STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

GENERAL REQUIREMENTS, GENERAL PROVISIONS, TECHNICAL PROVISIONS

FOR

DRAINAGE & WIND CONE IMPROVEMENTS

AT

HILO INTERNATIONAL AIRPORT

HILO, HAWAII

STATE PROJECT NO. AH1021-20

AIP PROJECT NO. 3-15-0004-###

2022

TABLE OF CONTENTS

TABLE OF CONTENTS

PART 0 – GENERAL REQUIREMENTS

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PART 0 – GENERAL REQUIREMENTS

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PART 0.A – BIDDING REQUIREMENTS

NOTICE TO BIDDERS

(Chapter 103D, HRS)

The receiving of SEALED BIDS for DRAINAGE AND WIND CONE IMPROVEMENTS, HILO INTERNATIONAL AIRPORT, HILO, HAWAII, STATE PROJECT NO. AH1021-20, AIP PROJECT NO. 3-15-0004-XXX will begin as advertised on December 14, 2022, in HIePRO. Bidders are to register and submit bids through HIePRO only. See the following HIePRO link for important information on registering: https://hiepro.ehawaii.gov/welcome.html.

Deadline to submit bids is 2:00 P.M., Hawaii Standard Time (HST), January 20, 2023. Bids received after said due date and time shall not be considered.

The GENERAL PROVISIONS dated 2016, applicable to this project are available at http://hidot.hawaii.gov/administration/con/.

The scope of work consists of demolition, relocation, and replacement of wind cones; installation of dry wells; AC pavement demolition, regrading, and grassing; AC mill and replacement; and installation of a compass calibration pad at the Hilo International Airport. The estimated cost of construction is between $8,500,000 and $9,000,000.

To be eligible for award, bidders must possess a valid State of Hawaii General Engineering "A" license prior to the award of contract.

A pre-bid conference is scheduled for Wednesday, December 21, 2022, at 2:00 P.M. Hawaii Standard Time (HST) on Microsoft Teams. All prospective bidders or their representatives (employees) are encouraged to attend, but attendance is not mandatory. Due to the impacts of COVID 19, the pre-bid meeting will be conducted virtually. All bidders that wish to attend must send an email indicating their interest to Mr. Hany Sokar, State Project Manager, at hany.fa.sokar@hawaii.gov. They will be added to the Microsoft Teams attendance list and

will be sent an invitation email with a Microsoft Teams web-link and teleconference call-in number. This will allow each person to attend the pre-bid via the internet or they may call in. The deadline to sign up for the pre-bid conference is one (1) working day prior to the date of the pre-bid conference.

ALL requests for information (RFI) and substitution requests shall be received in writing in HIePRO no less than 17 calendar days before bid opening. Questions received after the deadline will not be addressed. Verbal requests for information will not receive a response. Anything said at the conference is for clarification purposes and any changes to the bid documents will be made by addendum and posted in HIePRO. Reference Special Provisions Section 2.7 for additional information regarding substitution requests.

Federal forms, located on Proposal pages P-11 through P-19, shall be submitted with the bid. Failure to submit these forms shall result in rejection of bid.

Any protest of this solicitation shall be submitted in writing to the Director of Transportation, in accordance with §103D-701, HRS and §3-126, HAR.

Campaign contributions by State and County Contractors. Contractors are hereby notified of the applicability of Section 11-355, HRS, which states that campaign contributions are prohibited from specified State or county government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body. For more information, contact the Campaign Spending Commission at (808) 586-0285.

The U.S. Department of Transportation Regulation entitled, "Nondiscrimination in Federally-Assisted Programs of the U.S. Department of Transportation," Title 49, Code of Federal Regulations (CFR), Part 21 is applicable to this project. Bidders are hereby notified that the Department of Transportation will affirmatively ensure that the contract entered into pursuant

to this advertisement will be awarded to the lowest responsible bidder without discrimination on the grounds of race, color, national origin or sex (as directed by 23 CFR Part 200).

The Equal Employment Opportunity Regulations of the Secretary of Labor implementing Executive Order 11246, as amended shall be complied with on this project.

The U.S. Department of Transportation Regulations entitled "Participation by Disadvantaged Business Enterprise in Department of Transportation Financial Assistance Programs", Title 49, Code of Federal Regulations, Part 26 is applicable to this project. Bidders are hereby notified that the Department of Transportation will strictly enforce full compliance with all of the requirements of the Disadvantaged Business Enterprise (DBE) program with respect to this project.

Bidders are directed to read and be familiar with the DBE Requirements, which establishes the program requirements pursuant to Title 49 Code of Federal Regulations Part 26 and, particularly, the requirements of certification, method of award, and evidence of good faith. All Bidders must e-mail the State Project Manager at hany.fa.sokar@hawaii.gov, the Disadvantaged Business Enterprise (DBE) Contract Goal Verification and Good Faith Efforts (GFE) Documentation for Construction, the Disadvantaged Business Enterprise (DBE) Confirmation and Commitment Agreement – Trucking Company, and the Disadvantaged Business Enterprise (DBE) Confirmation and Commitment Agreement – Subcontractor, Manufacturer, or Supplier by the close of business, 4:30 P.M. Hawaii Standard Time (HST), 5 calendar days after bid opening. Failure to provide these documents or the receiving of the documents by the State Project Manager after the deadline shall be cause for rejection of bid.

For additional information, contact Mr. Hany Sokar, State Project Manager, by phone at (808) 838-8848 or email at hany.fa.sokar@hawaii.gov.

The State reserves the right to reject any or all proposals and to waive any defects in said proposals for the best interest of the public.

JADE T. BUTAY
Director of Transportation

Posted:

INSTRUCTIONS FOR CONTRACTOR'S LICENSING

"A" general engineering contractors and "B" general building contractors are reminded that due to the Hawaii Supreme Court's January 28, 2002 decision in Okada Trucking Co., Ltd. v. Board of Water Supply, et al., 97 Haw. 450 (2002), they are prohibited from undertaking any work, solely or as part of a larger project, which would require the general contractor to act as a specialty contractor in any area where the general contractor has no license. Although the "A" and "B" contractor may still bid on and act as the "prime" contractor on an "A" or "B" project *(See, HRS § 444-7 for the definitions of an "A" and "B" project.)*, respectively, the "A" and "B" contractor may only perform work in the areas in which they have the appropriate contractor's license *(An "A" or "B" contractor obtains "C" specialty contractor's licenses either on its own, or automatically under HAR § 16-77-32.)*. The remaining work must be performed by appropriately licensed entities. It is the sole responsibility of the contractor to review the requirements of this project and determine the appropriate licenses that are required to complete the project.

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PART 0.B – BIDDING DOCUMENTS TO BE SUBMITTED WITH BID

PROPOSAL TO THE

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

PROJECT:	**DRAINAGE AND WIND CONE IMPROVEMENTS HILO INTERNATIONAL AIRPORT SOUTH HILO, HAWAII**
STATE PROJECT NO.:	**AH1021-20**
AIP PROJECT NO.:	**3-15-0004-###**
COMPLETION TIME:	**SIXTY (60) Calendar days for pre-construction activities followed by; TWO HUNDRED EIGHTEEN (218) additional calendar days for construction activities, whereby; All work under this contract must be completed within TWO HUNDRED SEVENTY-EIGHT (278) Calendar days from the date indicated in the Notice to Proceed from the State.**
DBE PROJECT GOAL:	**2.0%**

DESIGN PROJECT MANAGER:

NAME:	**Hany Sokar**
ADDRESS:	**Department of Transportation Airports Division Daniel K. Inouye International Airport 400 Rodgers Boulevard, Suite 700 Honolulu, Hawaii 96819-1880**
EMAIL:	**hany.fa.sokar@hawaii.gov**
PHONE NO.:	**(808) 838-8848**
FAX NO.:	**(808) 838-8751**

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.

4. It will not maintain for its employees any segregated facilities at any of its establishments.

5. Does not and will not permit its employees to perform their services at any location under its control, where segregated facilities are maintained.

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 1032D-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. Unless amended by Special Provision, 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.

The Bidder acknowledges receipt of and certifies that it has completely examined the following listed items: Hawaii Standard Specifications for Road and Bridge Construction, 2005, and/or the General Provisions for Construction Projects for AIR and WATER Transportation Facilities Division dated 2016, as applicable, the Notice to Bidders, Special Provisions, Proposal, Contract, Bond Forms, and 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 on the following page. 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.

The undersigned Bidder asserts that affirmative action has been taken to seek out and consider Disadvantaged Business Enterprises (DBEs) for portions of the work which can be subcontracted, and the affirmative actions of the Bidder are fully documented in its records and are available upon request by the Department. It is also understood that it must meet or exceed the DBE contract goal listed on page P-1 or demonstrate that it made good faith efforts to meet the DBE project goal. The undersigned as Bidder agrees to utilize each participating DBE that it submitted to meet the contract goal of _____ % (percentage to be completed by Bidder) DBE participation if the contract is awarded to it, and shall maintain such DBE participation during the construction of this project.

SUBCONTRACTOR LISTING

(Attach additional sheets if necessary.)

	NAME OF FIRM	NATURE OF WORK
SUBCONTRACTOR:		
1.	_____	_____
1a[1].	_____	_____
2.	_____	_____
2a.	_____	_____
3.	_____	_____
3a.	_____	_____
4.	_____	_____
4a.	_____	_____
5.	_____	_____
5a.	_____	_____
6.	_____	_____
6a.	_____	_____
7.	_____	_____
7a.	_____	_____

NOTES:

The Name of Firm and Nature of Work shall be indicated for all listed firms. The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Sub- or Joint Contractor.

For each listed firm, the Bidder declares the respective firm is a Sub- or Joint Contractor and subject to evaluation as a Sub- or Joint Contractor.

[1] Second tier subcontractors

JOINT CONTRACTOR LISTING

(Attach additional sheets if necessary.)

NAME OF FIRM	NATURE OF WORK
JOINT CONTRACTOR:	
1. _____	_____
1a[1]. _____	_____
2. _____	_____
2a. _____	_____
3. _____	_____
3a. _____	_____
4. _____	_____
4a. _____	_____
5. _____	_____
5a. _____	_____
6. _____	_____
6a. _____	_____
7. _____	_____
7a. _____	_____

NOTES:

The Name of Firm and Nature of Work shall be indicated for all listed firms. The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Sub- or Joint Contractor.

For each listed firm, the Bidder declares the respective firm is a Sub- or Joint Contractor and subject to evaluation as a Sub- or Joint Contractor.

[1] Second tier joint contractors

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)

_____
Authorized Signature

_____
Title

_____
Business Address

_____ _____
Business Telephone Email

_____
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.

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
HILO, HAWAII
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
01000.1	Unforeseen Conditions	ALLOW	ALLOW	ALLOW	$ 500,000
01100.1	Contractor Quality Control Program	L.S.	L.S.	L.S.	$
01105.1	Mobilization (Not to exceed 10% of sum of all items, excluding this item and all allowances)	L.S.	L.S.	L.S.	$
01533.1	Portable Lighted RCM	2	E.A.	$	$
01533.2	Temporary Low-Profile Barricades	L.S.	L.S.	L.S.	$
01561.1	Construction Site Runoff Control Program	L.S.	L.S.		$
01562.1	Management of Contaminated Medias	ALLOW	ALLOW	ALLOW	$ 500,000
01565.1	Security Measures	ALLOW	ALLOW	ALLOW	$ 50,000
01900.1	Project Survey and Stakeout	L.S.	L.S.	L.S.	$
02101.1	AC Pavement Demolition and Disposal	19,700	S.Y.	$	$
02101.2	Cold Milling (Constant Depth)	40,500	S.Y.	$	$
02300.1	Unclassified Excavation and Embankment, Off Airport Property	12,400	C.Y.	$	$
02401.1	Asphalt Mix Pavement Surface Course	518	Ton	$	$
02602.1	Emulsified Asphalt Prime Coat	6,100	Gallon	$	$
02603.1	Emulsified Asphalt Tack Coat	1,700	Gallon	$	$
02610.1	Dry Well, 20 Feet Deep	5	E.A.	$	$
02620.1	Taxilane Markings – Remarking	2,300	S.F.	$	$
02620.2	Vehicle Service Road Markings – New	540	S.F.	$	$
02820.1	Compass Calibration Pad, In Place	L.S.	L.S.	L.S.	$
02901.1	Hydro-Mulch Seeding	6.1	Acre	$	$
02905.1	Topsoil, Obtained Off Site	1,650	C.Y.	$	$
03300.1	Segmented Circle, In Place	L.S.	L.S.	L.S.	$
16050.1	Concrete Encased Electrical Duct Bank, 2", 24" Minimum Cover	610	L.F.	$	$
16522.1	Type L-806, Style I-B, Size 1 Wind Cone and Foundation, in Place	3	E.A.	$	$
16522.2	No. 8 AWG, 5 kV, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit	610	L.F.	$	$
16522.3	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed in Trench, Duct or Conduit	610	L.F.	$	$
16522.4	No. 6 AWG, Bare, Stranded Equipment Ground, Installed in Duct Bank or Conduit	60	L.F.	$	$

16522.5	L-810 Airport Obstruction Light, in Place	3	E.A.	$_____	$_____

TOTAL AMOUNT FOR COMPARISON OF BIDS $_____

The prices bid 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 plans and specifications.

