202

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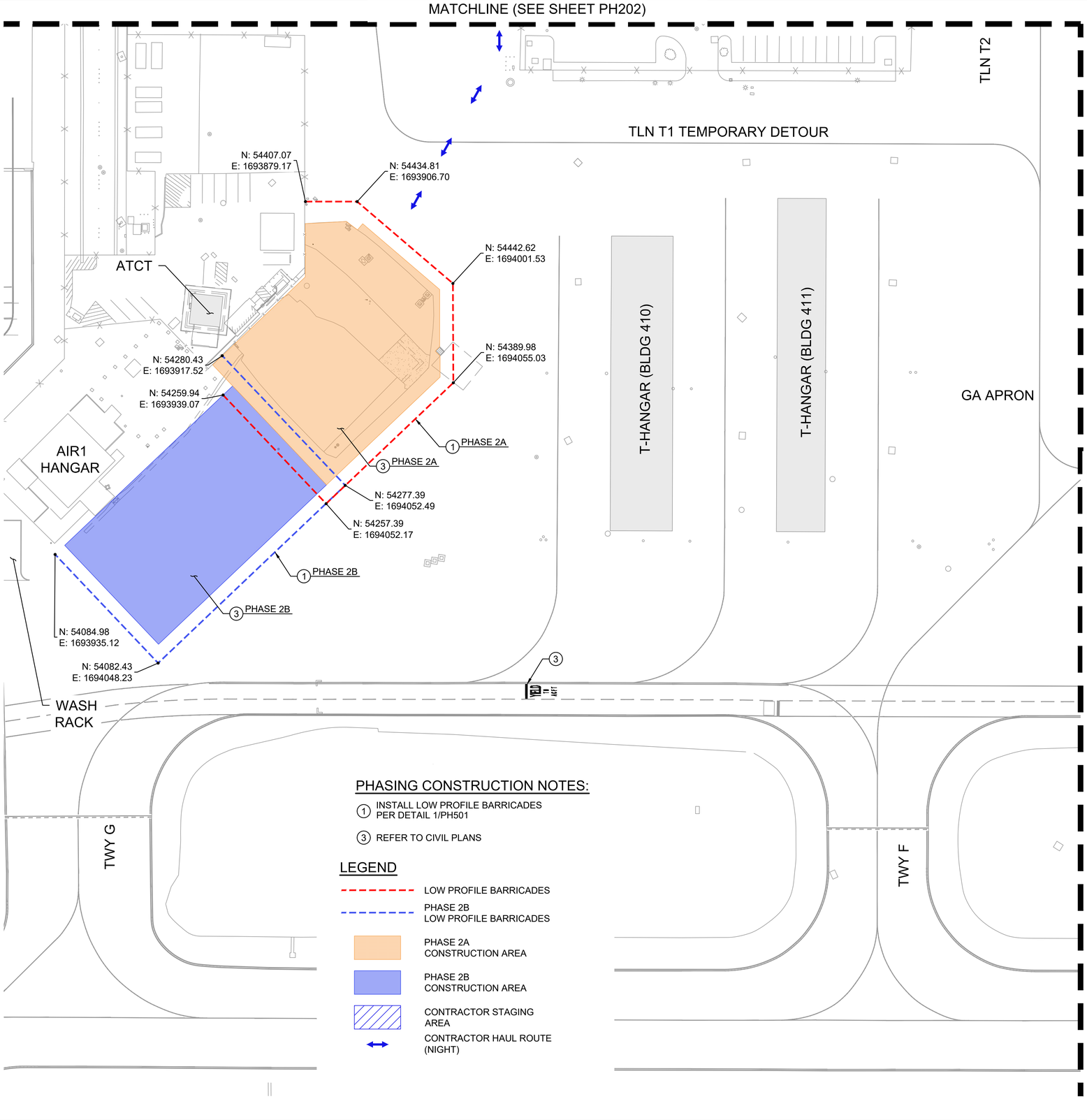

PHASE 2A AND 2B - NIGHTTIME (2000 TO 0500)

DURATION/WORK HOURS:

EIGHTY FIVE (85) WORKING NIGHTS / 2000 TO 0500 HST

IF BID ADDITIVE ALTERNATE C IS AWARDED, PHASE 2A AND 2B DURATION SHALL BE 154 CALENDAR DAYS. ⚠

PHASE 2A AND PHASE 2B SHALL NOT BE PERFORMED CONCURRENTLY.

UPON COMPLETION OF PHASE 2A, CONTRACTOR SHALL CLEAN THE SITE, REMOVE 2A LOW-PROFILE BARRICADES, AND REOPEN PHASE 2A AREA FOR HELICOPTER PARKING.

CONSTRUCTION WORK PRIORITIES:

1. CONSTRUCT UTILITIES, STORM DRAINS, AND PAVEMENT IMPROVEMENTS (REFER TO CIVIL PLANS).
2. IF ADDITIVE ALTERNATE A IS AWARDED, CONSTRUCT NEW AIRFIELD LIGHTING ELECTRICAL HANDHOLES, DUCTBANKS AND PULL AND SPLICE NEW ELECTRICAL CABLES.

AIRFIELD NOTAMS:

1. VSR CLOSED BETWEEN TAXIWAY H AND TAXIWAY F. USE VSR DETOUR.
2. IF ADDITIVE ALTERNATE C IS AWARDED, THE FOLLOWING NOTAMS WILL ⚠ APPLY FOR 2 CALENDAR DAYS FROM 0900 TO 1700:
   - CIRCUIT R1: RWY 17-35 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT R2: RWY 3-21 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T1: TWY B SOUTH OF TWY D & TWY C EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T2: TWY A EAST OF TWY G, TWY B NORTH OF TWY D, TWY D BETWEEN RWY 3 & RWY 17 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T3: TWY A WEST OF TWY F, TWY D NORTH OF RWY 3-21, TWY H, TWY J, TWY K, TWY L & TWY M EDGE LIGHTS OUT OF SERVICE.
   - FAA FACILITIES OUT OF SERVICE INCLUDING THE RWY 35 ⚠ LOCALIZER, RWY 21 PAPI, AND RWY 21 REILS.
3. IF ADDITIVE ALTERNATE C IS AWARDED, CONTRACTOR SHALL COORDINATE WITH FAA FOR ANY ELECTRICAL LINE DISTRIBUTION CABLES SHUTDOWN.

ATCT/OPERATION NOTES:

NONE

NON-STANDARD CONDITIONS:

NONE

PHASING NOTES:

1. DURING ACTIVE CONSTRUCTION, THE CONTRACTOR SHALL CONTINUOUSLY MONITOR THE WORK AREA TO REMOVE ANY FOD.
2. PRIOR TO THE END OF EACH SHIFT, THE CONTRACTOR SHALL THOROUGHLY FOD SWEEP AND CLEAN THE PAVEMENT SURFACE BEFORE REOPENING THE TAXILANE/APRON.
3. MAINTAIN ACCESS TO AIR1 HANGAR AND WASH RACK.
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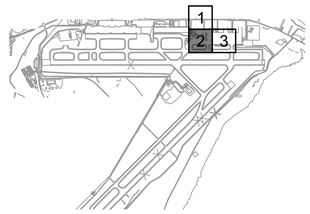
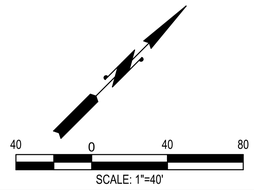
6. IF ADDITIVE ALTERNATE C IS AWARDED, THE SHUTDOWN OF FAA FACILITIES MUST BE COORDINATE WITH THE FAA A MINIMUM OF 60 CALENDAR DAYS IN ADVANCE.





STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

Duke Young
04/30/2028
Licensed Expiration Date

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HT	MP	KK	DY

NO.	DATE	REVISIONS
⚠	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE

APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

PHASE 2A AND 2B
(2000 TO 0500)
- ENLARGED 2

DATE :
04/13/2026
SHEET :
18 OF 58 SHEETS

DWG. NO.
PH203

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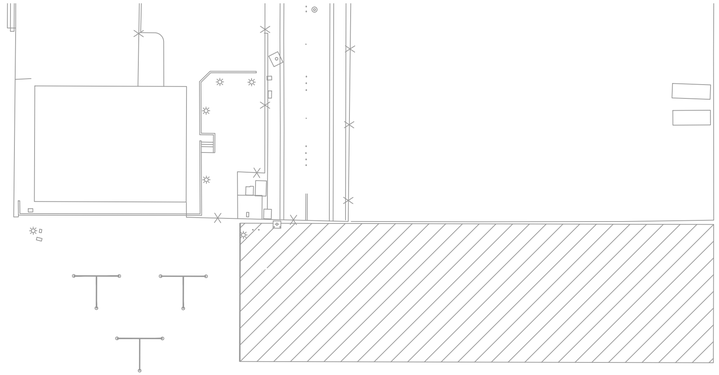
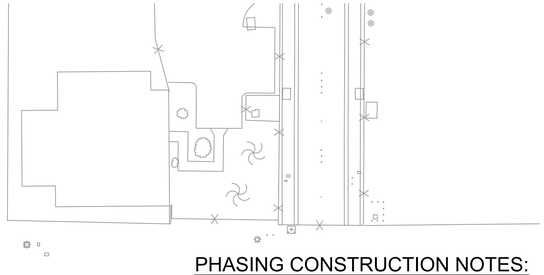