Notes:

1. Bid shall include all Federal, State, County and other applicable taxes and fees.
2. The TOTAL AMOUNT FOR COMPARISON OF BIDS will be used to determine the lowest responsible bidder.
3. Bidders shall complete all unit prices and amounts. Failure to do so may be grounds for rejection of bid.
4. If a discrepancy occurs between unit price and the total in said bid, the unit price shall prevail.
5. The 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.
6. Submission of a Proposal 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.
7. The bidder's attention is directed to Section 2.11 – BID SECURITY and Section 2.24 – REQUIREMENTS OF CONTRACT BONDS of the "General Provisions".
8. Bidders shall be paid for actual work performed as directed by the Engineer for allowance items. Bidder will not be paid overhead and profit for unused allowance funds.
9. If the lowest TOTAL AMOUNT FOR COMPARISON OF BIDS is less than, or approximately equal to the funds available for this project, an award will be made to the lowest responsible bidder.
10. If the lowest TOTAL AMOUNT FOR COMPARISON OF BIDS 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.
11. Proposal pages P-1 through P-19 shall be submitted at the time of bid. Failure to submit all pages shall result in rejection of bid.

SURETY BID BOND

Bond No. _____

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(Full name or legal title of offeror)

as Offeror, hereinafter called the Principal, and

_____
(name of bonding company)

as Surety, hereinafter called Surety, a corporation authorized to transact business as a Surety in the State of Hawaii, are held and firmly bound unto _____
(State/county entity)

as Owner, hereinafter called Owner, in the penal sum of

_____
(required amount of bid security)

Dollars ($_____), lawful money of the United States of America, for the payment of which sum well and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS:

The Principal has submitted an offer for _____

_____
(project by number and brief description)

NOW, THEREFORE:

The condition of this obligation is such that if the Owner shall reject said offer, or in the alternate, accept the offer of the Principal and the Principal shall enter into a contract with the Owner in accordance with the terms of such offer, and give such bond or bonds as may be specified in the solicitation or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof as specified in the solicitation then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed this _____ day of _____, _____

(Seal) _____
Name of Principal (Offeror)

_____
Signature

_____
Title

(Seal) _____
Name of Surety

_____
Signature

_____
Title

BIDDER'S STATEMENT ON PREVIOUS CONTRACTS SUBJECT TO EEO CLAUSES

The Bidder shall complete the following statement by checking the appropriate blanks:

The Bidder has ___ has not___participated in a previous contract subject to the equal opportunity clause prescribed by Executive Order 11246, as amended, of September 24, 1965.

The Bidder has___ has not___submitted all compliance reports in connection with any such contract due under the applicable filing requirements; and that representations indicating submission of required compliance reports signed by proposed subcontractors will be obtained prior to award of subcontracts.

If the Bidder has participated in a previous contract subject to the equal opportunity clause and has not submitted compliance reports due under applicable filing requirements, the Bidder shall submit a compliance report on Standard Form 100, "Employee Information Report EEO-I" prior to award of the contract (*).

NOTE: Failure to complete the blanks may be grounds for rejecting the bid.

_____

Signature **(Name of Bidder)**

_____

Date **(Name & Title Signing Official)**

Business Address _____

_____

PROHIBITION OF SEGREGATED FACILITIES

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

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

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

Date	Signature
Company Name	Title

CERTIFICATION REGARDING LOBBYING

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

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

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

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

Signed:_____ Dated:

Company's Authorized Representative

_____

Typed Name and Title of Authorized Representative

TRADE RESTRICTION CERTIFICATION

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

1. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);

2. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and

3. has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

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

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

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

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

2. whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list or

3. who incorporates in the public works project any product of a foreign country on such USTR list.

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

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

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

Signature **(Name of Bidder)**

Date **(Name & Title Signing Official)**

Business Address _____

_____

CERTIFICATE OF BUY AMERICAN COMPLIANCE FOR MANUFACTURED PRODUCTS

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

☐ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101 by:

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

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

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

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

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

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

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

Required Documentation

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

a) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition

Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).

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

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

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

a) Detailed cost information for total project using U.S. domestic product

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

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

Date	Signature
Company Name	Title

CERTIFICATION OF OFFEROR/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

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

Certifications

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

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

Note

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

Term Definitions

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

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

Date	Signature
Company Name	Title

CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT

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

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

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

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

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

Date	Signature
Company Name	Title

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PART 0.C – WAGE RATES

REQUIREMENTS OF CHAPTER 104, HRS
WAGES AND HOURS OF EMPLOYEE ON PUBLIC WORKS LAW

Chapter 104, HRS, applies to every public works construction project over $2,000, regardless of the method of procurement or financing (purchase order, voucher, bid, contract, lease arrangement, warranty, SPRB).

Rate of Wages for Laborers and Mechanics

- Minimum prevailing wages (basic hourly rate plus fringe benefits), as determined by the Director of Labor and Industrial Relations and published in wage rate schedules, shall be paid to the various classes of laborers and mechanics working on the job site. [§104-2(a), (b), Hawaii Revised Statutes (HRS)]
- If the Director of Labor determines that prevailing wages have increased during the performance of a public works contract, the rate of pay of laborers and mechanics shall be raised accordingly. [§104-2(a) and (b), HRS; §12-22-3(d) Hawaii Administrative Rules (HAR)]

Overtime

- Laborers and mechanics working on a Saturday, Sunday, or a legal holiday of the State or more than eight hours a day on any other day shall be paid overtime compensation at not less than one and one-half times the basic hourly rate plus the cost of fringe benefits for all hours worked. If the Director of Labor determines that a prevailing wage is defined by a collective bargaining agreement, the overtime compensation shall be at the rates set by the applicable collective bargaining agreement [§§104-1, 104-2(c), HRS; §12-22-4.1, HAR]

Weekly Pay

- Laborers and mechanics employed on the job site shall be paid their full wages at least once a week, without deduction or rebate, except for legal deductions, within five working days after the cutoff date. [§104-2(d), HRS]

Posting of Wage Rate Schedules

- Wage rate schedules with the notes for prevailing wages and special overtime rates, shall be posted by the contractor in a prominent and easily accessible place at the job site. A copy of the entire wage rate schedule shall be given to each laborer and mechanic employed under the contract, except when the employee is covered by a collective bargaining agreement. [§104-2(d), HRS]

Withholding of Accrued Payments

- If necessary, the contracting agency may withhold accrued payments to the contractor to pay to laborers and mechanics employed by the contractor or subcontractor on the job site any difference between the wages required by the public works contract or specifications and the wages received. [§104-2(e), HRS]

Certified Weekly Payrolls and Payroll Records

- A certified copy of all payrolls shall be submitted weekly to the contracting agency. [§104-3(a), HRS; §12-22-10, HAR]
- The contractor is responsible for the submission of certified copies of the payrolls of all subcontractors. The certification shall affirm that the payrolls are correct and complete, that the wage rates listed are not less than the applicable rates contained in the applicable wage rate schedule, and that the classifications for each laborer or mechanic conform with the work the laborer or mechanic performed. [§104-3(a), HRS; §12-22-10, HAR]
- Payroll records shall be maintained by the contractor and subcontractors for three years after completion of construction. The records shall contain: [§104-3(b), HRS; §12-22-10, HAR]
  - the name and home address of each employee
  - the last four digits of social security number
  - a copy of the apprentice's registration with DLIR
  - the employee's correct classification
  - rate of pay (basic hourly rate + fringe benefits)
  - itemized list of fringe benefits paid
  - daily and weekly hours worked
  - weekly straight time and overtime earnings
  - amount and type of deductions
  - total net wages paid
  - date of payment
- Records shall be made available for examination by the contracting agency, the Department of Labor and Industrial Relations (DLIR), or any of its authorized representatives, who may also interview employees during working hours on the job. [§§104-3(c), 104-22(a), HRS; §12-22-10, HAR]

Termination of Work on Failure to Pay Wages

- If the contracting agency finds that any laborer or mechanic employed on the job site by the contractor or any subcontractor has not been paid prevailing wages or overtime, the contracting agency may, by written notice to the contractor, terminate the contractor's or subcontractor's right to proceed with the work or with the part of the work in which the required wages or overtime compensation have not been paid. The contracting agency may complete this work by contract or otherwise, and

the contractor or contractor's sureties shall be liable to the contracting agency for any excess costs incurred. [§104-4, HRS]

Apprentices

- Apprentice wage rates apply to contractors who are a party to a bona fide apprenticeship program which has been registered with the DLIR. In order to be paid apprentice rates, apprentices must be parties to an agreement either registered with or recognized as a USDOL nationally approved apprenticeship program by the DLIR, Workforce Development Division, (808) 586-8877, and the apprentice must be individually registered by name with the DLIR. [§12-22-6(1) and (2), HAR]

- The number of apprentices on any public work in relation to the number of journeyworkers in the same craft classification as the apprentices employed by the same employer on the same public work may not exceed the ratio allowed under the apprenticeship standards registered with or recognized by the DLIR. A registered or recognized apprentice receiving the journeyworker rate will not be considered a journeyworker for the purpose of meeting the ratio requirement. [§12-22-6(3), HAR]

Enforcement

- To ensure compliance with the law, DLIR and the contracting agency will conduct investigations of contractors and subcontractors. If a contractor or subcontractor violates the law, the penalties are: [§104-24, HRS]
  - First Violation Equal to 25% of back wages found due or $250 per offense up to $2,500, whichever is greater.
  - Second Violation Equal to amount of back wages found due or $500 for each offense up to $5,000, whichever is greater.
  - Third Violation Equal to two times the amount of back wages found due or $1,000 for each offense up to $10,000, whichever is greater; and
    Suspension from doing any new work on any public work of a governmental contracting agency for three years.
  - A violation would be deemed a second violation if it occurs within two years of the **first notification of violation**, and a third violation if it occurs within three years of **the second notification of violation**. [§104-24, HRS; §12-22-25(b), HAR]
  - **Suspension**: For a first or second violation, the department shall immediately suspend a contractor who fails to pay wages or penalties until all wages and penalties are paid in full. For a third violation, the department shall penalize and suspend the contractor as described above, **except that if the contractor continues to violate the law, then the department shall immediately suspend the contractor for a mandatory three years. The contractor shall remain suspended until all wages and penalties are paid in full.** [§§104-24, 104-25, HRS]
- **Suspension**: Any contractor who fails to make payroll records accessible or provide requested information within 10 days, or fails to keep or falsifies any required record, shall be assessed a penalty including suspension as provided in Section 104-22(b) and 104-25(a)(3), HRS. [§104-3(c), HRS; §12-22-26, HAR]
- If any contractor interferes with or delays any investigation, the contracting agency shall withhold further payments until the delay has ceased. Interference or delay includes failure to provide requested records or information within ten days, failure to allow employees to be interviewed during working hours on the job, and falsification of payroll records. The department shall assess a penalty of $10,000 per project, and $1,000 per day thereafter, for interference or delay. [§104-22(b), HRS; §12-22-26, HAR]
- Failure by the contracting agency to include in the provisions of the contract or specifications the requirements of Chapter 104, HRS, relating to coverage and the payment of prevailing wages and overtime, is not a defense of the contractor or subcontractor for noncompliance with the requirements of this chapter. [§104-2(f), HRS]

For additional information, visit the department's website at *http://labor.hawaii.gov/wsd* or contact any of the following DLIR offices:

Oahu (Wage Standards Division) .....(808) 586-8777
Hawaii Island .....(808) 974-6464
Maui and Kauai .....(808) 243-5322

STATE OF HAWAII WAGE RATE SCHEDULE (NOT PHYSICALLY INCLUDED IN BID DOCUMENTS

"General Decision Number: HI20220001 10/14/2022

Superseded General Decision Number: HI20210001

State: Hawaii

Construction Types: Building, Heavy (Heavy and Dredging), Highway and Residential

Counties: Hawaii Statewide.

BUILDING CONSTRUCTION PROJECTS; RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories); HEAVY AND HIGHWAY CONSTRUCTION PROJECTS AND DREDGING

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://www.dol.gov/agencies/whd/government-contracts.