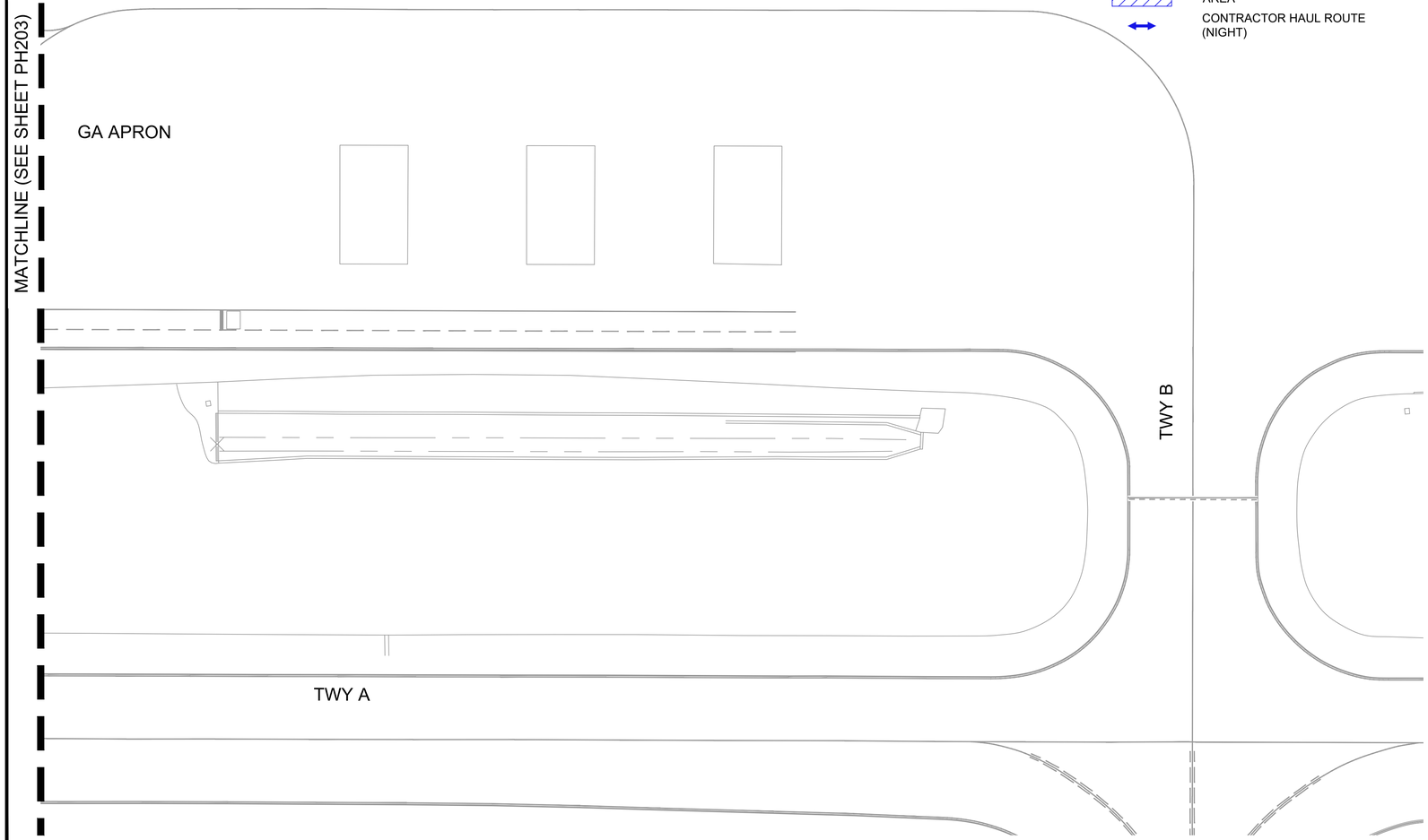
PHASING CONSTRUCTION NOTES:

(1) INSTALL LOW PROFILE BARRICADES PER DETAIL 1/PH501

(3) REFER TO CIVIL PLANS

LEGEND

- LOW PROFILE BARRICADES
- PHASE 2B LOW PROFILE BARRICADES
- PHASE 2A CONSTRUCTION AREA
- PHASE 2B CONSTRUCTION AREA
- CONTRACTOR STAGING AREA
- CONTRACTOR HAUL ROUTE (NIGHT)



PHASE 2A AND 2B - NIGHTTIME (2000 TO 0500)

DURATION/WORK HOURS:

EIGHTY FIVE (85) WORKING NIGHTS / 2000 TO 0500 HST

IF BID ADDITIVE ALTERNATE C IS AWARDED, PHASE 2A AND 2B DURATION SHALL BE 154 CALENDAR DAYS. ⚠1

PHASE 2A AND PHASE 2B SHALL NOT BE PERFORMED CONCURRENTLY.

UPON COMPLETION OF PHASE 2A, CONTRACTOR SHALL CLEAN THE SITE, REMOVE 2A LOW-PROFILE BARRICADES, AND REOPEN PHASE 2A AREA FOR HELICOPTER PARKING.

CONSTRUCTION WORK PRIORITIES:

1. CONSTRUCT UTILITIES, STORM DRAINS, AND PAVEMENT IMPROVEMENTS (REFER TO CIVIL PLANS).
2. IF ADDITIVE ALTERNATE A IS AWARDED, CONSTRUCT NEW AIRFIELD LIGHTING ELECTRICAL HANDHOLES, DUCTBANKS AND PULL AND SPLICE NEW ELECTRICAL CABLES.

AIRFIELD NOTAMS:

1. VSR CLOSED BETWEEN TAXIWAY H AND TAXIWAY F. USE VSR DETOUR.
2. IF ADDITIVE ALTERNATE C IS AWARDED, THE FOLLOWING NOTAMS WILL ⚠1 APPLY FOR 2 CALENDAR DAYS FROM 0900 TO 1700:
   - CIRCUIT R1: RWY 17-35 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT R2: RWY 3-21 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T1: TWY B SOUTH OF TWY D & TWY C EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T2: TWY A EAST OF TWY G, TWY B NORTH OF TWY D, TWY D BETWEEN RWY 3 & RWY 17 EDGE LIGHTS OUT OF SERVICE.
   - CIRCUIT T3: TWY A WEST OF TWY F, TWY D NORTH OF RWY 3-21, TWY H, TWY J, TWY K, TWY L & TWY M EDGE LIGHTS OUT OF SERVICE.
   - FAA FACILITIES OUT OF SERVICE INCLUDING THE RWY 35 ⚠1 LOCALIZER, RWY 21 PAPI, AND RWY 21 REILS.
3. IF ADDITIVE ALTERNATE C IS AWARDED, CONTRACTOR SHALL COORDINATE WITH FAA FOR ANY ELECTRICAL LINE DISTRIBUTION CABLES SHUTDOWN.

ATCT/OPERATION NOTES:

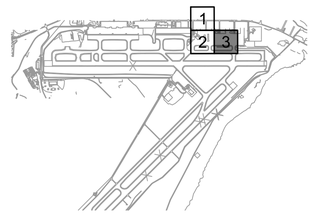
NONE

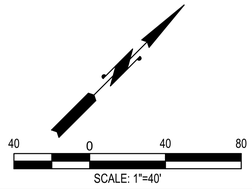
NON-STANDARD CONDITIONS:

NONE

PHASING NOTES:

1. DURING ACTIVE CONSTRUCTION, THE CONTRACTOR SHALL CONTINUOUSLY MONITOR THE WORK AREA TO REMOVE ANY FOD.
2. PRIOR TO THE END OF EACH SHIFT, THE CONTRACTOR SHALL THOROUGHLY FOD SWEEP AND CLEAN THE PAVEMENT SURFACE BEFORE REOPENING THE TAXILANE/APRON.
3. MAINTAIN ACCESS TO AIR1 HANGAR AND WASH RACK.
4. IF ADDITIVE ALTERNATE C IS AWARDED, CONTRACTOR SHALL ⚠1 MAINTAIN THE EXISTING AIRFIELD CIRCUITS, AND FIRST CONSTRUCT THE NEW AIRFIELD LIGHTING HANDHOLES AND CONDUITS TO BE READY FOR CUTOVER AND MINIMIZE THE OUTAGE.
5. CONTRACTOR SHALL COORDINATE WITH LIH OPS AND FAA TECH OPS A MINIMUM OF 10 WORKING DAYS IN ADVANCE WHEN WORKING NEAR ⚠1 FAA UTILITY LINES AND HANDHOLES.
6. IF ADDITIVE ALTERNATE C IS AWARDED, THE SHUTDOWN OF FAA FACILITIES MUST BE COORDINATE WITH THE FAA A MINIMUM OF 60 CALENDAR DAYS IN ADVANCE.





STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

Duke Young
04/30/2028
Licensed Expiration Date

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HT	MP	KK	DY

NO.	DATE	REVISIONS
⚠1	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE

APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

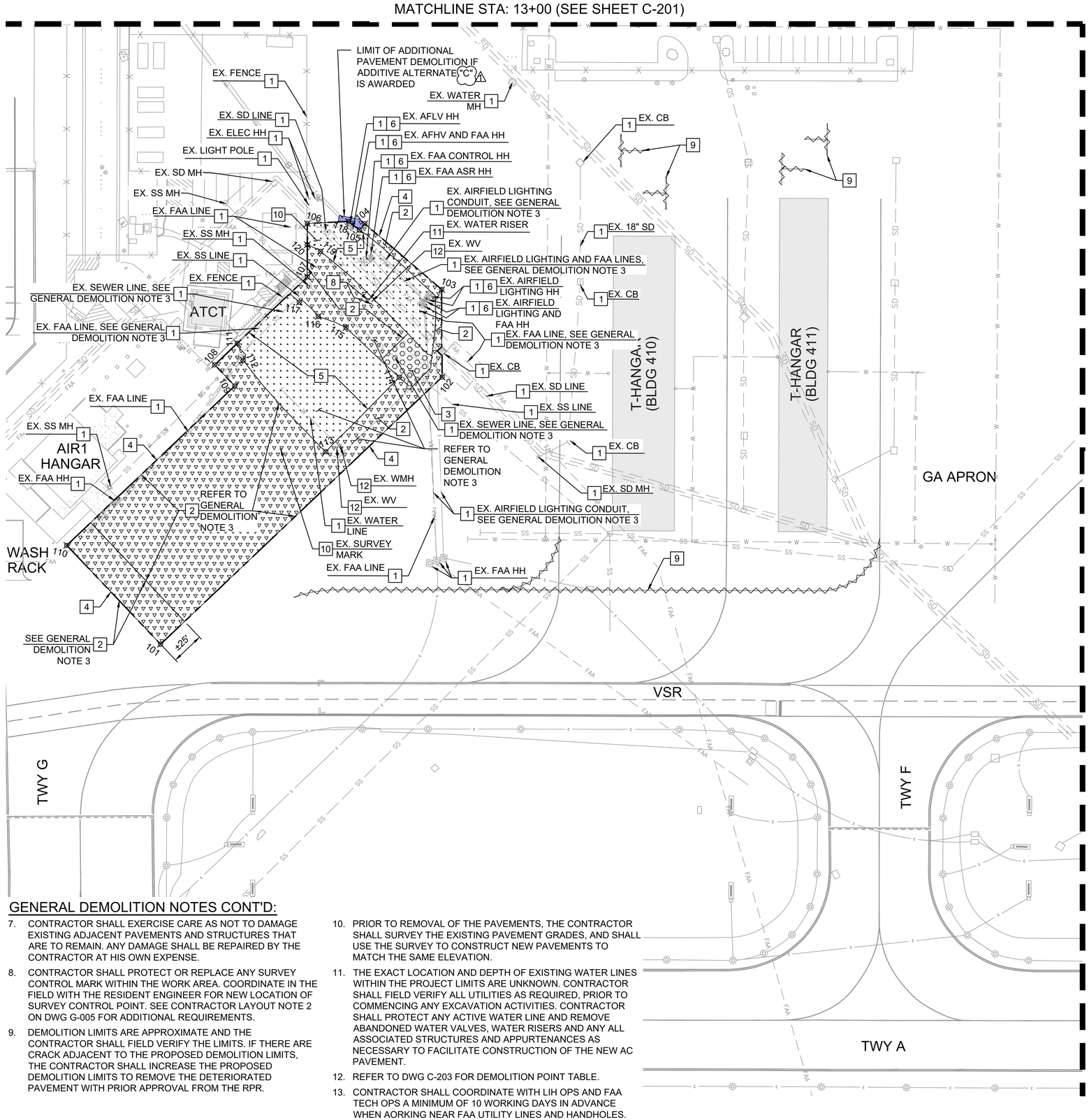
PHASE 2A AND 2B
(2000 TO 0500)
- ENLARGED 3

DATE :
04/13/2026

SHEET :
19 OF 58 SHEETS

DWG. NO.
PH204

C:\USERS\PHAMM\ONEDRIVE - AECOM\697339\80 CS1337-18 KAUAI DISTRICT DESIGN - DOCUMENTS\300-900\900_CAD_GIS\810_CAD\02-PHASING\SHEETS\PH201-TO-PH204.DWG



LEGEND

- LIMIT OF GRADING
- REMOVE AC PAVEMENT, FULL DEPTH
- REMOVE CONCRETE PAD, FULL DEPTH
- CLEAR AND GRUB EXISTING VEGETATION
- REMOVE AC PAVEMENT, FULL DEPTH. ADDITIVE ALTERNATE "C" ⚠
- BLACK-OUT / OBLITERATE MARKING

DEMOLITION KEY NOTES:

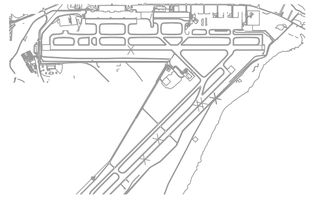
1. PROTECT IN PLACE
2. REMOVE AC PAVEMENT, FULL DEPTH
3. REMOVE CONCRETE PAD, FULL DEPTH
4. SAW-CUT AC PAVEMENT, FULL DEPTH
5. CLEAR AND GRUB EXISTING VEGETATION
6. IF ADDITIVE ALTERNATE "C" IS AWARDED REFER TO DRAWING E-101 FOR DISPOSITION
8. REMOVE BOLLARD AND FOUNDATION
9. BLACK OUT/OBLITERATE EXISTING MARKING, REFER TO PHASING DRAWINGS
10. RELOCATE SURVEY CONTROL MARK, SEE GENERAL DEMOLITION NOTE 8
11. CAP AND LOWER WATER RISER PIPE, REFER TO PAVING PLANS
12. CONTRACTOR SHALL FIELD VERIFY WATER VALVE STATUS PRIOR TO CONSTRUCTION. ADJUST TO GRADE AND REFER TO PAVING PLANS. SEE GENERAL DEMOLITION NOTES 3 AND 11

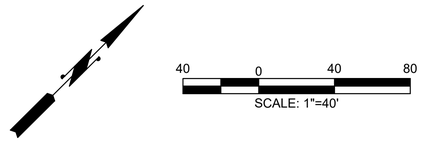
GENERAL DEMOLITION NOTES:

1. ALL REMOVAL ACTIVITIES SHALL BE COORDINATED WITH THE PHASING PLANS.
2. EXISTING CONDITIONS REPRESENTED HERE ARE BASED ON BEST INFORMATION AVAILABLE AT THE TIME OF DESIGN. IT IS NOT THE INTENTION OF THIS SHEET TO SHOW ALL SURFACE OR SUB-SURFACE FEATURES. THE PURPOSE IS TO SHOW GENERAL CONDITIONS WITHIN AND ADJACENT TO THE PROJECT LIMITS.
3. DURING PHASE 0 AND PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR MUST PERFORM UTILITY SCANNING/LOCATION, AND COMPLETE POTHOLES WITHIN THE EXCAVATION AREAS FOR ALL KNOWN UTILITIES, AND SUBMIT THAT INFORMATION WITH LOCATIONS, DEPTHS, AND SIZE TO THE RPR FOR REVIEW.
4. PAVEMENT MARKINGS AND STRIPING BEYOND THE LIMITS WHICH ARE DAMAGED BY THE CONTRACTOR SHALL BE REPAINTED TO ITS ORIGINAL CLARITY.
5. CONTRACTOR SHALL SAWCUT FULL DEPTH AT THE LIMIT OF PAVEMENT REMOVAL.
6. SEE ELECTRICAL IMPROVEMENT PLANS FOR DISPOSTION OF ADDITIONAL ELECTRICAL ITEM TO BE INCLUDED AS PART OF THE SCOPE OF WORK.

GENERAL DEMOLITION NOTES CONT'D:

7. CONTRACTOR SHALL EXERCISE CARE AS NOT TO DAMAGE EXISTING ADJACENT PAVEMENTS AND STRUCTURES THAT ARE TO REMAIN. ANY DAMAGE SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OWN EXPENSE.
8. CONTRACTOR SHALL PROTECT OR REPLACE ANY SURVEY CONTROL MARK WITHIN THE WORK AREA. COORDINATE IN THE FIELD WITH THE RESIDENT ENGINEER FOR NEW LOCATION OF SURVEY CONTROL POINT. SEE CONTRACTOR LAYOUT NOTE 2 ON DWG G-005 FOR ADDITIONAL REQUIREMENTS.
9. DEMOLITION LIMITS ARE APPROXIMATE AND THE CONTRACTOR SHALL FIELD VERIFY THE LIMITS. IF THERE ARE CRACK ADJACENT TO THE PROPOSED DEMOLITION LIMITS, THE CONTRACTOR SHALL INCREASE THE PROPOSED DEMOLITION LIMITS TO REMOVE THE DETERIORATED PAVEMENT WITH PRIOR APPROVAL FROM THE RPR.
10. PRIOR TO REMOVAL OF THE PAVEMENTS, THE CONTRACTOR SHALL SURVEY THE EXISTING PAVEMENT GRADES, AND SHALL USE THE SURVEY TO CONSTRUCT NEW PAVEMENTS TO MATCH THE SAME ELEVATION.
11. THE EXACT LOCATION AND DEPTH OF EXISTING WATER LINES WITHIN THE PROJECT LIMITS ARE UNKNOWN. CONTRACTOR SHALL FIELD VERIFY ALL UTILITIES AS REQUIRED, PRIOR TO COMMENCING ANY EXCAVATION ACTIVITIES. CONTRACTOR SHALL PROTECT ANY ACTIVE WATER LINE AND REMOVE ABANDONED WATER VALVES, WATER RISERS AND ANY ALL ASSOCIATED STRUCTURES AND APPURTENANCES AS NECESSARY TO FACILITATE CONSTRUCTION OF THE NEW AC PAVEMENT.
12. REFER TO DWG C-203 FOR DEMOLITION POINT TABLE.
13. CONTRACTOR SHALL COORDINATE WITH LIH OPS AND FAA TECH OPS A MINIMUM OF 10 WORKING DAYS IN ADVANCE WHEN AORKING NEAR FAA UTILITY LINES AND HANDHOLES.





STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

Duke Young
04/30/2028
Licensed Expiration Date

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HT	MP	KK	DY

NO.	DATE	REVISIONS
⚠	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

DEMOLITION PLAN 2 OF 3

DATE :
04/13/2026
SHEET :
35OF 58 SHEETS

DWG. NO.
C-202

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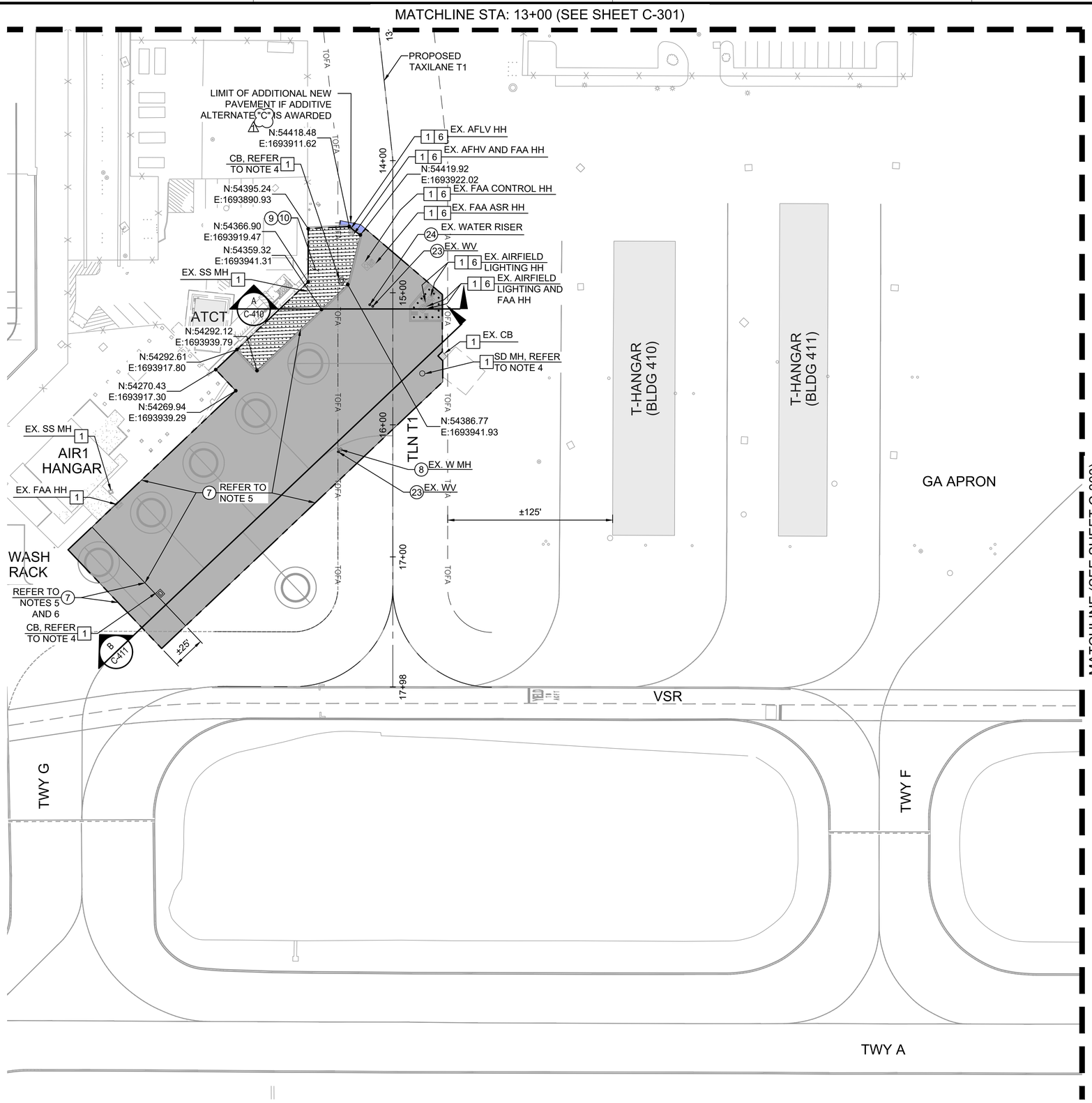


LEGEND

- TOFA — TAXIWAY OBJECT FREE AREA
- EXISTING FENCE
- LIMITS OF GRADING
- TAXILANE PAVEMENT
- COMPACTED SOIL / TOPSOILS AND SPRIGGING
- SLURRY SEAL COAT
- TAXILANE PAVEMENT, ADDITIVE ALTERNATE "C" (1)