Modification Number	Publication Date
0	01/07/2022
1	01/14/2022
2	02/18/2022
3	02/25/2022
4	03/04/2022
5	03/11/2022
6	03/18/2022
7	03/25/2022
8	04/15/2022
9	07/08/2022
10	08/19/2022
11	08/26/2022
12	09/02/2022
13	09/09/2022
14	09/30/2022
15	10/14/2022

ASBE0132-001 06/05/2022

	Rates	Fringes
Asbestos Workers/Insulator Includes application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems. Also the application of firestopping material for wall openings and penetrations in walls, floors, ceilings and curtain walls	$ 42.80	25.85

BOIL0627-005 01/01/2021

	Rates	Fringes
BOILERMAKER	$ 37.25	31.25

BRHI0001-001 08/30/2021

	Rates	Fringes
BRICKLAYER		
Bricklayers and Stonemasons	$ 46.46	30.43
Pointers, Caulkers and Weatherproofers	$ 46.71	30.43

BRHI0001-002 08/30/2021

	Rates	Fringes
Tile, Marble & Terrazzo Worker		
Terrazzo Base Grinders	$ 42.59	32.57
Terrazzo Floor Grinders and Tenders	$ 41.04	32.57
Tile, Marble and Terrazzo Workers	$ 44.40	32.57

CARP0745-001 10/01/2021

	Rates	Fringes
Carpenters:		
Carpenters; Hardwood Floor Layers; Patent Scaffold Erectors (14 ft. and over); Piledrivers; Pneumatic Nailers; Wood Shinglers and Transit and/or Layout Man	$ 51.25	24.84
Millwrights and Machine Erectors	$ 51.50	24.84
Power Saw Operators (2 h.p. and over)	$ 51.40	24.84

CARP0745-002 10/01/2021

	Rates	Fringes
Drywall and Acoustical Workers and Lathers	$ 51.50	24.84

ELEC1186-001 08/22/2022

	Rates	Fringes
Electricians:		
Cable Splicers	$ 60.51	30.90
Electricians	$ 53.55	30.69
Telecommunication worker	$ 34.94	13.69

ELEC1186-002 08/22/2022

	Rates	Fringes
Line Construction:		
Cable Splicers	$ 60.51	30.90
Groundmen/Truck Drivers	$ 40.16	25.34
Heavy Equipment Operators	$ 48.20	28.43
Linemen	$ 53.55	30.69
Telecommunication worker	$ 34.94	13.69

ELEV0126-001 01/01/2022

	Rates	Fringes
ELEVATOR MECHANIC	$ 65.33	36.885+a+b

a. VACATION: Employer contributes 8% of basic hourly rate for 5 years service and 6% of basic hourly rate for 6 months to 5 years service as vacation pay credit.

b. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving Day and Christmas Day.

ENGI0003-002 09/03/2018

	Rates	Fringes
Diver (Aqua Lung) (Scuba))		
Diver (Aqua Lung) (Scuba) (over a depth of 30 feet)	$ 66.00	31.26
Diver (Aqua Lung) (Scuba) (up to a depth of 30 feet)	$ 56.63	31.26
Stand-by Diver (Aqua Lung) (Scuba)	$ 47.25	31.26
Diver (Other than Aqua Lung)		
Diver (Other than Aqua Lung)	$ 66.00	31.26
Diver Tender (Other than Aqua Lung)	$ 44.22	31.26
Stand-by Diver (Other than Aqua Lung)	$ 47.25	31.26
Helicopter Work		
Airborne Hoist Operator for Helicopter	$ 45.80	31.26
Co-Pilot of Helicopter	$ 45.98	31.26
Pilot of Helicopter	$ 46.11	31.26
Power equipment operator - tunnel work		
GROUP 1	$ 42.24	31.26

GROUP 2	$ 42.35	31.26
GROUP 3	$ 42.52	31.26
GROUP 4	$ 42.79	31.26
GROUP 5	$ 43.10	31.26
GROUP 6	$ 43.75	31.26
GROUP 7	$ 44.07	31.26
GROUP 8	$ 44.18	31.26
GROUP 9	$ 44.29	31.26
GROUP 9A	$ 44.52	31.26
GROUP 10	$ 44.58	31.26
GROUP 10A	$ 44.73	31.26
GROUP 11	$ 44.88	31.26
GROUP 12	$ 45.24	31.26
GROUP 12A	$ 45.60	31.26
Power equipment operators:		
GROUP 1	$ 41.94	31.26
GROUP 2	$ 42.05	31.26
GROUP 3	$ 42.22	31.26
GROUP 4	$ 42.49	31.26
GROUP 5	$ 42.80	31.26
GROUP 6	$ 43.45	31.26
GROUP 7	$ 43.77	31.26
GROUP 8	$ 43.88	31.26
GROUP 9	$ 43.99	31.26
GROUP 9A	$ 44.22	31.26
GROUP 10	$ 44.28	31.26
GROUP 10A	$ 44.43	31.26
GROUP 11	$ 44.58	31.26
GROUP 12	$ 44.94	31.26
GROUP 12A	$ 45.30	31.26
GROUP 13	$ 42.22	31.26
GROUP 13A	$ 42.49	31.26
GROUP 13B	$ 42.80	31.26
GROUP 13C	$ 43.45	31.26
GROUP 13D	$ 43.77	31.26
GROUP 13E	$ 43.88	31.26

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Fork Lift (up to and including 10 tons); Partsman (heavy duty repair shop parts room when needed).

GROUP 2: Conveyor Operator (Handling building material); Hydraulic Monitor; Mixer Box Operator (Concrete Plant).

GROUP 3: Brakeman; Deckhand; Fireman; Oiler; Oiler/Gradechecker; Signalman; Switchman; Highline Cableway Signalman; Bargeman; Bunkerman; Concrete Curing Machine (self-propelled, automatically applied unit on streets, highways, airports and canals); Leveeman; Roller (5 tons and under); Tugger Hoist.

GROUP 4: Boom Truck or dual purpose ""A"" Frame Truck (5 tons

or less); Concrete Placing Boom (Building Construction); Dinky Operator; Elevator Operator; Hoist and/or Winch (one drum); Straddle Truck (Ross Carrier, Hyster and similar).

GROUP 5: Asphalt Plant Fireman; Compressors, Pumps, Generators and Welding Machines (""Bank"" of 9 or more, individually or collectively); Concrete Pumps or Pumpcrete Guns; Lubrication and Service Engineer (Grease Rack); Screedman.

GROUP 6: Boom Truck or Dual Purpose ""A""Frame Truck (over 5 tons); Combination Loader/Backhoe (up to and including 3/4 cu. yd.); Concrete Batch Plants (wet or dry); Concrete Cutter, Groover and/or Grinder (self-propelled unit on streets, highways, airports, and canals); Conveyor or Concrete Pump (Truck or Equipment Mounted); Drilling Machinery (not to apply to waterliners, wagon drills or jack hammers); Fork Lift (over 10 tons); Loader (up to and including 3 and 1/2 cu. yds); Lull High Lift (under 40 feet); Lubrication and Service Engineer (Mobile); Maginnis Internal Full Slab Vibrator (on airports, highways, canals and warehouses); Man or Material Hoist; Mechanical Concrete Finisher (Large Clary, Johnson Bidwell, Bridge Deck and similar); Mobile Truck Crane Driver; Portable Shotblast Concrete Cleaning Machine; Portable Boring Machine (under streets, highways, etc.); Portable Crusher; Power Jumbo Operator (setting slip forms, etc., in tunnels); Rollers (over 5 tons); Self-propelled Compactor (single engine); Self-propelled Pavement Breaker; Skidsteer Loader with attachments; Slip Form Pumps (Power driven by hydraulic, electric, air, gas, etc., lifting device for concrete forms); Small Rubber Tired Tractors; Trencher (up to and including 6 feet); Underbridge Personnel Aerial Platform (50 feet of platform or less).

GROUP 7: Crusher Plant Engineer, Dozer (D-4, Case 450, John Deere 450, and similar); Dual Drum Mixer, Extend Lift; Hoist and/or Winch (2 drums); Loader (over 3 and 1/2 cu. yds. up to and including 6 yards.); Mechanical Finisher or Spreader Machine (asphalt), (Barber Greene and similar) (Screedman required); Mine or Shaft Hoist; Mobile Concrete Mixer (over 5 tons); Pipe Bending Machine (pipelines only); Pipe Cleaning Machine (tractor propelled and supported); Pipe Wrapping Machine (tractor propelled and supported); Roller Operator (Asphalt); Self-Propelled Elevating Grade Plane; Slusher Operator; Tractor (with boom) (D-6, or similar); Trencher (over 6 feet and less than 200 h.p.); Water Tanker (pulled by Euclids, T-Pulls, DW-10, 20 or 21, or similar); Winchman (Stern Winch on Dredge).

GROUP 8: Asphalt Plant Operator; Barge Mate (Seagoing); Cast-in-Place Pipe Laying Machine; Concrete Batch Plant (multiple units); Conveyor Operator (tunnel); Deckmate;

Dozer (D-6 and similar); Finishing Machine Operator (airports and highways); Gradesetter; Kolman Loader (and similar); Mucking Machine (Crawler-type); Mucking Machine (Conveyor-type); No-Joint Pipe Laying Machine; Portable Crushing and Screening Plant; Power Blade Operator (under 12); Saurman Type Dragline (up to and including 5 yds.); Stationary Pipe Wrapping, Cleaning and Bending Machine; Surface Heater and Planer Operator, Tractor (D-6 and similar); Tri-Batch Paver; Tunnel Badger; Tunnel Mole and/or Boring Machine Operator Underbridge Personnel Aerial Platform (over 50 feet of platform).

GROUP 9: Combination Mixer and Compressor (gunite); Do-Mor Loaderand Adams Elegrader; Dozer (D-7 or equal); Wheel and/or Ladder Trencher (over 6 feet and 200 to 749 h.p.).

GROUP 9A: Dozer (D-8 and similar); Gradesetter (when required by the Contractor to work from drawings, plans or specifications without the direct supervision of a foreman or superintendent); Push Cat; Scrapers (up to and including 20 cu. yds); Self-propelled Compactor with Dozer; Self-Propelled, Rubber-Tired Earthmoving Equipment (up to and including 20 cu. yds) (621 Band and similar); Sheep's Foot; Tractor (D-8 and similar); Tractors with boom (larger than D-6, and similar).

GROUP 10: Chicago Boom; Cold Planers; Heavy Duty Repairman or Welder; Hoist and/or Winch (3 drums); Hydraulic Skooper (Koehring and similar); Loader (over 6 cu. yds. up to and including 12 cu. yds.); Saurman type Dragline (over 5 cu. yds.); Self-propelled, rubber-tired Earthmoving Equipment (over 20 cu. yds. up to and including 31 cu. yds.) (637D and similar); Soil Stabilizer (P & H or equal); Sub-Grader (Gurries or other automatic type); Tractors (D-9 or equivalent, all attachments); Tractor (Tandem Scraper); Watch Engineer.

GROUP 10A: Boat Operator; Cable-operated Crawler Crane (up to and including 25 tons); Cable-operated Power Shovel, Clamshell, Dragline and Backhoe (up to and including 1 cu. yd.); Dozer D9-L; Dozer (D-10, HD41 and similar) (all attachments); Gradall (up to and including 1 cu. yd.); Hydraulic Backhoe (over 3/4 cu. yds. up to and including 2 cu. yds.); Mobile Truck Crane Operator (up to and including 25 tons) (Mobile Truck Crane Driver Required); Self-propelled Boom Type Lifting Device (Center Mount) (up to and including 25 tons) (Grove, Drott, P&H, Pettibone and similar; Trencher (over 6 feet and 750 h.p. or more); Watch Engineer (steam or electric).

GROUP 11: Automatic Slip Form Paver (concrete or asphalt); Band Wagon (in conjunction with Wheel Excavator); Cable-operated Crawler Cranes (over 25 tons but less than

50 tons); Cable-operated Power Shovel, Clamshell, Dragline and Backhoe (over 1 cu. yd. up to 7 cu. yds.); Gradall (over 1 cu. yds. up to 7 cu. yds.); DW-10, 20, etc. (Tandem); Earthmoving Machines (multiple propulsion power units and 2 or more Scrapers) (up to and including 35 cu. yds.,"" struck"" m.r.c.); Highline Cableway; Hydraulic Backhoe (over 2 cu. yds. up to and including 4 cu. yds.); Leverman; Lift Slab Machine; Loader (over 12 cu. yds); Master Boat Operator; Mobile Truck Crane Operator (over 25 tons but less than 50 tons); (Mobile Truck Crane Driver required); Pre-stress Wire Wrapping Machine; Self-propelled Boom-type Lifting Device (Center Mount) (over 25 tons m.r.c); Self-propelled Compactor (with multiple-propulsion power units); Single Engine Rubber Tired Earthmoving Machine (with Tandem Scraper); Tandem Cats; Trencher (pulling attached shield).

GROUP 12: Clamshell or Dipper Operator; Derricks; Drill Rigs; Multi-Propulsion Earthmoving Machines (2 or more Scrapers) (over 35 cu. yds ""struck""m.r.c.); Operators (Derricks, Piledrivers and Cranes); Power Shovels and Draglines (7 cu. yds. m.r.c. and over); Self-propelled rubber-tired Earthmoving equipment (over 31 cu. yds.) (657B and similar); Wheel Excavator (up to and including 750 cu. yds. per hour); Wheel Excavator (over 750 cu. yds. per hour).

GROUP 12A: Dozer (D-11 or similar or larger); Hydraulic Excavators (over 4 cu. yds.); Lifting cranes (50 tons and over); Pioneering Dozer/Backhoe (initial clearing and excavation for the purpose of providing access for other equipment where the terrain worked involves 1-to-1 slopes that are 50 feet in height or depth, the scope of this work does not include normal clearing and grubbing on usual hilly terrain nor the excavation work once the access is provided); Power Blade Operator (Cat 12 or equivalent or over); Straddle Lifts (over 50 tons); Tower Crane, Mobile; Traveling Truss Cranes; Universal, Liebher, Linden, and similar types of Tower Cranes (in the erection, dismantling, and moving of equipment there shall be an additional Operating Engineer or Heavy Duty Repairman); Yo-Yo Cat or Dozer.

GROUP 13: Truck Driver (Utility, Flatbed, etc.)

GROUP 13A: Dump Truck, 8 cu.yds. and under (water level); Water Truck (up to and including 2,000 gallons).

GROUP 13B: Water Truck (over 2,000 gallons); Tandem Dump Truck, over 8 cu. yds. (water level).

GROUP 13C: Truck Driver (Semi-trailer. Rock Cans, Semi-Dump or Roll-Offs).

GROUP 13D: Truck Driver (Slip-In or Pup).

GROUP 13E: End Dumps, Unlicensed (Euclid, Mack, Caterpillar or similar); Tractor Trailer (Hauling Equipment); Tandem Trucks hooked up to Trailer (Hauling Equipment)

BOOMS AND/OR LEADS (HOURLY PREMIUMS):

The Operator of a crane (under 50 tons) with a boom of 80 feet or more (including jib), or of a crane (under 50 tons) with leads of 100 feet or more, shall receive a per hour premium for each hour worked on said crane (under 50 tons) in accordance with the following schedule:

Booms of 80 feet up to but not including 130 feet or Leads of 100 feet up to but not including 130 feet	0.50
Booms and/or Leads of 130 feet up to but not including 180 feet	0.75
Booms and/or Leads of 180 feet up to and including 250 feet	1.15
Booms and/or Leads over 250 feet	1.50

The Operator of a crane (50 tons and over) with a boom of 180 feet or more (including jib) shall receive a per hour premium for each hour worked on said crane (50 tons and over) in accordance with the following schedule:

Booms of 180 feet up to and including 250 feet	1.25
Booms over 250 feet	1.75

ENGI0003-004 09/04/2017

	Rates	Fringes
Dredging: (Boat Operators)		
Boat Deckhand	$ 41.22	30.93
Boat Operator	$ 43.43	30.93
Master Boat Operator	$ 43.58	30.93
Dredging: (Clamshell or Dipper Dredging)		
GROUP 1	$ 43.94	30.93
GROUP 2	$ 43.28	30.93
GROUP 3	$ 42.88	30.93
GROUP 4	$ 41.22	30.93
Dredging: (Derricks)		
GROUP 1	$ 43.94	30.93
GROUP 2	$ 43.28	30.93
GROUP 3	$ 42.88	30.93

GROUP 4	$ 41.22	30.93
Dredging: (Hydraulic Suction Dredges)		
GROUP 1	$ 43.58	30.93
GROUP 2	$ 43.43	30.93
GROUP 3	$ 43.28	30.93
GROUP 4	$ 43.22	30.93
GROUP 5	$ 37.88	26.76
Group 5	$ 42.88	30.93
GROUP 6	$ 37.77	26.76
Group 6	$ 42.77	30.93
GROUP 7	$ 36.22	26.76
Group 7	$ 41.22	30.93

CLAMSHELL OR DIPPER DREDGING CLASSIFICATIONS

GROUP 1: Clamshell or Dipper Operator.
GROUP 2: Mechanic or Welder; Watch Engineer.
GROUP 3: Barge Mate; Deckmate.
GROUP 4: Bargeman; Deckhand; Fireman; Oiler.

HYDRAULIC SUCTION DREDGING CLASSIFICATIONS

GROUP 1: Leverman.
GROUP 2: Watch Engineer (steam or electric).
GROUP 3: Mechanic or Welder.
GROUP 4: Dozer Operator.
GROUP 5: Deckmate.
GROUP 6: Winchman (Stern Winch on Dredge)
GROUP 7: Deckhand (can operate anchor scow under direction of Deckmate); Fireman; Leveeman; Oiler.

DERRICK CLASSIFICATIONS

GROUP 1: Operators (Derricks, Piledrivers and Cranes).
GROUP 2: Saurman Type Dragline (over 5 cubic yards).
GROUP 3: Deckmate; Saurman Type Dragline (up to and including 5 yards).
GROUP 4: Deckhand, Fireman, Oiler.

ENGI0003-044 09/03/2018

	Rates	Fringes
Power Equipment Operators (PAVING)		
Asphalt Concrete Material Transfer	$ 42.92	32.08
Asphalt Plant Operator	$ 43.35	32.08
Asphalt Raker	$ 41.96	32.08
Asphalt Spreader Operator	$ 43.44	32.08
Cold Planer	$ 43.75	32.08

Combination Loader/Backhoe (over 3/4 cu.yd.)	$ 41.96	32.08
Combination Loader/Backhoe (up to 3/4 cu.yd.)	$ 40.98	32.08
Concrete Saws and/or Grinder (self-propelled unit on streets, highways, airports and canals)	$ 42.92	32.08
Grader	$ 43.75	32.08
Laborer, Hand Roller	$ 41.46	32.08
Loader (2 1/2 cu. yds. and under)	$ 42.92	32.08
Loader (over 2 1/2 cu. yds. to and including 5 cu. yds.)	$ 43.24	32.08
Roller Operator (five tons and under)	$ 41.69	32.08
Roller Operator (over five tons)	$ 43.12	32.08
Screed Person	$ 42.92	32.08
Soil Stabilizer	$ 43.75	32.08

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* IRON0625-001 09/01/2022

	Rates	Fringes
Ironworkers:	$ 45.00	39.00

a. Employees will be paid $.50 per hour more while working in tunnels and coffer dams; $1.00 per hour more when required to work under or are covered with water (submerged) and when they are required to work on the summit of Mauna Kea, Mauna Loa or Haleakala.

LABO0368-001 09/05/2022

	Rates	Fringes
Laborers:		
Driller	$ 41.00	24.25
Final Clean Up	$ 30.45	19.57
Gunite/Shotcrete Operator and High Scaler	$ 40.50	24.25
Laborer I	$ 40.00	24.25
Laborer II	$ 37.40	24.25
Mason Tender/Hod Carrier	$ 40.50	24.25
Powderman	$ 41.00	24.25
Window Washer (bosun chair)	$ 39.50	24.25

LABORERS CLASSIFICATIONS

Laborer I: Air Blasting run by electric or pneumatic compressor; Asphalt Laborer, Ironer, Raker, Luteman, and Handroller, and all types of Asphalt Spreader Boxes;

Asphalt Shoveler; Assembly and Installation of Multiplates, Liner Plates, Rings, Mesh, Mats; Batching Plant (portable and temporary); Boring Machine Operator (under streets and sidewalks); Buggymobile; Burning and Welding; Chainsaw, Faller, Logloader, and Bucker; Compactors (Jackson Jumping Jack and similar); Concrete Bucket Dumpman; Concrete Chipping; Concrete Chuteman/Hoseman (pouring concrete) (the handling of the chute from ready-mix trucks for such jobs as walls, slabs, decks, floors, foundations, footings, curbs, gutters, and sidewalks); Concrete Core Cutter (Walls, Floors, and Ceiling); Concrete Grinding or Sanding; Concrete: Hooking on, signaling, dumping of concrete for treme work over water on caissons, pilings, abutments, etc.; Concrete: Mixing, handling, conveying, pouring, vibrating, otherwise placing of concrete or aggregates or by any other process; Concrete: Operation of motorized wheelbarrows or buggies or machines of similar character, whether run by gas, diesel, or electric power; Concrete Placement Machine Operator: operation of Somero Hammerhead, Copperheads, or similar machines; Concrete Pump Machine (laying, coupling, uncoupling of all connections and cleaning of equipment); Concrete and/or Asphalt Saw (Walking or Handtype) (cutting walls or flatwork) (scoring old or new concrete and/or asphalt) (cutting for expansion joints) (streets and ways for laying of pipe, cable or conduit for all purposes); Concrete Shovelers/Laborers (Wet or Dry); Concrete Screeding for Rough Strike-Off: Rodding or striking-off, by hand or mechanical means prior to finishing; Concrete Vibrator Operator; Coring Holes: Walls, footings, piers or other obstructions for passage of pipes or conduits for any purpose and the pouring of concrete to secure the hole; Cribbers, Shorer, Lagging, Sheeting, and Trench Jacking and Bracing, Hand-Guided Lagging Hammer Whaling Bracing; Curbing (Concrete and Asphalt); Curing of Concrete (impervious membrane and form oiler) mortar and other materials by any mode or method; Cut Granite Curb Setter (setting, leveling and grouting of all precast concrete or stone curbs); Cutting and Burning Torch (demolition); Dri Pak-It Machine; Environmental Abatement: removal of asbestos, lead, and bio hazardous materials (EPA and/or OSHA certified); Falling, bucking, yarding, loading or burning of all trees or timber on construction site; Forklift (9 ft. and under); Gas, Pneumatic, and Electric tools; Grating and Grill work for drains or other purposes; Green Cutter of concrete or aggregate in any form, by hand, mechanical means, grindstone or air and/or water; Grout: Spreading for any purpose; Guinea Chaser (Grade Checker) for general utility trenches, sitework, and excavation; Headerboard Man (Asphalt or Concrete); Heat Welder of Plastic (Laborers' AGC certified workers) (when work involves waterproofing for waterponds, artificial lakes and reservoir) heat welding for sewer pipes and fusion of HDPE pipes; Heavy Highway Laborer (Rigging, signaling, handling,

and installation of pre-cast catch basins, manholes, curbs and gutters); High Pressure Nozzleman - Hydraulic Monitor (over 100# pressure); Jackhammer Operator; Jacking of slip forms: All semi and unskilled work connected therewithin; Laying of all multi-cell conduit or multi-purpose pipe; Magnesite and Mastic Workers (Wet or Dry)(including mixer operator);Mortar Man; Mortar Mixer (Block, Brick, Masonry, and Plastering); Nozzleman (Sandblasting and/or Water Blasting): handling, placing and operation of nozzle; Operation, Manual or Hydraulic jacking of shields and the use of such other mechanical equipment as may be necessary; Pavement Breakers; Paving, curbing and surfacing of streets, ways, courts, under and overpasses, bridges, approaches, slope walls, and all other labor connected therewith; Pilecutters; Pipe Accessment in place, bolting and lining up of sectional metal or other pipe including corrugated pipe; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, HDPE, metallic or non-metallic, conduit, and any other stationary-type of tubular device used for conveying of any substance or element, whether water, sewage, solid, gas, air, or other product whatsoever and without regard to the nature of material from which tubular material is fabricated; No-joint pipe and stripping of same, Pipewrapper, Caulker, Bander, Kettlemen, and men applying asphalt, Laykold, treating Creosote and similar-type materials (6-inch) pipe and over); Piping: resurfacing and paving of all ditches in preparation for laying of all pipes; Pipe laying of lateral sewer pipe from main or side sewer to buildings or structure (except Contactor may direct work be done under proper supervision); Pipe laying, leveling and marking of the joint used for main or side sewers and storm sewers; Laying of all clay, terra cotta, ironstone, vitrified concrete, HDPE or other pipe for drainage; Placing and setting of water mains, gas mains and all pipe including removal of skids; Plaster Mortar Mixer/Pump; Pneumatic Impact Wrench; Portable Sawmill Operation: Choker setters, off bearers, and lumber handlers connected with clearing; Posthole Digger (Hand Held, Gas, Air and Electric); Powderman's Tender; Power Broom Sweepers (Small); Preparation and Compaction of roadbeds for railroad track laying, highway construction, and the preparation of trenches, footings, etc., for cross-country transmission by pipelines, electrical transmission or underground lines or cables (by mechanical means); Raising of structure by manual or hydraulic jacks or other methods and resetting of structure in new locations, including all concrete work; Ramming or compaction; Rigging in connection with Laborers' work (except demolition), Signaling (including the use of walkie talkie) Choke Setting, tag line usage; Tagging and Signaling of building materials

into high rise units; Riprap, Stonepaver, and Rock Slinger (includes placement of stacked concrete, wet or dry and loading, unloading, signaling, slinging and setting of other similar materials); Rotary Scarifier (including multiple head concrete chipping Scarifier); Salamander Heater, Drying of plaster, concrete mortar or other aggregate; Scaffold Erector Leadman; Scaffolds: (Swing and hanging) including maintenance thereof; Scaler; Septic Tank/Cesspool and Drain Fields Digger and Installer; Shredder/Chipper (tree branches, brush, etc.); Stripping and Setting Forms; Stripping of Forms: Other than panel forms which are to be re-used in their original form, and stripping of forms on all flat arch work; Tampers (Barko, Wacker, and similar type); Tank Scaler and Cleaners; Tarman; Tree Climbers and Trimmers; Trencher (includes hand-held, Davis T-66 and similar type); Trucks (flatbed up to and including 2 1/2 tons when used in connection with on-site Laborers'work; Trucks (Refuse and Garbage Disposal) (from job site to dump); Vibra-Screed (Bull Float in connection with Laborers' work); Well Points, Installation of or any other dewatering system.