DEMOLITION KEY NOTES:

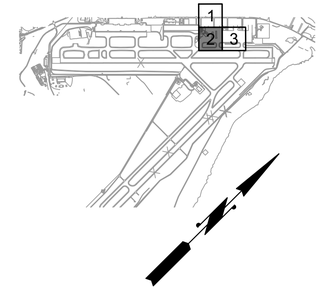
1. PROTECT IN PLACE
6. IF ADDITIVE ALTERNATE "C" (1) IS AWARDED REFER TO DRAWING E-101 FOR DISPOSITION

PAVING KEY NOTES:

7. CONSTRUCT TAXILANE PAVEMENT PER DETAIL 1/C-410
8. ADJUST TO FINISHED GRADE AND CONVERT TO H-20 LOAD RATED WATER VALVE MANHOLE PER DETAIL 1/C-513
9. PLACE AND COMPACT SOILS TO 90% AND 95% GRADE AS SHOWN ON PLAN
10. INSTALL TOPSOILS AND SPRIGGING FOR AREAS AS SHOWN ON PLAN
23. ADJUST TO FINISHED GRADE AND CONVERT TO H-20 LOAD RATED WATER VALVE BOX PER DETAIL 2/C-513
24. CAP AND LOWER RISER PIPE BELOW PAVEMENT AND INSTALL H-20 LOAD RATED WATER VALVE BOX PER DETAIL 2/C-513

NOTES:

1. SEE HORIZONTAL CONTROL PLAN AND DEMOLITION PLAN FOR EXACT LIMITS OF WORK.
2. EXISTING UNDERGROUND UTILITIES ARE NOT SHOWN FOR CLARITY. SEE DRAWINGS C-101 TO C-103 FOR EXISTING CONDITIONS PLAN.
3. PROTECT IN PLACE ALL STRUCTURES EXCEPT THOSE IDENTIFIED OTHERWISE.
4. PROTECT IN PLACE NEW STRUCTURES AFTER INSTALLATION.
5. PAVING LIMITS ARE APPROXIMATE AND THE CONTRACTOR SHALL FIELD VERIFY THE LIMITS. IF THERE ARE CRACK ADJACENT TO THE PROPOSED PAVING LIMITS, THE CONTRACTOR SHALL INCREASE THE PROPOSED PAVING LIMITS TO REMOVE THE DETERIORATED PAVEMENT WITH PRIOR APPROVAL FROM THE RPR.
6. PRIOR TO REMOVAL OF THE PAVEMENTS, THE CONTRACTOR SHALL SURVEY THE EXISTING PAVEMENT GRADES, AND SHALL USE THE SURVEY TO CONSTRUCT NEW PAVEMENTS TO MATCH THE SAME ELEVATION.



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SCALE: 1"=40'

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

04/30/2028
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NO.	DATE	REVISIONS
1	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

PAVING PLAN 2 OF 3

DATE :
04/13/2026
SHEET :
38 OF 58 SHEETS

DWG. NO.
C-302

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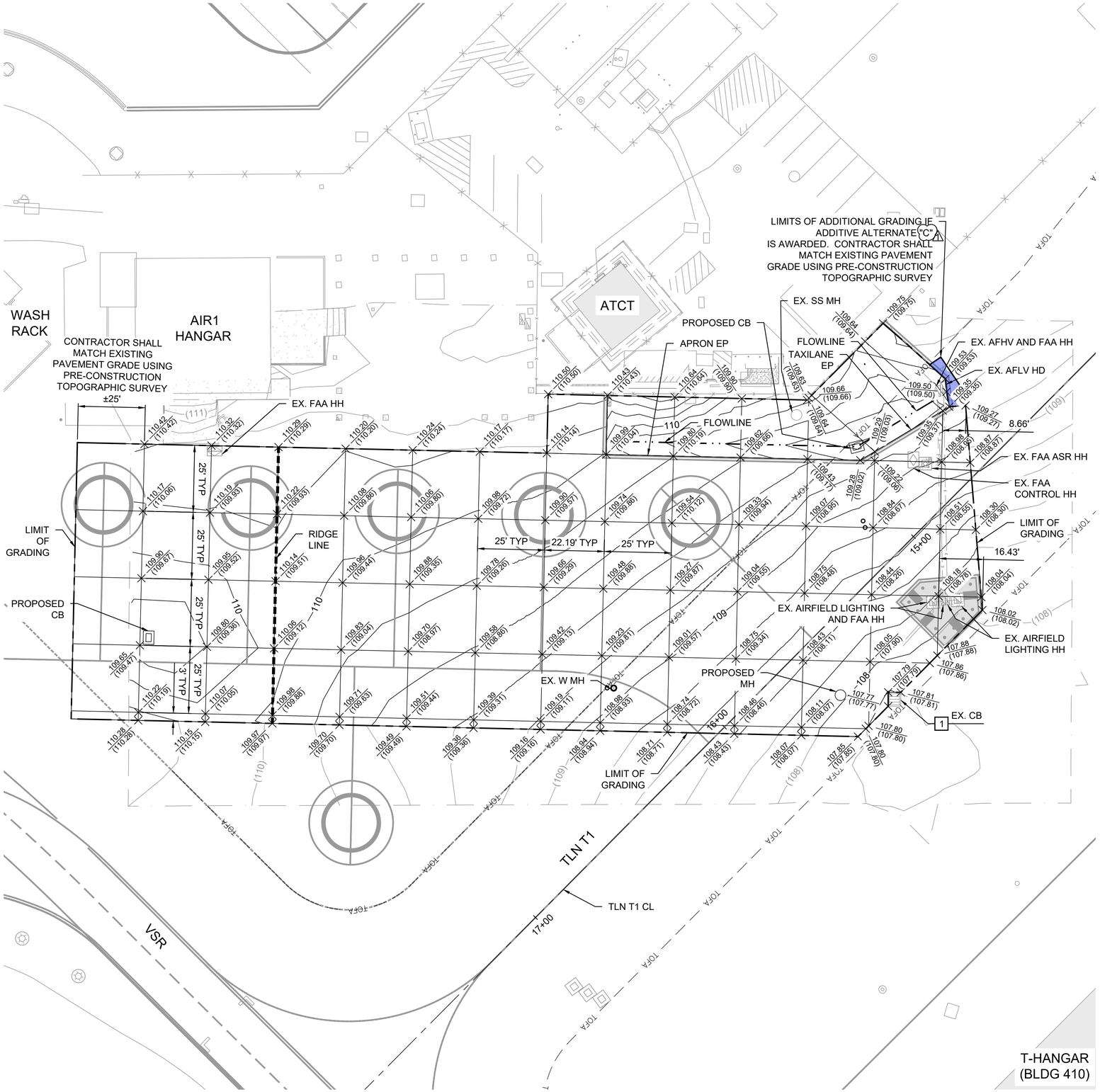

LEGEND

- (110) EXISTING CONTOURS
- 110 PROPOSED CONTOURS
- 100.00 / (100.00) PROPOSED / EXISTING SPOT ELEVATION
- LIMITS OF GRADING
- LIMITS OF SURVEY
- RIDGE LINE
- FLOWLINE
- ADDITIVE ALTERNATE "C" ⚠

GENERAL NOTES:

1. EXISTING UNDERGROUND UTILITIES NOT SHOWN FOR CLARITY.
2. AIRFIELD LIGHTING IS NOT SHOWN FOR CLARITY.
3. CONTRACTOR SHALL FIELD VERIFY AND MATCH EXISTING PAVEMENT ELEVATIONS.

20 0 20 40
SCALE: 1"=20'

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
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HAWAII U.S.A.

Duke Young
04/30/2028
Licensed Expiration Date

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⚠	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

PAVEMENT ELEVATION PLAN

DATE :
04/13/2026
SHEET :
40OF 58 SHEETS

DWG. NO.
C-401

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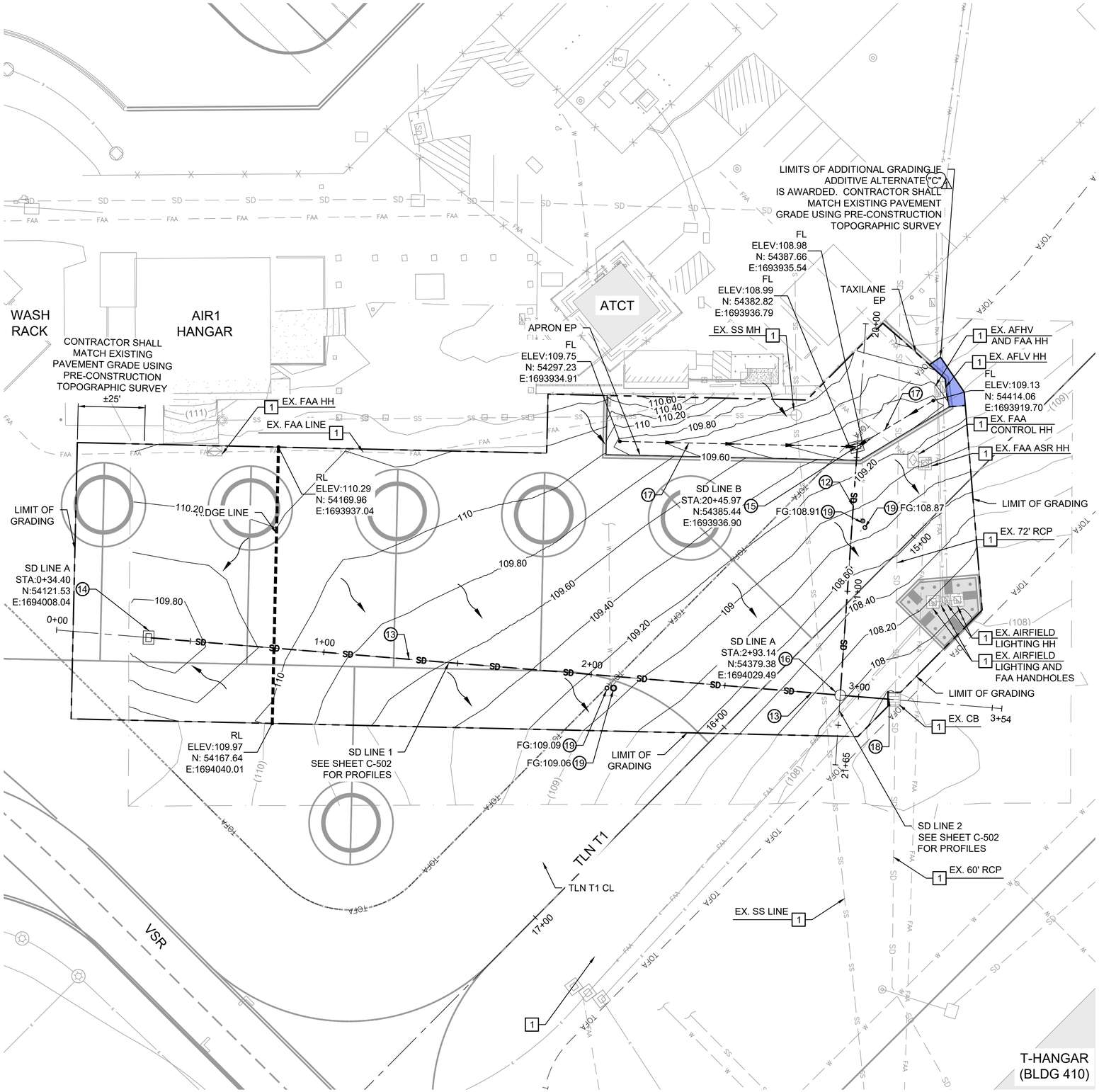