Laborer II: Asphalt Plant Laborer; Boring Machine Tender; Bridge Laborer; Burning of all debris (crates, boxes, packaging waste materials); Chainman, Rodmen, and Grade Markers; Cleaning, clearing, grading and/or removal for streets, highways, roadways, aprons, runways, sidewalks, parking areas, airports, approaches, and other similar installations; Cleaning or reconditioning of streets, ways, sewers and waterlines, all maintenance work and work of an unskilled and semi-skilled nature; Concrete Bucket Tender (Groundman) hooking and unhooking of bucket; Concrete Forms; moving, cleaning, oiling and carrying to the next point of erection of all forms; Concrete Products Plant Laborers; Conveyor Tender (conveying of building materials); Crushed Stone Yards and Gravel and Sand Pit Laborers and all other similar plants; Demolition, Wrecking and Salvage Laborers: Wrecking and dismantling of buildings and all structures, with use of cutting or wrecking tools, breaking away, cleaning and removal of all fixtures, All hooking, unhooking, signaling of materials for salvage or scrap removed by crane or derrick; Digging under streets, roadways, aprons or other paved surfaces; Driller's Tender; Chuck Tender, Outside Nipper; Dry-packing of concrete (plugging and filling of she-bolt holes); Fence and/or Guardrail Erector: Dismantling and/or re-installation of all fence; Finegrader; Firewatcher; Flagman (Coning, preparing, stablishing and removing portable roadway barricade devices); Signal Men on all construction work defined herein, including Traffic Control Signal Men at construction site; General Excavation; Backfilling, Grading and all other labor connected therewith; Digging of trenches, ditches and manholes and the leveling, grading

and other preparation prior to laying pipe or conduit for any purpose; Excavations and foundations for buildings, piers, foundations and holes, and all other construction. Preparation of street ways and bridges; General Laborer: Cleaning and Clearing of all debris and surplus material. Clean-up of right-of-way. Clearing and slashing of brush or trees by hand or mechanical cutting. General Clean up: sweeping, cleaning, wash-down, wiping of construction facility and equipment (other than ""Light Clean up (Janitorial) Laborer. Garbage and Debris Handlers and Cleaners. Appliance Handling (job site) (after delivery unlading in storage area); Ground and Soil Treatment Work (Pest Control); Gunite/Shotcrete Operator Tender; Junk Yard Laborers (same as Salvage Yard); Laser Beam ""Target Man"" in connection with Laborers' work; Layout Person for Plastic (when work involves waterproofing for waterponds, artificial lakes and reservoirs); Limbers, Brush Loaders, and Pilers; Loading, Unloading, carrying, distributing and handling of all rods and material for use in reinforcing concrete construction (except when a derrick or outrigger operated by other than hand power is used); Loading, unloading, sorting, stockpiling, handling and distribution of water mains, gas mains and all pipes; Loading and unloading of all materials, fixtures, furnishings and appliances from point of delivery to stockpile to point of installation; hooking and signaling from truck, conveyance or stockpile; Material Yard Laborers; Pipelayer Tender; Pipewrapper, Caulker, Bander, Kettlemen, and men applying asphalt, Laykold, Creosote, and similar-type materials (pipe under 6 inches); Plasterer Laborer; Preparation, construction and maintenance of roadbeds and sub-grade for all paving, including excavation, dumping, and spreading of sub-grade material; Prestressed or precast concrete slabs, walls, or sections: all loading, unloading, stockpiling, hooking on of such slabs, walls or sections; Quarry Laborers; Railroad, Streetcar, and Rail Transit Maintenance and Repair; Roustabout; Rubbish Trucks in connection with Building Construction Projects (excluding clearing, grubbing, and excavating); Salvage Yard: All work connected with cutting, cleaning, storing, stockpiling or handling of materials, all cleanup, removal of debris, burning, back-filling and landscaping of the site; Sandblasting Tender (Pot Tender): Hoses and pots or markers; Scaffolds: Erection, planking and removal of all scaffolds used for support for lathers, plasters, brick layers, masons, and other construction trades crafts; Scaffolds: (Specially designed by carpenters) laborers shall tend said carpenter on erection and dismantling thereof, preparation for foundation or mudsills, maintenance; Scraping of floors; Screeds: Handling of all screeds to be reused; handling, dismantling and conveyance of screeds; Setting, leveling and securing or bracing of metal or other road forms and expansion joints; Sheeting Piling/trench shoring (handling

and placing of skip sheet or wood plank trench shoring); Ship Scalers; Shipwright Tender; Sign Erector (subdivision traffic, regulatory, and street-name signs); Sloper; Slurry Seal Crews (Mixer Operator, Applicator, Squeegee Man, Shuttle Man, Top Man); Snapping of wall ties and removal of tie rods; Soil Test operations of semi and unskilled labor such as filling sand bags; Striper (Asphalt, Concrete or other Paved Surfaces); Tool Room Attendant (Job Site); Traffic Delineating Device Applicator; Underpinning, lagging, bracing, propping and shoring, loading, signaling, right-of-way clearance along the route of movement, The clearance of new site, excavation of foundation when moving a house or structure from old site to new site; Utilities employees; Water Man; Waterscape/Hardscape Laborers; Wire Mesh Pulling (all concrete pouring operations); Wrecking, stripping, dismantling and handling concrete forms an false work.

LABO0368-002 09/05/2022

	Rates	Fringes
Landscape & Irrigation Laborers		
GROUP 1	$ 27.25	15.80
GROUP 2	$ 28.25	15.80
GROUP 3	$ 22.15	15.80

LABORERS CLASSIFICATIONS

GROUP 1: Installation of non-potable permanent or temporary irrigation water systems performed for the purposes of Landscaping and Irrigation architectural horticultural work; the installation of drinking fountains and permanent or temporary irrigation systems using potable water for Landscaping and Irrigation architectural horticultural purposes only. This work includes (a) the installation of all heads, risers, valves, valve boxes, vacuum breakers (pressure and non-pressure), low voltage electrical lines and, provided such work involves electrical wiring that will carry 24 volts or less, the installation of sensors, master control panels, display boards, junction boxes, conductors, including all other components for controllers, (b) and metallic (copper, brass, galvanized, or similar) pipe, as well as PVC or other plastic pipe including all work incidental thereto, i.e., unloading, handling and distribution of all pipes fittings, tools, materials and equipment, (c) all soldering work in connection with the above whether done by torch, soldering iron, or other means; (d) tie-in to main lines, thrust blocks (both precast and poured in place), pipe hangers and supports incidental to installation of the entire irrigation system,

(e) making of pressure tests, start-up testing, flushing, purging, water balancing, placing into operation all irrigation equipment, fixtures and appurtenances installed under this agreement, and (f) the fabrication, replacement, repair and servicing oflandscaping and irrigation systems. Operation of hand-held gas, air, electric, or self-powered tools and equipment used in the performance of Landscape and Irrigation work in connection with architectural horticulture; Choke-setting, signaling, and rigging for equipment operators on job-site in the performance of such Landscaping and Irrigation work; Concrete work (wet or dry) performed in connection with such Landscaping and Irrigation work. This work shall also include the setting of rock, stone, or riprap in connection with such Landscape, Waterscape, Rockscape, and Irrigation work; Grubbing, pick and shovel excavation, and hand rolling or tamping in connection with the performance of such Landscaping and Irrigation work; Sprigging, handseeding, and planting of trees, shrubs, ground covers, and other plantings and the performance of all types of gardening and horticultural work relating to said planting; Operation of flat bed trucks (up to and including 2 1/2 tons).:

GROUP 2. Layout of irrigation and other non-potable irrigation water systems and the layout of drinking fountains and other potable irrigation water systems in connection with such Landscaping and Irrigation work. This includes the layout of all heads, risers, valves, valve boxes, vacuum breakers, low voltage electrical lines, hydraulic and electrical controllers, and metallic (coppers, brass, galvanized, or similar) pipe, as well as PVC or other plastic pipe. This work also includes the reading and interpretation of plans and specifications in connection with the layout of Landscaping, Rockscape, Waterscape, and Irrigation work; Operation of Hydro-Mulching machines (sprayman and driver), Drillers, Trenchers (riding type, Davis T-66, and similar) and fork lifts used in connection with the performance of such Landscaping and Irrigation work; Tree climbers and chain saw tree trimmers, Sporadic operation (when used in connection with Landscaping, Rockscape, Waterscape, and Irrigation work) of Skid-Steer Loaders (Bobcat and similar), Cranes (Bantam, Grove, and similar), Hoptos, Backhoes, Loaders, Rollers, and Dozers (Case, John Deere, and similar), Water Trucks, Trucks requiring a State of Hawaii Public Utilities Commission Type 5 and/or type 7 license, sit-down type and ""gang"" mowers, and other self-propelled, sit-down operated machines not listed under Landscape & Irrigation Maintenance Laborer; Chemical spraying using self-propelled power spraying equipment (200 gallon capacity or more).

GROUP 3: Maintenance of trees, shrubs, ground covers, lawns

and other planted areas, including the replanting of trees, shrubs, ground covers, and other plantings that did not ""take"" or which are damaged; provided, however, that re-planting that requires the use of equipment, machinery, or power tools shall be paid for at the rate of pay specified under Landscape and Irrigation Laborer, Group 1; Raking, mowing, trimming, and runing, including the use of ""weed eaters"", hedge trimmers, vacuums, blowers, and other hand-held gas, air, electric, or self-powered tools, and the operation of lawn mowers (Note: The operation of sit-down type and ""gang"" mowers shall be paid for at the rate of pay specified under Landscape & Irrigation Laborer, Group 2); Guywiring, staking, propping, and supporting trees; Fertilizing, Chemical spraying using spray equipment with less than 200 gallon capacity, Maintaining irrigation and sprinkler systems, including the staking, clamping, and adjustment of risers, and the adjustment and/or replacement of sprinkler heads, (Note: the cleaning and gluing of pipe and fittings shall be paid for at the rate of pay specified under Landscape & Irrigation Laborer(Group 1); Watering by hand or sprinkler system and the peformance of other types of gardening, yardman, and horticultural-related work.

LABO0368-003 09/05/2022

	Rates	Fringes
Underground Laborer		
GROUP 1	$ 40.60	24.25
GROUP 2	$ 42.10	24.25
GROUP 3	$ 42.60	24.25
GROUP 4	$ 43.60	24.25
GROUP 5	$ 43.95	24.25
GROUP 6	$ 44.20	24.25
GROUP 7	$ 44.65	24.25

GROUP 1: Watchmen; Change House Attendant.

GROUP 2: Swamper; Brakeman; Bull Gang-Muckers, Trackmen; Dumpmen (any method); Concrete Crew (includes rodding and spreading); Grout Crew; Reboundmen

GROUP 3: Chucktenders and Cabletenders; Powderman (Prime House); Vibratorman, Pavement Breakers

GROUP 4: Miners - Tunnel (including top and bottom man on shaft and raise work); Timberman, Retimberman (wood or steel or substitute materials thereof); Blasters, Drillers, Powderman (in heading); Microtunnel Laborer; Headman; Cherry Pickerman (where car is lifted); Nipper; Grout Gunmen; Grout Pumpman & Potman; Gunite, Shotcrete Gunmen & Potmen; Concrete Finisher (in tunnel); Concrete Screed Man;

Bit Grinder; Steel Form Raisers & Setters; High Pressure Nozzleman; Nozzleman (on slick line); Sandblaster-Potman (combination work assignment interchangeable); Tugger

GROUP 5: Shaft Work & Raise (below actual or excavated ground level); Diamond Driller; Gunite or Shotcrete Nozzleman; Rodman; Groundman

GROUP 6: Shifter

GROUP 7: Shifter (Shaft Work & Raiser)

PAIN1791-001 07/01/2022

	Rates	Fringes
Painters:		
Brush	$ 40.00	30.59
Sandblaster; Spray	$ 40.00	30.59

PAIN1889-001 07/01/2022

	Rates	Fringes
Glaziers	$ 41.50	38.37

PAIN1926-001 02/27/2022

	Rates	Fringes
Soft Floor Layers	$ 38.77	33.31

PAIN1944-001 01/02/2022

	Rates	Fringes
Taper	$ 43.85	32.65

PLAS0630-001 09/05/2022

	Rates	Fringes
PLASTERER	$ 45.00	33.58

PLAS0630-002 08/31/2020

	Rates	Fringes
Cement Masons:		
Cement Masons	$ 42.65	32.29
Trowel Machine Operators	$ 42.80	32.29

PLUM0675-001 07/03/2022

	Rates	Fringes
Plumber, Pipefitter, Steamfitter & Sprinkler Fitter	$ 50.13	29.05

ROOF0221-001 09/05/2021

	Rates	Fringes
Roofers (Including Built Up, Composition and Single Ply)	$ 42.55	20.78

SHEE0293-001 02/27/2022

	Rates	Fringes
Sheet metal worker	$ 46.22	30.64

* SUHI1997-002 09/15/1997

	Rates	Fringes
Drapery Installer	$ 13.60 **	1.20
FENCE ERECTOR (Chain Link Fence)	$ 9.33 **	1.65

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

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($15.00) or 13658 ($11.25). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is

like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates

the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PART 0.D – SPECIAL PROVISIONS

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.