LEGEND

- (110) EXISTING CONTOURS
- 110 PROPOSED CONTOURS
- SD EXISTING STORM DRAIN LINE
- SD PROPOSED STORM DRAIN LINE
- RIDGE LINE
- DITCH/SWALE FLOW PATH
- SURFACE FLOW ARROW
- LIMIT OF GRADING
- LIMIT OF SURVEY
- ADDITIVE ALTERNATE "C" (A)

DRAINAGE KEY NOTES:

(12) CONSTRUCT 12" RCP, CLASS III PER DETAIL 2/C-512

(13) CONSTRUCT 18" RCP, CLASS III PER DETAIL 2/C-512

(14) CONSTRUCT H-20 TRAFFIC RATED CATCH BASIN PER DETAIL 1/C-511, SIZE AS SHOWN

(15) CONSTRUCT CATCH BASIN TYPE G1 PER DETAIL 1/C-510, SIZE AS SHOWN

(16) CONSTRUCT H-20 TRAFFIC RATED MANHOLE PER DETAIL 2/C-511, SIZE AS SHOWN

(17) GRADE DIRT SWALE

(18) JOIN PIPE TO EXISTING CATCH BASIN PER DETAIL 1/C-512

(19) FOR DISPOSITION, REFER TO DRAWING C-302

(22) INSTALL ELECTRICAL HANDOLES, REFER TO DRAWING E-101

DEMOLITION KEY NOTES:

[1] PROTECT IN PLACE

GENERAL GRADING NOTES:

1. ALL DIRT AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE TOPSOIL & SPRIGGING.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONNECTION POINTS. ANY DEVIATIONS FROM PLAN SHALL BE APPROVED BY THE RPR.
3. FOR OTHER UTILITY LINE IMPROVEMENTS, REFER TO THE UTILITY PLANS.

20 0 20 40
SCALE: 1"=20'

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
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HAWAII U.S.A.

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ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

GRADING AND DRAINAGE PLAN

DATE :	DWG. NO.
04/13/2026	C-501
SHEET : 43OF 58 SHEETS	

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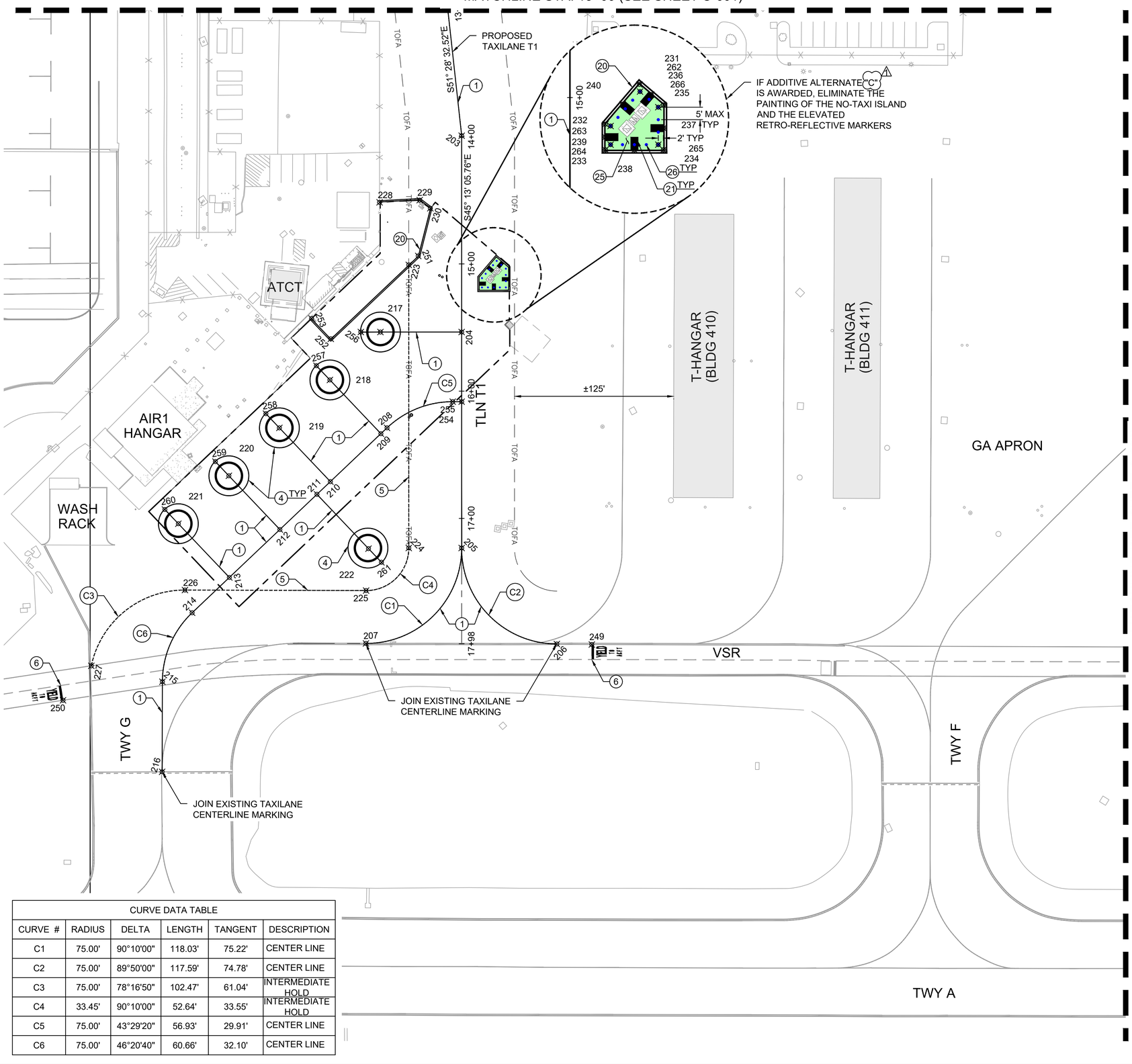


CURVE DATA TABLE					
CURVE #	RADIUS	DELTA	LENGTH	TANGENT	DESCRIPTION
C1	75.00'	90°10'00"	118.03'	75.22'	CENTER LINE
C2	75.00'	89°50'00"	117.59'	74.78'	CENTER LINE
C3	75.00'	78°16'50"	102.47'	61.04'	INTERMEDIATE HOLD
C4	33.45'	90°10'00"	52.64'	33.55'	INTERMEDIATE HOLD
C5	75.00'	43°29'20"	56.93'	29.91'	CENTER LINE
C6	75.00'	46°20'40"	60.66'	32.10'	CENTER LINE

LEGEND

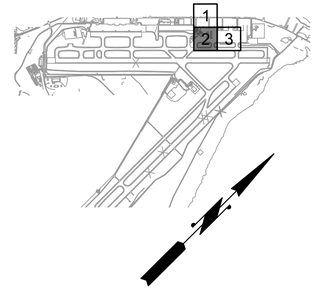
- —TOFA— TAXIWAY OBJECT FREE AREA
- EXISTING AOA PERIMETER FENCE
- LIMIT OF GRADING

KEY NOTES:

1. TAXILANE CENTERLINE MARKING PER DETAIL 1/C-610
3. 4" THICK SOLID RED LINE STRIPING MARKING
4. HELICOPTER PARKING MARKING PER DETAIL 5/C-610
5. INTERMEDIATE HOLDING POSITION MARKING PER DETAIL 4/C-610
6. STOP BAR MARKING PER DETAIL 3/C-610
20. TAXILANE EDGE MARKING PER DETAIL 3/C-611
21. TAXILANE SHOULDER MARKING PER DETAIL 4/C-611
25. PAINT TAXILANE GREEN SHOULDER
26. INSTALL ELEVATED EDGE RETROREFLECTOR MARKER PER DETAIL 5/C-611

NOTES:

1. SEE DRAWING C-401 FOR PAVEMENT ELEVATION PLAN.
2. SEE DRAWING C-410 FOR PAVEMENT SECTIONS
3. SEE DRAWING PH101 THRU PH305 FOR CONSTRUCTION PHASING.
4. CONTRACTOR SHALL RESTORE ALL STRIPING OUTSIDE IMPROVEMENT AREAS, DAMAGED BY CONSTRUCTION, TO ORIGINAL CLARITY. THIS MAY REQUIRE RESTRIPING OF THE MARKING TO THE NEXT ANGLE POINT OR AS DIRECTED BY THE RESIDENT ENGINEER.
5. ALL NEW PAVEMENT MARKINGS SHALL BE PAINTED WITH 6" WIDE BLACK BORDER, UNLESS NOTED OTHERWISE OR DIRECTED BY THE RESIDENT ENGINEER, DIMENSIONS SHOWN EXCLUDE BORDER. EXCEPT BLACK PAINTED BORDERS, ALL NEW PAVEMENT MARKINGS SHALL RECEIVE GLASS BEADS PER SPECIFICATIONS.
6. REFER TO PHASING DRAWINGS FOR THE OBLITERATION AND REPAINTING OF EXISTING PAVEMENT MARKINGS. PRIOR TO OBLITERATION, CONTRACTOR SHALL SURVEY THE MARKINGS.
7. WORK NOTED OUTSIDE OF THE "LIMIT OF CONSTRUCTION" SHALL BE WITHIN THE SCOPE OF THIS PROJECT.
8. REFER TO DWG C-603 FOR MARKING POINT TABLE.



40 0 40 80
SCALE: 1"=40'

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-17779
HAWAII U.S.A.

Duke Young
04/30/2028
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HT	MP	KK	DY

NO.	DATE	REVISIONS
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ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

HORIZONTAL CONTROL AND PAVEMENT MARKING PLAN 2 OF 3

DATE :
04/13/2026
SHEET :
50OF 58 SHEETS

DWG. NO.
C-602

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ELECTRICAL GENERAL NOTES

1. ALL EQUIPMENT, LIGHTING FIXTURES, CABLING AND MATERIAL SHALL CONFORM TO THE LATEST FAA REGULATIONS AND ADVISORY CIRCULARS.
2. CONTRACTOR SHALL FIELD VERIFY THE DEPTH AND LOCATION OF ALL EXISTING UNDERGROUND UTILITIES, POWER, TELEPHONE, DRAINAGE PIPE LINES, FUEL LINES, ETC. PRIOR TO START OF WORK. ANY DAMAGE TO UTILITIES DUE TO CONTRACTORS ACTIVITIES SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE. CONTRACTOR SHALL CONTACT UTILITY COMPANIES TO LOCATE AND MARK LOCATIONS OF UTILITIES.
3. EXISTING FAA DUCTS, CONDUITS OR UNDERGROUND CABLES NOT AFFECTED BY THE SCOPE OF THIS PROJECT, SHALL REMAIN IN SERVICE. FAA CABLE AND/OR CONDUIT DAMAGED AS A RESULT OF WORK BY THIS CONTRACTOR SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. ANY EXISTING AIRFIELD LIGHTING FIXTURE WHICH IS TO REMAIN, AND IS DAMAGED BY THE CONTRACTOR, SHALL BE REPLACED AT CONTRACTOR'S EXPENSE
4. EXISTING EQUIPMENT IS SHOWN AT APPROXIMATE LOCATIONS. VERIFY EXACT LOCATIONS IN FIELD.
5. ALL CABLES FOR AIRFIELD LIGHTING, UNLESS OTHERWISE NOTED, SHALL BE PER FAA SPECIFICATION L-824, 5KV, #8 TYPE C CABLE. CONNECTORS SHALL BE PER FAA SPECIFICATION L-823.
6. COORDINATE CONDUIT AND DUCT TRENCHING WITH NEW PCC CONSTRUCTION AND SHOULDER PAVING. CONTRACTOR SHALL NOT LEAVE EXCAVATIONS UNFILLED OR UNPROTECTED AFTER THE COMPLETION OF EACH WORK SHIFT.
7. EXISTING PULLBOX, MANHOLE AND DUCT BANK INFORMATION SHOWN ON THESE DRAWINGS IS BASED UPON RECORD DRAWINGS AND SHALL BE VERIFIED PRIOR TO CONSTRUCTION.
8. THE CONTRACTOR SHALL RESTORE ALL AIRFIELD LIGHTING SYSTEMS TO FULL OPERATION, OR TEMPORARY STATE, AT THE END OF EACH WORK SHIFT.
9. LOW VOLTAGE (600 V.) AND MEDIUM VOLTAGE (5000 V.) CONDUCTORS MUST BE INSTALLED IN SEPARATE WIREWAYS, EXCEPT WHERE 600V WIRE IS USED AS GROUND.
10. NEATLY LACE WIRING IN DISTRIBUTION PANELS, WIREWAYS, SWITCHES AND PULL/JUNCTION BOXES.
11. ALL STEEL CONDUITS, FITTINGS, NUTS, BOLTS, ETC., SHALL BE GALVANIZED.
12. THE JOINTS OF ALL L-823 PRIMARY CONNECTORS MUST BE WRAPPED WITH TAPE AND COVERED WITH HEAT SHRINK TUBING AS DETAILED IN THE PLANS.
13. THE CABLE ENTRANCE INTO THE FIELD ATTACHED L-823 CONNECTORS MUST BE ENCLOSED BY A HEAT-SHRINKABLE TUBING WITH CONTINUOUS INTERNAL ADHESIVE.
14. THE 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 AND ELECTRICAL TAPE.
15. L-823 TYPE 11, TWO-CONDUCTOR SECONDARY CONNECTOR MUST BE CLASS "A" (FACTORY MOLDED).
16. THERE MUST BE NO SPLICES IN THE SECONDARY CABLE(S) WITHIN THE STEMS OF ELEVATED RUNWAY OR TAXIWAY EDGE LIGHTING FIXTURES, INCLUDING THE WIREWAYS LEADING TO TAXIWAY SIGNS.
17. EACH NEW AIRFIELD LIGHTING CABLE SHALL BE TAGGED IN EACH PULLBOX, JUNCTION CAN, OR LIGHT BASE. EACH EXISTING AIRFIELD LIGHTING CABLE AFFECTED BY THE CURRENT PROJECT CONSTRUCTION SHALL BE TAGGED IN EACH PULLBOX, JUNCTION CAN OR LIGHT BASE. EACH TAG SHALL BE CLEARLY STAMPED WITH ¼-INCH HIGH LETTER TO INDICATE THE CIRCUIT NUMBER ON IT. THE TAGS SHALL BE SECURELY ATTACHED TO THE CABLE WITH MINIMUM NO. 14 AWG TW WIRE.
18. GROUNDING CONDUCTORS SHALL BE INSTALLED IN ALL CONDUITS, RACEWAYS, UNDERGROUND PULL BOXES, JUNCTION CANS, LIGHT BASES AND TRANSFORMER HOUSINGS. SIZE OF CONDUCTOR SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250 AND INSTALLED PER ARTICLE 250 EXCEPT FOR GROUND CONDUCTOR IN AIRFIELD LIGHTING CIRCUITS WHICH SHALL BE 1 #6 GREEN "THWN" INSULATED THROUGHOUT LIGHTING SYSTEM. IN THE EVENT THERE IS NO GROUND LUG IN ANY EXISTING BASE CAN AFFECTED BY WORK OF THIS CONTRACT, CONTRACTOR SHALL INSTALL NEW GROUND LUG AND CONNECT #6 GROUND CONDUCTOR.
19. CONTRACTOR SHALL CLOSELY COORDINATE ALL NAVAID WORK WITH AIRPORT AND THE FAA.
20. COUNTERPOISE SYSTEM SHALL BE INSTALLED ABOVE ALL NEW UNDERGROUND AIRFIELD LIGHTING CONDUITS AS SHOWN ON THE DRAWINGS.

GENERAL DEMOLITION NOTES

1. SPECIAL CARE SHALL BE TAKEN NOT TO DISTURB EXISTING SERVICE OR JEOPARDIZE INTEGRITY OF EXISTING FAA OR UTILITY CABLES FOUND IN THE WORK AREA. ALTHOUGH SOME CABLES AND THEIR ASSOCIATED INFRASTRUCTURES AND EQUIPMENT ARE SHOWN ON THIS PLAN, OTHERS MAY EXIST AND IF THEY INTERFERE WITH NEW WORK, THEY MUST BE REROUTED/RELOCATED IN CONSULTATION WITH THE ENGINEER AND FAA.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING CONTINUITY OF CIRCUITS FOR EQUIPMENT REMAINING OPERATIONAL DURING THE CONSTRUCTION PERIOD IN DEMOLITION AREA.
3. FIELD VERIFY THE EXACT LOCATION AND DEPTH OF ELECTRICAL INFRASTRUCTURES, EQUIPMENT, LIGHT FIXTURES, SIGNS, ETC.
4. REMOVAL, RELOCATION AND DEMOLITION WORK SHALL BE PERFORMED AT LOCATIONS SHOWN ON THE DRAWING. ALL OTHER EXISTING FACILITIES SUCH AS: EQUIPMENT, SYSTEMS, CONDUITS, MANHOLES, PULL BOXES, SIGNS AND LIGHTS SHALL BE PROTECTED IN PLACE. REFER TO CIVIL DRAWINGS FOR REFERENCE TO; CONSTRUCTION SEQUENCING, EXISTING UTILITIES AND CIVIL DEMOLITION AND REMOVAL.
5. ALL CONDUIT AND DUCTBANK TO BE REMOVED ARE CONCRETE ENCASED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL STRUCTURES TO BE PROTECTED IN PLACE WITH THE PROPOSED GRADING PLANS AND ADJUSTING ALL STRUCTURES, TO BE PROTECTED IN PLACE, TO FINAL FINISH GRADE.
7. ALL CABLE REMOVED SHALL BE TURNED OVER TO THE AIRPORT, CONTRACTOR SHALL COORDINATE DELIVERY WITH THE AIRPORT.

ELECTRICAL SYMBOL LIST

- A,B — CIRCUIT IDENTIFIER - CABLE INSTALLED IN EXISTING CONDUIT "A" "B" INDICATES CIRCUITS "A" AND "B" IN SHARED CONDUIT
- EXISTING HANDHOLE
- FAA — FAA UNDERGROUND DUCTBANK
- EXISTING CONDUIT/CIRCUIT
- X — INDICATES ITEM TO BE REMOVED
- –X– –X– –X– — EXISTING UNDERGROUND CKT TO BE REMOVED. ABANDON (E) CONDUIT IN PLACE
- EXISTING CABLE/S IN EXISTING CONDUIT. NO. OF HASH MARKS INDICATE NO. OF L-824 (5KV) CABLES AND NO HASH MARKS INDICATE 1#8 (L-824 (5KV) CABLE
- PROPOSED HANDHOLE, (ADDITIVE ALTERNATE "C") 1

ABBREVIATIONS

A, AMP	AMPERE
AF	AMPERE FRAME, AMPERE FUSE
ALCMS	AIRFIELD LIGHTING CONTROL AND MONITORING SYSTEM
AOA	AIR OPERATIONS AREA
AT	AMPERE TRIP
ATCT	AIR TRAFFIC CONTROL TOWER
ATS	AUTOMATIC TRANSFER SWITCH
BLDG	BUILDING
BLNK	BLANK
C, COND	CONDUIT
CB, C/B	CIRCUIT BREAKER
CCR	CONSTANT CURRENT REGULATOR
CKT	CIRCUIT
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CU	COPPER
DWG	DRAWING
(E), E	EXISTING
EMERG	EMERGENCY
ELEC	ELECTRIC
ELECT	ELECTRICAL
EP	EDGE OF PAVEMENT
ES	EDGE OF SHOULDER
(F)	FUTURE
FAA	FEDERAL AVIATION ADMINISTRATION
FDR	FEEDER
FIXT	FIXTURE
FLEX	FLEXIBLE
G	GREEN
GND	GROUND
HH	HAND HOLE
HV	HIGH VOLTAGE
JB	JUNCTION BOX
JC	JUNCTION CAN
KVA	KILOVOLT AMPERES
KW	KILOWATT
LHU	LAMP HOUSING UNIT
LTS	LIGHTS
LTG	LIGHTING
MFR	MANUFACTURER
MTD	MOUNTED
(N), N	NEW
NEC	NATIONAL ELECTRICAL CODE
NF	NON FUSED
NO.	NUMBER
NTS	NOT TO SCALE
OD	OUTER DIAMETER
P	POLE
(P)	PROPOSED
PAPI	PRECISION APPROACH PATH INDICATOR
PB	PULL BOX
PCC	PORTLAND CEMENT CONCRETE
PE	POLYETHYLENE CABLE JACKET
Ø, PH	PHASE
PNL	PANEL
PWR	POWER
PVMT	PAVEMENT
R	RED
RDR	RUNWAY DISTANCE REMAINING SIGN
REF	REFERENCE, REFER
RELOC	RELOCATE
REIL	RUNWAY END IDENTIFIER LIGHTS
REQ'D	REQUIRED
RGS	RIGID GALVANIZED STEEL
RGSC	RIGID GALVANIZED STEEL CONDUIT
RI	REMOVE AND RE-INSTALL
RR	REMOVE AND REPLACE W/NEW
RWY	RUNWAY
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TEL	TELEPHONE
TWY	TAXIWAY
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UND	UNDERGROUND
UL	UNDERWRITERS LABORATORIES
V	VOLTAGE, VOLTS
VA	VOLT-AMPERES
W	WIRE, WATTS, WHITE
WH	WHITE
W/	WITH
WP	WEATHER PROOF
XFMR	TRANSFORMER
XLPE	CROSS-LINKED POLYTHYLENE
Y	YELLOW

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-19550
HAWAII U.S.A.