Airport Improvement Program (AIP) - A grant-in-aid program, administered by the Federal Aviation Administration (FAA).

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).

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.

Construction Safety and Phasing Plan (CSPP) - The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.

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.

Federal Specifications - The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.

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.

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.

Modification of Standards (MOS) - Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.

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.

Passenger Facility Charge (PFC) - Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.

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

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

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.

Safety Plan Compliance Document (SPCD) - Details how the Contractor will comply with the CSPP.

Sponsor - A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.

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.

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

"The bidder shall submit the proposal in HIePRO. Bids received after said due date and time shall not be considered. Original bid documents do not have to be submitted. Award will be made based on proposal submitted in HIePRO."

2.11 BID SECURITY is amended as follows: Paragraph (a) shall be replaced with the following:

"(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 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, or

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."

4. Proposal Guaranty listed in (1) and (3) shall be in its original form, and shall be received at the Contracts Office, Department of Transportation, 869 Punchbowl Street, Honolulu, Hawaii 96813 before the bid deadline.

2.12 Pre-Opening Modification or Withdrawal of Bids is amended by deleting 2.12 Pre-Opening Modification or Withdrawal of Bids in its entirety and replaced with the following:

"A bidder may withdraw or revise a proposal after the bidder submits the proposal in HIePRO. Withdrawal or revisions of proposal must be completed before the time set for the receiving of bids."
2.14 PUBLIC OPENING OF BIDS is amended by deleting 2.14 Public Opening of bids in its entirety

4.12 UTILITIES AND SERVICES is amended as follows:

Add the following after the last paragraph:

"(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."

7.4 WORKING HOURS; NIGHT WORK is amended as follows: Paragraph shall be replaced with the following:

"Normal working hours shall be as shown on the Plans."

7.21 PUBLIC CONVENIENCE AND SAFETY - is hereby added to Article VII of 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:

The schedule of liquidated damages provided in Section 8.8 of the General Provisions in these specifications shall be amended to include the following:

TEN THOUSAND DOLLARS ($10,000.00) per calendar day for failure to complete the project withing TWO HUNDRED SEVENTY-EIGHT (278) calendar days from the date indicated in the Notice to Proceed from the State.

Phase	1	2	3	4	5	6	7	8
Duration (calendar days)	90	30	14	14	28	28	7	7

TEN THOUSAND DOLLARS ($10,000.00) per hour for delay in re-opening the runway when an overnight closure is required. Charges shall be prorated but rounded up to the next 15 minute increment.

FIVE THOUSAND DOLLARS ($5,000.00) per hour for delay in re-opening the taxiway when a closure is required. Charges shall be prorated but rounded up to the next 15 minute increment.

8.20 LIMITATION OF OPERATIONS: is hereby added to Article VIII of 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.

Blasting Operations - The Contractor shall notify the Engineer at least three (3) days before performing blasting operations as to the extent and timing of such operations, so that the Control Tower and other concerned parties can be informed.

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 Article VIII of the General Provisions:

"The contractor shall conform with 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--------

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PART 0.E – REQUIRED FEDERAL AIRPORT IMPROVEMENT PROGRAM (AIP) CONTRACT PROVISIONS

NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

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

   Timetables

   Goals for minority participation for each trade: 69.1%

   Goals for female participation in each trade: 6.9%

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

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

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

As used in this notice and in the contract resulting from this solicitation, the "covered area" is Hilo, Hawaii.

EQUAL OPPORTUNITY CLAUSE

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

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

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

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

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

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

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

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

STANDARD FEDERAL EQUAL EMPLOYEMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS

1. As used in these specifications:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

   b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;

   c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;

   d. "Minority" includes:

      1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

      2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);

      3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

      4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

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

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

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and

such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

DISADVANTAGED BUSINESS ENTERPRISE REQUIREMENTS

I. GENERAL

This project is subject to Title 49, Code of Federal Regulations, Part 26, entitled "Participation by Disadvantaged Business Enterprise in Department of Transportation Financial Assistance Programs," hereinafter referred to as the ("DBE Regulations") and is incorporated and made a part of this contract herein by this reference. The following shall be incorporated as part of the contract documents for compliance. If any requirements herein are in conflict with the general provisions or special provisions applicable to this project, the requirements herein shall prevail unless specifically superseded or amended in the special provisions or by addendum.

II. POLICY

It is the policy of the U.S. Department of Transportation ("USDOT") and the State of Hawaii, Department of Transportation and its political subdivisions ("Department") that Disadvantaged Business Enterprises ("DBE"), as defined in the DBE Regulations, have an equal opportunity to receive and participate in federally assisted contracts.

III. DBE ASSURANCES

Each contract signed with a prime contractor (and each subcontract the prime contractor signs with a subcontractor) shall include the following assurance:

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

The prime contractor agrees to include the above statements in any subsequent contracts that it enters into with other contractors and shall require those contractors to include similar statements in further agreements.

IV. BIDDER/OFFEROR RESPONSIBILITIES

All bidders/offerors are required to register with the Department's OCR, DBE Section, using the Bidder Registration Form, which can be downloaded from the Department's website at http://hidot.hawaii.gov/administration/ocr/dbe/dbe-program-forms/. Certified DBEs are considered registered with the Department and are not required to submit a

Bidder Registration Form. All other bidders/offerors are required to complete this form which may be faxed to (808) 831-7944, e-mailed to HDOT-DBE@hawaii.gov, or mailed to the HDOT DBE Section at 200 Rodgers Boulevard, Honolulu, Hawaii, 96819. Registered bidders/offerors are posted on the website listed above.

Bidders/offerors, subcontractors, manufacturers, vendors or suppliers, and trucking companies shall fully inform themselves with respect to the requirements of the DBE Regulations. Particular attention is directed to the following matters:

A. Bidders/offerors shall take all necessary steps to ensure that DBEs have an opportunity to participate in this contract.

B. DBEs may participate as a consultant, prime contractor, subcontractor, trucking company, or vendor of materials or supplies. DBEs may also team with other DBEs or non-DBE firms as part of a joint venture or partnership.

C. Agreements between a bidder/offeror and a DBE in which an DBE promises not to provide subcontracting quotations to other bidders/offerors are strictly prohibited.

D. A DBE shall be certified by the Department under the appropriate North American Industry Classification System (NAICS) code and work in their registered field of work in order for credit to be allowed.

E. Information regarding the current certification status of DBEs is available on the internet at https://hdot.dbesystem.com/.

F. Commercially Useful Function ("CUF"). An DBE must perform a CUF. This means that an DBE must be responsible for the execution of a distinct element of the work, must carry out its responsibility by actually performing, managing, and supervising at least 30% of the work involved by using its own employees and equipment, must negotiate price, determine quality and quantity, order and install material (when applicable), and must pay for the material itself.[1]

To determine whether an DBE is performing a CUF, the Department must evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing, the DBE credit claimed for performance of the work, and other relevant factors. The prime contractor is responsible to ensure that the DBE performs a CUF.

V. PROPOSAL REQUIREMENTS

A. DBEs must be certified by the bid opening date.

[1] The use of joint checks payable to an DBE subcontractor and supplier may be allowed to purchase materials and supplies under limited circumstances. See VII USE OF JOINT CHECKS UNDER THE DBE PROGRAM

B. DBE subcontractors, manufacturers, suppliers, trucking companies, and any second tier subcontractors shall be listed on the respective DBE forms as specified below in order to receive credit.

C. The following forms are due to the Department's Project Manager or designee **by the close of business, 4:30 P.M. Hawaii Standard Time (HST), five (5) days after bid opening:**[2]

1. DBE Confirmation and Commitment Agreement. This form must be signed by the bidder/offeror and each DBE subcontractor, manufacturer, supplier, or trucking company. Information to be provided on the form shall include, among other things, the project number, the DBE's NAICS codes, description of work, bid items with corresponding price information, prime contractor name and contact information DBE name and contact information and subcontractor name and contact information if the DBE is a second tier subcontractor.

2. DBE Contract Goal Verification and Good Faith Efforts (GFE) Documentation for Construction. List the dollar amount of all subcontractors, manufacturers, suppliers, and trucking companies (both DBE and non-DBE firms). Bidder/offeror must also list the DBE project goal on this form (See paragraph D below regarding goal calculation). The bidder/offeror must submit documentation demonstrating how the DBE goal was met or how the bidder/offeror attempted to meet the goal if the goal was not met. This documentation shall include quotations for both DBE and non-DBE subcontractors when a non-DBE is selected over a DBE for the project. **Documentation of good faith efforts is required irrespective of whether the bidder/offeror met the DBE project goal.**

The above forms must be complete and provide the necessary information to properly evaluate bids/proposals. Failure to provide any of the above shall be cause for bid/proposal rejection.

D. Calculation of the DBE contract goal for this project is the proportionate contract dollar value of work performed, materials, and goods to be supplied by DBEs. DBE credit shall not be given for mobilization, force account items and allowance items. This DBE contract goal is applicable to all the contract work performed for this project and is calculated as follows:

1. DBE contract goal percentage = Contract Dollar Value of the work to be performed by DBE subcontractors and manufacturers, plus 60% of the contract dollar value of DBE suppliers, divided by the sum of all contract items (sum of all contract items is the total amount for comparison of bids less mobilization, force account items, and allowance items).

[2] In computing calendar days, the day from which the period begins to run is not counted, and when the last day of the period is a Saturday, Sunday, or Federal or State holiday, the period extends to the next day that is not a Saturday, Sunday, or holiday.

2. The Department shall adjust the bidder's/offeror's DBE contract goal to the amount of the project goal if it finds that the bidder/offeror met the goal but erroneously calculated a lower percentage. If the amount the bidder/offeror submits as its contract goal exceeds the project goal, the bidder/offeror shall be held to the higher goal.

VI. COUNTING DBE PARTICIPATION TOWARDS CONTRACT GOAL

A. Count the entire amount of the portion of a contract (or other contract not covered by paragraph B below) that is performed by the DBE's own forces. Include the cost of supplies and materials obtained by the DBE for the work on the contract, including supplies purchased or equipment leased by the DBE (except supplies and equipment the DBE subcontractor purchases or leases from the prime contractor or its affiliate).

B. Count the entire amount of fees or commissions charged by an DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a USDOT-assisted contract, toward DBE goals, provided the Department determines the fee to be reasonable and not excessive as compared with fees customarily allowed for similar services.

C. When an DBE subcontracts part of the work of its contract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the DBE's subcontractor is itself an DBE. Work that an DBE subcontracts to a non-DBE firm does not count toward DBE goals.

D. When an DBE performs as a participant in a joint venture, count a portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the DBE performs with its own forces toward DBE goals.

E. Count expenditures to an DBE contractor toward DBE goals only if the DBE is performing a CUF on that contract.

F. The following is a list of appropriate DBE credit to be allowed for work to be performed by an DBE subcontractor. Count expenditures with DBEs for materials or supplies toward DBE goals as provided in the following:

1. If the materials or supplies are obtained from an DBE manufacturer, count 100 percent of the cost of the materials or supplies toward DBE goals;
2. For purposes of determining DBE goal credit, a manufacturer is a firm that operates or maintains a factory or establishment that produces (on the premises) the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications;

3. If the materials or supplies are purchased from an DBE regular dealer, count 60 percent of the cost of the materials or supplies toward DBE goals;
4. For purposes of determining DBE goal credit, a regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business;
5. To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question;
6. A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided in the DBE Regulations, if the person both owns and operates distribution equipment for the products. Any supplementing of a regular dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis;
7. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers;
8. With respect to materials or supplies purchased from an DBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site, toward DBE goals, provided that the Department determines the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services. Do not count any portion of the cost of the materials and supplies themselves toward DBE goals; however,
9. If a firm is not currently certified as an DBE in accordance with standards of this part at the time of the execution of the contract, do not count the firm's participation toward any DBE goals, except as provided for in §26.87(i);
10. Do not count the dollar value of work performed under a contract with a firm after it has ceased to be certified toward the Department’s overall goal; and
11. Do not count the participation of an DBE subcontractor toward a contractor's final compliance with its DBE obligations on a contract until the amount being counted has actually been paid to the DBE.