04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
HT	MP	KK	DY

NO.	DATE	REVISIONS
1	05/15/2026	REVISED BID ADDITIVES

ADVERTISING & BIDDING PHASE
APRIL 13, 2026
DATE

PROJECT TITLE :

TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

ELECTRICAL GENERAL NOTES, SYMBOLS AND ABBREVIATIONS

DATE : **04/13/2026**

SHEET : 54OF 58 SHEETS

DWG. NO. **E-001**

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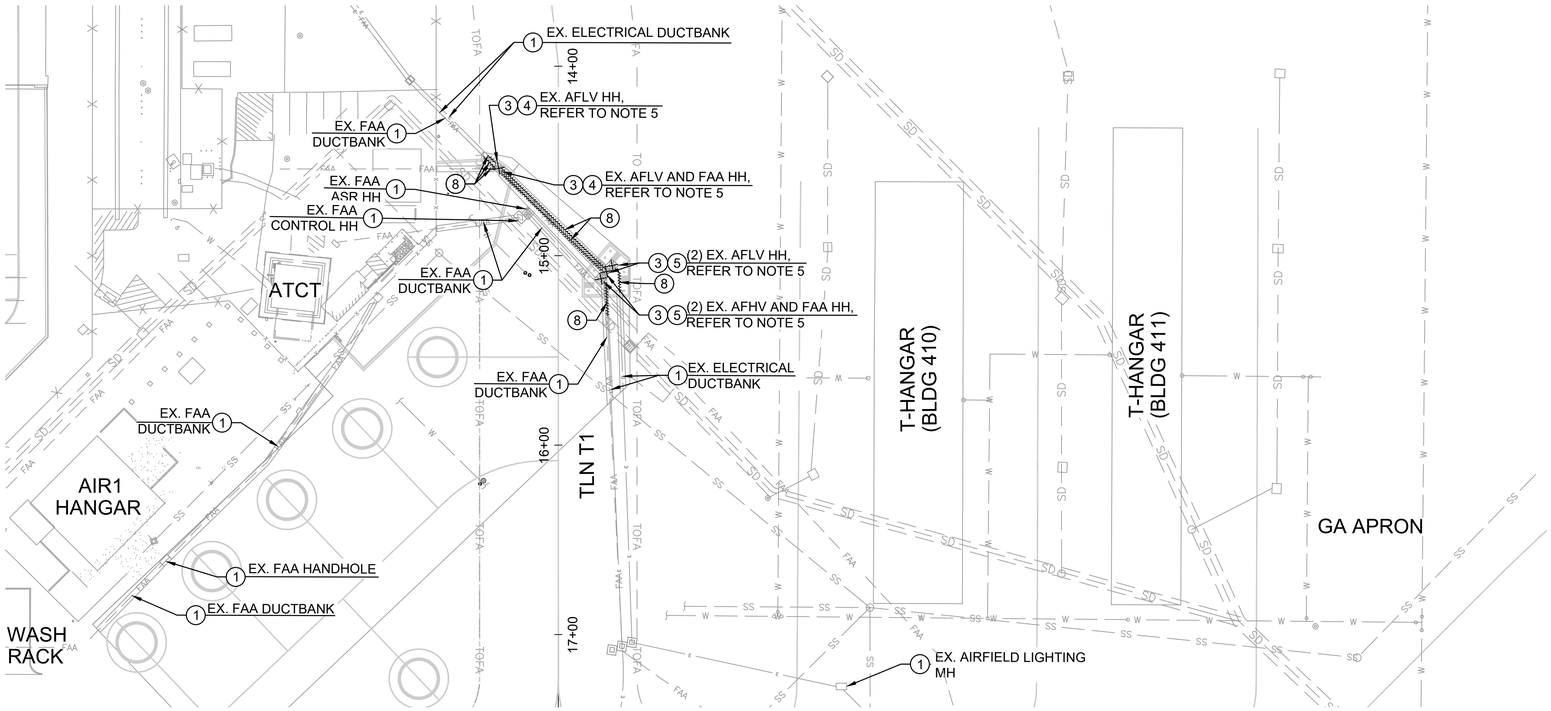
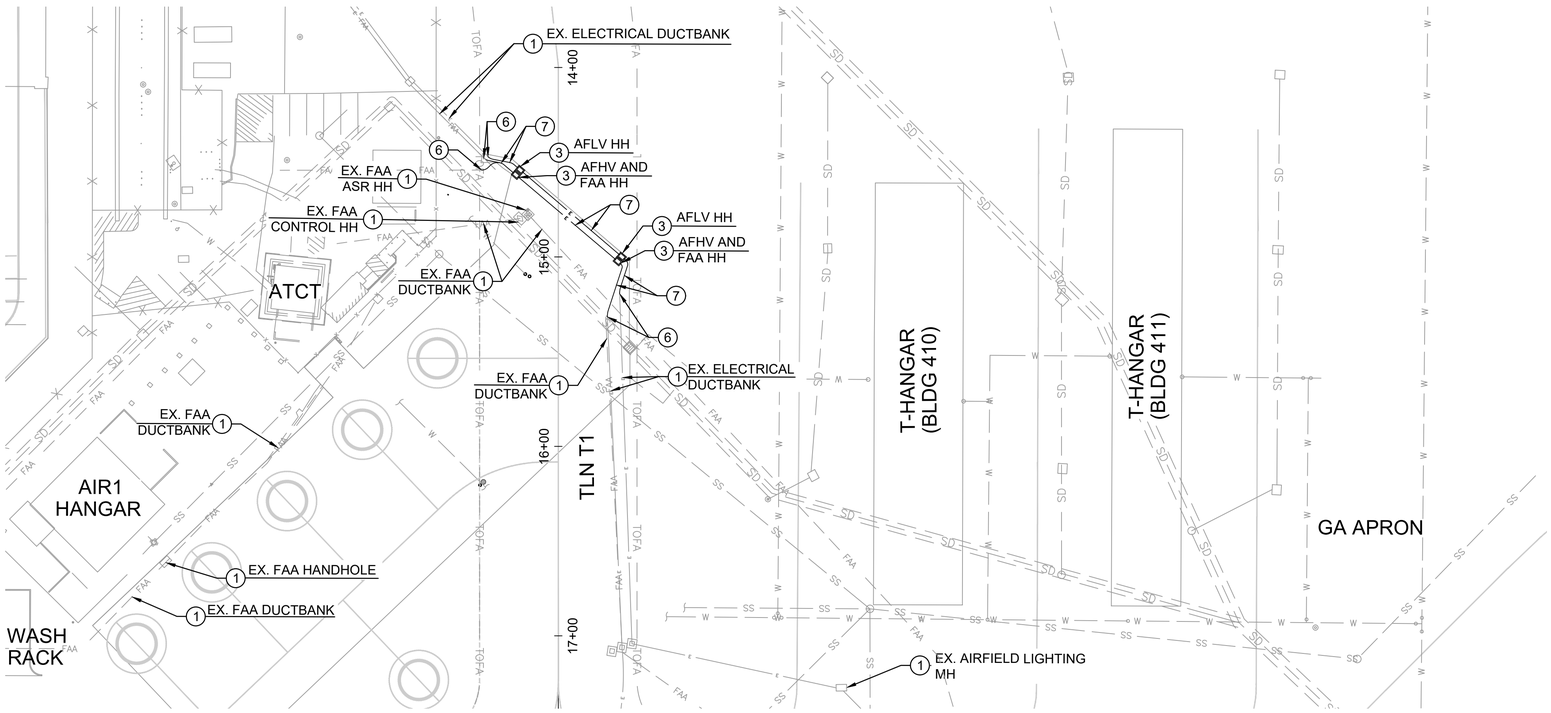


ELECTRICAL DEMOLITION PLAN



ELECTRICAL NEW PLAN

LEGEND

—TOFA— TAXIWAY OBJECT FREE AREA

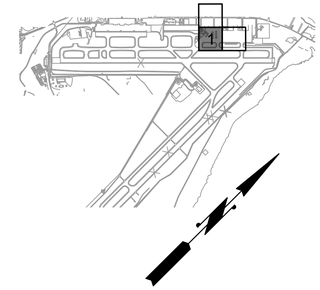
EXISTING FENCE

ELECTRICAL KEY NOTES:

1. PROTECT IN PLACE ITEM, AS INDICATED
3. REMOVE EXISTING PULL BOX AND REPLACE WITH 24"x36" PULL BOX, WHERE INDICATED. SEE DETAIL 1/E-110A. (ADDITIVE ALTERNATE "C")
4. SEE PHOTO REFERENCE DETAIL 2/E-110A (ADDITIVE ALTERNATE "C")
5. SEE PHOTO REFERENCE DETAIL 3/E-110A (ADDITIVE ALTERNATE "C")
6. INTERCEPT (E) CONDUITS WHERE INDICATED. SEE DETAIL 2/E-110. (ADDITIVE ALTERNATE "C")
7. CONSTRUCT DUCTBANK PER DETAIL 4/E-110. (ADDITIVE ALTERNATE "C")
8. REMOVE (E) DUCT BANK, AS INDICATED

NOTES:

1. COORDINATE ANY OUTAGES WITH AIRPORT AND FAA.
2. SEE SHEETS PH101 TO PH304 FOR CONSTRUCTION PHASING.
3. EXISTING CABLES TO BE REMOVED AND REINSTALLED INCLUDE AIRFIELD LIGHTING (L-824) AND FAA POWER AND COMM CABLES.
4. REMOVAL OF COMM CABLES SHALL INCLUDE REMOVAL OF ANY ASSOCIATED INNERDUCT AND SHALL BE REPLACED.
5. CONTRACTOR SHALL CONSTRUCT THE NEW HANDHOLES AND DUCTBANKS PRIOR TO DEMOLITION OF EXISTING STRUCTURES TO MINIMIZE THE OUTAGE.
6. EXISTING CABLES SHALL BE PULLED BACK TO NEAREST UNDISTURBED PULL BOX AND RE-PULLED AT COMPLETION OF THE UNDERGROUND CONDUIT CONSTRUCTION. CONTRACTOR SHALL RE-ESTABLISH CONNECTION TO EXISTING CABLES.



40 0 40 80

SCALE: 1"=40'

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

LICENSED PROFESSIONAL ENGINEER
PE-19550
HAWAII U.S.A.