G. The following factors are used in counting DBE participation for trucking companies:

1. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular

contract, and there cannot be a contrived arrangement for the purpose of meeting DBE goals;

2. The DBE must itself own and operate at least one (1) fully licensed, insured, and operational truck used on the contract;
3. The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs;
4. The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as an DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract;
5. The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE that leases trucks equipped with drivers from a non-DBE is entitled to credit for the total value of transportation services provided by non-DBE leased trucks equipped with drivers not to exceed the value of transportation services on the contract provided by DBE-owned trucks or leased trucks with DBE employee drivers. Additional participation by non-DBE owned trucks equipped with drivers receives credit only for the fee or commission it receives as a result of the lease arrangement. If a recipient chooses this approach, it must obtain written consent from the appropriate Department operating administration.
   EXAMPLE: DBE firm X uses two (2) of its own trucks on a contract, leases two (2) trucks from DBE Firm Y and six (6) trucks from non-DBE Firm Z. DBE credit would be awarded for the total value of transportation services provided by Firm X and Firm Y, and may also be awarded for the total value of transportation services provided by four (4) of the six (6) trucks provided by Firm Z. In all, full credit would be allowed for the participation of eight (8) trucks. With respect to the other two (2) trucks provided by Firm Z, DBE credit could be awarded only for the fees or commissions pertaining to those trucks Firm X receives as a result of the lease with Firm Z;
6. The DBE may lease trucks without drivers from a non-DBE truck leasing company. If the DBE leases trucks from a non-DBE truck leasing company and uses its own employees as drivers, it is entitled to credit for the total value of these hauling services.
   EXAMPLE: DBE Firm X uses two (2) of its own trucks on a contract. It leases two (2) additional trucks from non-DBE Firm Z. Firm X uses its own employees to drive the trucks leased from Firm Z. DBE credit would be awarded for the total value of the transportation services provided by all four (4) trucks; and
7. For purposes of determining whether a trucking firm performs a CUF, a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

H. The bidder/offeror may be a joint venture or partnership that has a certified DBE as a partner. A "Joint Venture" means an association between an DBE firm and one (1) or more other firms to carry out a single, for-profit, business enterprise for which the parties combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the contract, and whose share in the capital contribution, control, management, risks and profits are commensurate with its ownership interest.

I. Effects of a Summary Suspension of an DBE. When an DBE's certification is suspended, the DBE may not be considered to meet a contract goal on a new contract and any work it does on a contract received during the suspension shall not be counted towards the overall goal. The DBE may continue to perform work under an existing contract executed before the DBE received a Notice of Suspension and may be counted towards the contract goal during the period of suspension as long as the DBE is performing a CUF under the existing contract.

J. Effects of Decertification of an DBE. Should an DBE become decertified during the term of the subcontract for reasons beyond the control of and with no fault or negligence on the part of the contractor, the work remaining under the subcontract may be credited towards the contract goal, but are not included in the overall accomplishments.

Should the DBE be decertified after contract award and before notice to proceed, the contractor must still meet the DBE goal by either: a) withdrawing the subcontract from the DBE and expending good faith efforts to replace it with an DBE that is currently certified for that same work; or b) continuing with the subcontract with the decertified firm and expending good faith efforts to find other work not already subcontracted out to DBEs in an amount to meet the DBE goal either by; 1) increasing the participation of other DBEs on the project; 2) documenting good faith efforts; or 3) by a combination of the above.

VII. USE OF JOINT CHECKS UNDER THE DBE PROGRAM

A. The following guidelines apply to the use of joint checks:

1. The second party (typically the prime contractor) acts solely as a guarantor;
2. The DBE must release the check to the supplier;
3. The use of joint checks is a commonly recognized business practice;
4. The Department must approve the use of joint checks prior to use by contractors and/or DBEs. As part of this approval process the Department will analyze industry practice to confirm that the use of joint checks is commonly employed outside of the DBE program for non-DBE subcontractors on both federal and state funded contracts. Using joint checks shall not be approved if it conflicts with other aspects of the DBE Regulations regarding CUF; and
5. The Department will monitor the use of joint checks closely to avoid abuse.

B. Contractors and DBEs should review the following general guidelines when determining whether to use joint checks closely to avoid abuse:

1. That standard industry practice applies to all contractors (federal and state contracts);
2. Use of joint checks must be available to all subcontractors;
3. Material industry sets the standard industry practice, not prime contractors;
4. Short term, not to exceed reasonable time (i.e., one (1) year, two (2) years) to establish/increase a credit line with the material supplier;
5. No exclusive arrangement between one (1) prime and one (1) DBE in the use of joint checks that might bring the independence of the DBE into question;
6. Non-proportionate ratio of DBE's normal capacity to size of contract and quantity of material to be provided under the contract;
7. The DBE is normally responsible to install and furnish the work item; and
8. The DBE must be more than an extra participant in releasing the check to the material supplier.

C. The Department shall allow the use of joint checks if the following general conditions are met:

1. DBE submits request to the Department for action;
2. There is a formalized agreement between all parties that specify the conditions under which the arrangement shall be permitted;
3. There is a full and prompt disclosure of the expected use of joint checks;
4. The Department will provide prior approval;
5. DBE remains responsible for all other elements of 49 CFR 26.55(c)(1);
6. The agreement states clearly and determines that independence is not threatened because the DBE retains final decision making responsibility;
7. The Department will determine that the request is not an attempt to artificially inflate DBE participation;
8. Standard industry practice is only one (1) factor;
9. The Department will monitor and maintain oversight of the arrangement by reviewing cancelled checks and/or certification statement of payment; and
10. The Department will verify there is no requirement by prime contractor that the DBE is to use a specific supplier nor the prime contractor's negotiated unit price.

VIII. DEMONSTRATION OF GOOD FAITH EFFORTS FOR CONTRACT AWARD

A. When a project goal is not met, the Department shall conduct the initial review of GFE submitted by the bidder/offeror and shall determine whether the bidder/offeror has performed the quality, quantity, and intensity of efforts that demonstrate a reasonably active and aggressive attempt to meet the contract goal in accordance with 49 CFR Part 26, Appendix A.

B. The bidder/offeror bears the responsibility of demonstrating that it met the contract goal, or if the contract goal was not met, by documenting the GFE it made in an attempt to meet the goal. It is the sole responsibility of the bidder/offeror to submit any and all documents, logs, correspondence, and any other records or information to the Department that will demonstrate that the bidder/offeror made good faith efforts to meet the DBE goal.

C. In its good faith evaluation, the Department shall perform the following as part of its evaluation: a) compare the bidder's/offeror's bid against the bids/offers of other bidders/offerors, and compare the DBEs and DBE work areas utilized by the bidder/offeror with the DBEs listed in other bids/offers submitted for this contract (If other bidders obtained DBEs in a particular work area in which the low bidder did not, the Department shall take this into consideration in its evaluation); b) verify contacts by bidders/offerors with DBEs; and c) compare the DBE and the categories of DBE work targeted by the bidder/offeror for participation in the contract, with the total pool of available DBEs ready, willing and able to perform work on each particular subcontract targeted by the bidder/offeror.

D. Actions on the part of the bidder/offeror that will be considered demonstrative of good faith efforts include, but are not limited to, the following:

1. Whether the bidder/offeror submitted the required information (i.e., DBE name, address, NAICS code, description of work, project name, and number), and dollar amounts for all subcontractors, within five (5) days of bid opening;
2. Whether the bidder/offeror solicited through all reasonable and available means (e.g., attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform part or all of the work to be included under the contract. The Department will also consider whether the bidder/offeror solicited the participation of potential DBEs as early in the procurement process as practicable, and allowed sufficient time for the DBEs to properly inquire about the project and respond to the solicitation. The Department will also review whether the bidder/offeror took appropriate steps to follow up with interested DBEs in a timely manner to facilitate participation by DBEs in this project;
3. Whether the bidder/offeror identified and broke up portions of work that can be performed by DBEs in order to increase the likelihood that an DBE will be able to participate, and that the DBE goal could be achieved (e.g., breaking out contract items into economically feasible units to facilitate DBE participation even when the bidder/offeror might otherwise prefer to self-perform these work items with its own forces);
4. Whether the bidder/offeror made available or provided interested DBEs with adequate information about the plans, specifications, and requirements of the project in a timely manner, and assisted them in responding to the bidder's/offeror's solicitation;

5. Whether the bidder/offeror negotiated in good faith with interested DBEs. Evidence of such negotiations includes documenting: a) the names, addresses and telephone numbers of DBEs that were contacted; b) a description of the information that was provided to DBEs regarding the plans and specifications; and c) detailed explanation for not utilizing individual DBEs on the project;
6. Whether the bidder/offeror solely relied on price in determining whether to use an DBE. The fact that there may be additional or higher costs associated with finding and utilizing DBEs are not, by itself, sufficient reasons for a bidder's/offeror's refusal to utilize an DBE, or the failure to meet the DBE goal, provided that such additional costs are not unreasonable. Also, the ability or desire of a bidder/offeror to perform a portion of the work with its own forces, that could have been undertaken by an available DBE, does not relieve the bidder/offeror of the responsibility to make good faith efforts to meet the DBE goal, and to make available and solicit DBE participation in other areas of the project to meet the DBE goal;
7. Whether the bidder/offeror rejected DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The DBEs standing within the industry, membership in specific groups, organizations or associations, and political or social affiliation are not legitimate basis for the rejection or non-solicitation of bids from particular DBEs;
8. Whether the bidder/offeror made efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance;
9. Whether the bidder/offeror made efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials or related assistance or services;
10. Whether the bidder/offeror effectively used the services of available minority/women community organizations, minority/women business groups, contractors' groups, and local, state and federal minority/women business assistance offices or other organizations to provide assistance in recruitment and placement of DBEs;
11. Whether the bidder/offeror, who selects a non-DBE over an DBE subcontractor, has quotes of each DBE and non-DBE subcontractor submitted to the bidder for work on the contract; and for each DBE that was contacted but not utilized by the bidder/offeror for a contract, the bidder/offeror has a detailed written explanation for each DBE detailing the reasons for the bidder's/offeror's failure or inability to utilize, or to allow the DBE to participate in the contract; and
12. Whether other bidders/offerors met the goal and whether the apparent successful bidder/offeror could have met the goal with additional efforts. The Department may determine that an apparent successful bidder/offeror who fell short of meeting the goal, made good faith efforts when it met or exceeded the average DBE participation obtained by other bidders/offerors.

IX. ADMINISTRATIVE RECONSIDERATION.

If it is determined by the Department that the apparent successful bidder/offeror has failed to meet the provisions of 49 CFR Section 26.53(a), the bidder/offeror may submit a request for administrative reconsideration. If under the provisions of 49 CFR, Section 26.53(d), it is determined by the Department that the apparent successful bidder/offeror has failed to meet the provisions of this subsection, the bidder/offeror may submit a written request for administrative reconsideration.

A. Within five (5) working days of being informed in writing by the Department that the bidder/offeror has not documented sufficient GFE, a bidder/offeror may request administrative reconsideration. Bidders/offerors should make this request in writing to the following official:

Director of Transportation
Hawaii Department of Transportation
869 Punchbowl Street, Room 509
Honolulu, Hawaii 96813

B. The reconsideration official, or his or her designee (referred to as "reconsideration official"), shall not have played any role in the original determination that the bidder/offeror failed to meet the goal or make adequate good faith efforts to do so.

C. As part of this reconsideration, the bidder/offeror will have the opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate GFE to do so. The bidder/offeror will have the opportunity to meet in person with the reconsideration official to discuss the issue of whether it met the goal or made adequate GFE to do so.

D. In an administrative reconsideration, the reconsideration official will review all previously submitted documents, oral and written arguments, and other evidence presented in the reconsideration, in making the decision.

E. The Department shall inform the bidder/offeror of the decision within thirty (30) days of the proceeding. The decision will state the Department's findings, and explain the basis of those findings, with respect to whether or not the bidder/offeror met the contract goal, or whether or not the bidder/offeror made adequate GFE to achieve the contract goal.

F. The reconsideration decision is not administratively appealable to USDOT but is appealable under HRS 103D-709.

X. AWARD OF CONTRACT

A. In a sealed bid procurement, the Department reserves the right to reject any or all bids. The award of contract, if it is awarded, will be to the lowest responsive and responsible bidder who meets or exceeds the DBE project goal, or who makes

good faith efforts to meet or exceed the DBE project goal, as determined by the Department.

B. If the lowest responsible bidder does not meet the DBE project goal and does not demonstrate to the satisfaction of the Department that it made good faith efforts to meet the DBE project goal, such bid shall be rejected as non-responsive. The Department will then consider the next lowest responsive and responsible bidder for award in accordance with paragraph A above.

XI. REPLACEMENT OF AN DBE ON A PROJECT WITH A CONTRACT GOAL

Under this contract, the prime contractor shall utilize the specific DBE listed to perform the work and supply the materials for which each is listed unless the contractor obtains written consent from the Department to replace an DBE. If the Department's consent is not provided, the contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE. The Department reserves the right to request copies of all DBE subcontracts.

The Department will require a contractor to make good faith efforts to replace an DBE that is terminated or has otherwise failed to complete its work on a contract with another certified DBE, to the extent needed to meet the contract goal. A prime contractor's inability to find a replacement DBE at the original price is not sufficient to demonstrate that good faith efforts have been made to replace the original DBE. The fact that the contractor has the ability and/or desire to perform the contract work with its own forces does not relieve the contractor of the obligation to make good faith efforts to find a replacement DBE, and it is not a sound basis for rejecting a prospective replacement DBE's reasonable quote.