04/30/2026
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TAXILANE "T1" EXTENSION

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LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

ELECTRICAL PLAN
ADDITIVE ALTERNATE "C"

DATE :
04/13/2026

SHEET :
56OF 58 SHEETS

DWG. NO.
E-101A

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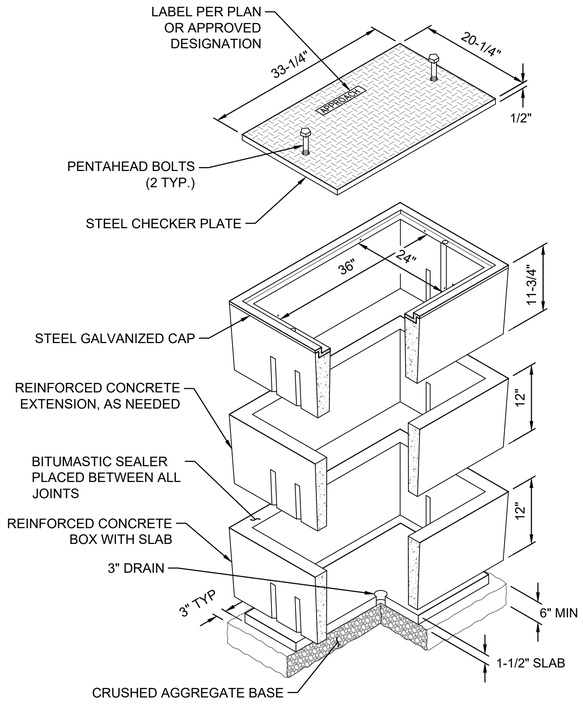

DESIGN LOAD: AASHTO H-20 TRAFFIC LOADING

24"x36" HANDHOLE — 1
SCALE: N.T.S. — -

(LOOKING NORTH)
AIRFIELD LIGHTING HANDHOLES — 2
SCALE: N.T.S. — -

(LOOKING WEST)
FAA AND AIRFIELD LIGHTING HANDHOLES — 3
SCALE: N.T.S. — -

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

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TAXILANE "T1" EXTENSION

AT
LIHUE AIRPORT
LIHUE, KAUAI, HAWAII

PROJECT NO.:

CK1627-33

SHEET TITLE:

ELECTRICAL DETAILS ADDITIVE ALTERNATE "C"

DATE :
04/13/2026
SHEET :
58OF 58 SHEETS

DWG. NO.
E-110A

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PRE-BID MEETING - MINUTES

DATE: Wednesday, May 6, 2026 **TIME:** 10:00 AM

LOCATION: Microsoft Teams Telecommunication Meeting
(Local) +1 808-829-4853,,364435735#
Phone conference ID: 364 435 735#
MS Teams Meeting ID: 279 585 415 086 124
MS Teams Passcode: 9kr9Gb3j

PROJECT: Taxilane T1 Extension
Lihue Airport
State Project No. CK1627-33

PRESENT: See attached list

SUBJECT: Pre-Bid Meeting

MEETING SUMMARY:

I. INTRODUCTIONS

1. Introduction of participants involved with the project:

   State
   James Fu, HDOT-Airports, Section Head
   Maybelle Lee, HDOT-Airports, Project Manager

   State Consultant
   Sean Dunkel, AECOM, Airfield Engineering Assistance
   Sean Quarrie, PARSONS, Airfield Engineering Assistance

   Design Team
   AECOM (Design Consultant): Keli'i Kau and Duke Young

II. GENERAL DISCUSSION

1. As a reminder, anything said at this meeting is for clarification of general information only. The bid documents shall govern over anything said at the pre-bid meeting and discrepancies shall be clarified by addendum.

2. Bidders are not allowed to ask questions at this meeting. All Request for Information questions, including substitution requests, must be submitted in writing no later than May 19, 2026 by 2:00 p.m. Hawaii Standard Time. As noted in Special Provisions Paragraph 2.7, substitution requests shall be submitted via email to the contact person listed in HIePRO for the solicitation and also posted as a question in HIePRO under the question/answer tab referencing the email with the request.

3. Questions received after the deadline will not be addressed, and verbal RFIs will not receive a response.

4. Bidding Schedule:

• May 1, 2026	Advertisement
• May 19, 2026 @ 2:00 pm HST	Last Day to submit Questions and Substitution Requests via HIePRO
• June 8, 2026 @ 2:00 pm HST	Deadline to submit Bids via HIePRO

5. A one-time only site visit is scheduled for May 8, 2026. Deadline for bidders to confirm their attendance was May 5, 2026.

6. A valid State of Hawaii General Engineering “A” License is required at the time of bidding.

7. The Notice to Proceed (NTP) will be issued immediately upon execution of the contract. Thereafter, 90 calendar days have been allocated towards pre-construction activities, followed by 90 calendar days for construction activities. As such, all work under this contract shall be completed within 180 calendar days from the Notice to Proceed (NTP) date.

8. Liquidated damages, please see Special Provisions 8.8.

9. A complete Proposal package shall be submitted at the time of bid. These forms can be found in Part III of the project specifications. The Proposal Schedule must be completely filled in, even if the proposed cost is $0 for a line item. Failure to fill in all forms or failure to submit all proposal pages shall result in rejection of the bid.

10. Any changes to the bid documents will be issued through an addendum. Bidders are reminded to acknowledge receipt of any addendum(s) on page P-4 of the Proposal.

11. Subject to availability of space and approval by the Airport Manager, parking may be made available at a designated parking area for vehicle parking. The General Contractor shall submit the parking request to the Airport Manager through the State Project Manager for review. The State Project Manager will verify the list against the General Contractor's approved subcontractor list and forward it to the Airport Manager for approval.

12. Pending the availability of space on airport property, the State will issue a Revocable Permit to the Contractor for the use of the space, assessed at a monthly fee of $50 for each Revocable Permit issued. The space may be used for a field office, staging of materials and equipment, vehicle parking or other uses subject to the approval of the State. All spaces shall be subject to the requirements of Section 01561 Construction Site Runoff Control Program.

13. Since space on airport property is extremely limited, the State does not guarantee that the space provided to the Contractor will be in close proximity to the project site. The State will make every effort to provide the Contractor with space on airport property; however, should the State determine that no space is available for such use(s), the responsibility shall then be on the Contractor to find space outside of airport property.

14. Due to the need to minimize impacts to operations, working hours shall be as defined in Section 01005 Description of Work, Paragraph 1.3.

15. Per Section 01561 Construction Site Pollution Controls, Contractor will have to prepare and submit a site-specific BMP plan within 30 calendar days of contract execution. Contractor may use the SSBMP Plan template included in Section 01561 as a starting point and update as needed. Note that there are liquidated damages associated with non-compliance of the BMP requirements.

16. Work on this project will be within the Airport Operations Area (AOA) and various public areas along airport property. The Contractor shall ensure that all AOA fence lines and access gates are secured at all times. Under no circumstances shall tools, equipment or materials be left in areas where the public can gain access to these items. Other security requirements are stated in Section 01565 Security Measures.

17. Security plan shall be submitted within 14 calendar days after execution of contract as specified in Paragraph 1.03 of Section 01565.

18. Requests for AOA access shall be submitted within 14 calendar days after execution of contract. In addition to the requirements stated in the Contract Bid Documents, all Contractors shall comply with the requirements and procedures of the Contractor's Training Guide.

19. Construction Safety and Phasing Plan, FOD Control, and responsibility for providing barricades, per the Special Provisions

    The Contractor is responsible for managing and removing all FOD generated as part of the project works. Work within the Airports Operations Area (AOA) shall be in compliance with Special Provisions, Sections 7.21, 8.20, and 8.21. Any specific Runway or Taxiway related closure barricades are to be coordinated with the LIH District personnel.

III. PROJECT SCOPE OF WORK

Design Consultant, AECOM, will provide a brief description of the scope of work.

1. The scope of work includes but is not limited to:

Base Bid:

a. Furnish and install all necessary storm water pollution protection and BMP's.
b. Removal of existing asphalt pavements.
c. Excavate and stockpile excess soils at the airport, and comply with Site-specific Construction-Environmental Hazard Management Plan C-EHMP, which will be provided by HDOTA to the Contractor separately prior to issuance of the Construction NTP.
d. Construct new storm drain systems including catch basins, manholes, and reinforced concrete pipes (RCP).
e. Adjust miscellaneous utility structures to new grade.
f. Construct concrete utility protection slabs for existing FAA and airfield lighting conduits.
g. Construct new aircraft tie-down anchors.
h. Construct new asphalt taxilane and apron pavements.
i. Apply slurry seal to existing pavements
j. Providing seeding and sprigging for disturbed graded areas.
k. Provide new pavement markings and elevated reflectors.

Additive Alternate "A":

a. Remove existing FAA and airfield lighting electrical handholes.
b. Install new FAA and airfield lighting electrical handholes.
c. Install new electrical conduit duct banks and cables.
d. Coordinate with FAA during installation.
e. Demolish and construct additional new asphalt taxilane and apron pavements.

Additive Alternate "B":

a. Transport stockpiled soils from Base Bid and dispose as solid waste at landfill.

Additive Alternate "C":

a. Transport stockpiled soils from Base Bid and dispose as hazardous waste at an approved United States Environmental Protection Agency (EPA) regulated facility.

2 Project Phasing and Limitations.

a. Designated contractor staging area and access point to the project work site.

b. Work and personnel subject to conditions of working in the secured Airport Operations Area (AOA)

c. Work generally restricted to night work

d. Phased construction of the work areas to allow aircraft parking during construction.

Please inform us of any omissions or corrections to the minutes of the meeting.

Meeting adjourned at: 10:12 a.m.

MEETING ATTENDANCE SHEET
Pre-Bid Conference Meeting

Project Name: Taxilane T1 Extension
Lihue Airport
Project No. CK1627-33
Meeting Location: Microsoft Teams Date: May 6, 2026

Name: Maybelle Lee Title: State Project Manager	Company: State of Hawaii, DOT Address: 400 Rodgers Blvd., Suite 700 Honolulu, HI 96814	Phone: (808) 838-8890 E-Mail: maybelle.p.lee@hawaii.gov
Name: James Fu Title: Section Head	Company: State of Hawaii, DOT Address: 400 Rodgers Blvd., Suite 700 Honolulu, HI 96814	Phone: (808) 838-8827 E-Mail: james.fu2@hawaii.gov
Name: Sean Quarrie Title: AIR-EA Assistance	Company: Parsons	E-Mail: sean.quarrie@parsons.com
Name: Mary Brana Title: AIR-EA Assistance	Company: AECOM	E-Mail: mary.branamunoz@aecom.com
Name: Sean Dunckel Title: AIR-EA Assistance	Company: AECOM	E-Mail: sean.dunckel@aecom.com
Name: Keli'i Kau Title: Design Consultant	Company: AECOM Design	E-Mail: steven.kau@aecom.com
Name: Duke Young Title: Design Consultant	Company: AECOM Design	E-Mail: duke.young@aecom.com
Name: Jason Ames Title:	Company: Grace Pacific	E-Mail: james@gracepacific.com