The Department will require the prime contractor to promptly provide written notice to the project manager of the DBE's inability or unwillingness to perform and provide reasonable documentation.

The written notice by the contractor must include the following:

1. The date the contractor determined the certified DBE to be unwilling, unable or ineligible to perform work on the contract;
2. The projected date that the contractor shall require a substitution or replacement DBE to commence work if consent is granted by the Department;
3. Documentation of facts that describe and cite specific actions or inactions on the part of the affected DBE that led to the contractor's conclusion that the DBE is unwilling, unable, or ineligible to perform work on the contract;
4. A brief statement of the affected DBE's capacity and ability or inability to perform the work as determined by the contractor;
5. Documentation of contractor's good faith efforts to enable affected DBE to perform the work;
6. The current percentage of work completed on each bid item by the affected DBE;

7. The total dollar amount currently paid per bid item for work performed by the affected DBE;
8. The total dollar amount per bid item remaining to be paid to the DBE for work completed but for which the DBE has not received payment, and with which the contractor has no dispute; and
9. The total dollar amount per bid item remaining to be paid to the DBE for work completed, for which the DBE has not received payment, and with which the contractor and DBE have a dispute.

The prime contractor shall send a copy of the written notice to replace a certified DBE on a contract to the affected DBE. The affected DBE may submit a written response within five (5) calendar days to the Department to explain its position on its performance on the committed work. The Department shall consider both the prime contractor's request and DBE's stated position before approving the termination or substitution request, or determining if any action shall be taken against the contractor.

There shall be no substitution or termination of an DBE subcontractor at any time without the prior written consent of the Department. The Department will provide written consent only if the contractor has good cause, as determined by the Department, to terminate the DBE. Good cause may include, but is not limited to the following circumstances:

1. The DBE subcontractor fails or refuses to execute a written contract;
2. The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards;
3. The listed DBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
4. The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
5. The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1200 or applicable state law;
6. The Department has determined that the listed DBE subcontractor is not a responsible contractor;
7. The listed DBE subcontractor voluntarily withdraws from the project and provides to the Department written notice of its withdrawal;
8. The listed DBE is ineligible to receive DBE credit for the type of work required; and
9. An DBE owner dies or becomes disabled with the result that the listed DBE contractor is unable to complete its work on the contract.

Upon approval from the Department to replace an DBE, the contractor's good faith efforts shall be documented and submitted to the Department within seven (7) calendar days. This time period may be extended for another seven (7) calendar days upon request by the prime contractor.

If an DBE subcontractor is unable to perform work under the contract, and is to be

replaced, the contractor's failure to obtain a substitute certified DBE or to make good faith efforts to obtain such a substitute DBE subcontractor to perform said work, may constitute a breach of this contract for which the Department may terminate the contract or pursue such remedy as deemed appropriate by the Department.

XII. CONTRACT COMPLIANCE

This contract is subject to contract compliance tracking, and the prime contractor and all subcontractors are required to report payments electronically in the HDOT online Certification and Contract Compliance Management System (hereafter referred to as "online tracking system"). The prime contractor shall report the date payment was made by the Department and shall report payment to all subcontractors for the audit period. The prime contractor and all subcontractors are responsible for responding by any noted response date or due date to any instructions or request for information, and to check the online tracking system on a regular basis to manage contact information and contract records.

The prime contractor is responsible for ensuring all subcontractors have completed all requested items and that their contact information is accurate and up-to-date. HDOT may require additional information related to the contract to be provided electronically through the online tracking system at any time before, during, or after contract award. Information related to contractor access of the online tracking system will be provided to designated point of contact with each contractor upon award of the contract. The online tracking system is web-based and can be accessed at the following Internet address: https://hdot.dbesystem.com/.

XIII. PAYMENT

A. The Department will make an estimate in writing each month based on the items of work performed and materials incorporated in the work and the value therefore at the unit prices or lump sum prices set forth in the contract. All progress estimates and payments will be approximate only and shall be subject to correction at any time prior to or in the final estimate and payment. The Department will not withhold any amount from any payment to the contractor, including retainage.

B. The contractor shall pay all subcontractors within ten (10) calendar days after receipt of any progress payments from the Department. This clause applies to both DBE and non-DBE subcontractors, and all tiers of subcontracts.

C. The contractor will verify that payment or retainage has been released to the subcontractors or its suppliers within the specified time through entries in the Department's online tracking system during the corresponding monthly audits. Prompt payment will be monitored and enforced through the contractor's reporting of payments to its subcontractors and suppliers in the online tracking system.

Subcontractors, including lower tier subcontractors and/or suppliers will confirm the timeliness and the payment amounts received utilizing the online tracking system. Discrepancies will be investigated by the DBE Program Office and the project engineer. Payments to the subcontractors, including lower tier subcontractors, and including retainage released after the subcontractor or lower tier subcontractor's work has been completed to the Department's satisfaction, will be reported by the Contractor or the subcontractor.

D. When any subcontractor has satisfactorily completed its work as specified in the subcontract, and there are no bona fide disputes, the contractor shall make prompt and full payment to the subcontractor of all monies due, including retainage, within ten (10) calendar days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented, as required by the Department. The contractor must obtain the prior written approval from the Department before it can continue to withhold retainage from any subcontractor who has completed its portion of the work. This clause applies to both DBE and non-DBE subcontractors, and all tiers of subcontracts.

XIV. RECORDS

The contractor shall maintain and keep all records necessary for the Department to determine compliance with the contractor's DBE obligations. The records shall be available at reasonable times and places for inspection by the Department and appropriate Federal agencies. The records to be kept by the contractor shall include:

1. The names, race/ethnicity, gender, address, phone number, and contact person of all DBE and non-DBE consultants, subcontractors, manufacturers, suppliers, truckers and vendors identified as DBEs;
2. The nature of work of each DBE and non-DBE consultant, subcontractor, manufacturer, supplier, trucker and vendor;
3. The dollar amount contracted with each DBE and non-DBE consultant, subcontractor, manufacturer, supplier, trucker and vendor; and
4. Cumulative dollar amount of all change orders to the subcontract.

XV. FAILURE TO COMPLY WITH DBE REQUIREMENTS

The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT assisted contracts. All contractors, subcontractors, manufacturers and suppliers are hereby advised that failure to carry out all DBE requirements specified herein shall constitute a material breach of contract that may result in termination of the contract or such other remedy as deemed appropriate by the Department including but not limited to: 1) withholding monthly progress payments; 2) assessing sanctions; 3) liquidated damages; and/or 4) disqualifying the contractor from future bidding as non-responsible.

BUY AMERICAN PREFERENCE STATEMENT

The Buy American Preference requirement in 49 USC § 50101 requires that all steel and manufactured goods used on AIP projects be produced in the United States. The statute gives the FAA the ability to issue a waiver to a sponsor to use non-domestic material on an AIP funded project subject to meeting certain conditions. A sponsor may request that the FAA issue a waiver from the Buy American Preference requirements if the FAA finds that:

1. Applying the provision is not in the public interest;
2. The steel or manufactured goods are not available in sufficient quantity or quality in the United States;
3. The cost of components and subcomponents produced in the United States is more than 60 percent of the total components of a facility or equipment, and final assembly has taken place in the United States. Items that have an FAA standard specification item number (such as specific airport lighting equipment) are considered the equipment.
4. Applying this provision would increase the cost of the overall project by more than 25 percent.

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

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

Appendix X. Buy American Guidance

X-1. General Sponsor Buy American Requirements.

The Buy American Preferences under 49 USC § 50101 require that all steel and manufactured goods used in AIP funded projects be produced in the United States. Under 49 USC § 50101(c), ground transportation demonstration projects in 49 USC § 47127 are excluded. Sponsors must complete one of the three requirements in Table X-1 for the AIP projects (including ineligible or non-AIP funded work included in the same contract).

Table X-1 General Sponsor Buy American Requirements

All sponsors must complete one of the following for AIP funded projects…
(1) Certify, in writing, all products are wholly produced in America and are of 100% U.S. materials.
(2) Certify that all equipment that is being used on the project is on the Nationwide Buy American conformance list.
(3) Request a waiver to use non- U.S. produced products.

X-2. Other Buy American and Buy America Requirements.

There are other Buy American and Buy America preference rules and requirements imposed by other Federal agencies that may differ from the AIP Buy American guidance. That is because there are difference statutory requirements for other Federal agencies and grant programs that do not apply to AIP.

X-3. Changes Orders and Buy American Requirements.

A change order to a project requires a separate Buy American review and may require an ADO determination.

X-4. Buy American Waiver Process and Delegation.

Under 49 USC § 50101(b) and 49 CFR § 1.83(a)(11), the FAA is given the authority to waive these Buy American Preferences if certain market or product conditions exist. Many pieces of equipment are constructed with some non- U.S. produced components or subcomponents. Therefore, it is expected that the sponsor will have to request a waiver on a majority of projects (unless the project is constructed of materials that already have a nationwide waiver). These requirements only apply to manufactured components and subcomponents. Software is not considered a component or subcomponent.

The four types of Buy American waivers that the FAA may be issued are listed in Table X-2. The responsibility for Type I and II waivers, as well as any nationwide waivers remains with

APP-500. The ADOs have been delegated the authority to issue Type III and Type IV waivers to a sponsor on a project level.

Table X-2 Criteria by Buy American Waiver Type

For the following…	The following criteria apply…
Type I Waiver	Per 49 USC § 50101(b)(1), the FAA can issue this type of waiver if the FAA determines that applying the Buy American requirements would be inconsistent with the public interest. Due to the possible national implications of such a waiver, APP-500 is responsible for reviewing and issuing Type I Waivers.
Type II Waiver	Per 49 USC § 50101(b)(2), the FAA can issue this type of waiver for equipment or construction material if the FAA determines that the goods are not produced in a sufficient and reasonably available amount or are not of a satisfactory quality. Type II Waivers can only be issued on the equipment/construction material level and cannot be issued for a system and/or facility that is comprised of various pieces of equipment/construction material. These waivers are issued by APP-500, after the FAA publishes a Federal Register Notice asking manufacturers to advise the FAA if they manufacture the equipment/material that is seeking a waiver and if their product meets the FAA specifications and Buy American requirements. After manufacturers respond to this notice, APP-500 will make a determination if there is insufficient quantity or quality.
Type III Waiver	Per 49 USC § 50101(b)(3), the FAA can issue this type of waiver if the FAA determines that 60% or more of the components and subcomponents in the equipment/facility are of U.S. origin and their final assembly is in the United States. A Type III Waiver cannot be issued at the system level and must be issued for each piece of equipment; however, in the case of facilities a Type III Waiver may be issued for the entire facility if all the construction materials when combined meet the 60% U.S. origin requirement. The ADO may issue these waivers. For block grant state projects, only the FAA (usually the ADO) may issue the waivers. Block grant states are not allowed to issue a waiver. To complete a Type III Waiver request, the following supporting documentation must be submitted by the requester: **(1)** A completed Buy American Content Percentage Calculation Worksheet (or equivalent) (see Appendix B for link). Per 49 USC § 50101(c), labor costs at final assembly must be excluded from this worksheet. This is because the Buy American statute is based on the cost of materials and equipment, not labor. **(2)** A completed Buy American Product Final Assembly Questionnaire (or equivalent) (see Appendix B for link). Final assembly in the United States must meet the standard defined below under Final Assembly Location. **(3)** The manufacturer must certify in writing that any major structural steel used in their equipment is of 100% U.S. origin. Small amounts of steel that are used in components and subcomponents, that are not structural steel, may be of foreign origin. This would typically consist of nuts, bolts and clips. For these types of steel, the manufacturer must indicate the use of the steel (nuts, bolts, clips, etc.) and must count this steel as non-U.S. origin when completing the Content Percentage Calculation Form. Per FAA policy, after the ADO reviews the waiver request, the ADO must send a notification to the requester informing them of the approval or disapproval of the

Table X-2 Criteria by Buy American Waiver Type

For the following…	The following criteria apply…
	waiver. The ADO must use the following language in this notification for project specific waivers: *I have reviewed the request for Waiver of Buy American Requirement submitted by XXX for the use of XXXXX equipment on the subject project. The information submitted by XXXX satisfies the requirement for waiver of the requirements of 49 USC § 50101 based on XX% of the cost of components and subcomponents to be used in the project being produced in the United States with final assembly being performed in XXXXXXX. The waiver is hereby approved for use on this AIP grant project*. The ADO must place a copy of the notifications in the grant file. Following this notification, no further action is required.
Type IV Waiver	Per 49 USC § 50101(b)(4), the FAA can issue this type of waiver if the FAA determines that applying Buy American requirements increases the cost of the overall project by more than 25%. The ADO may issue these waivers. For block grant state projects, only the FAA (usually the ADO) may issue the waivers. Block grant states are not allowed to issue a waiver. In order to issue this type of waiver, the FAA must determine that there is at least one bid from a Buy American compliant supplier to make the 25% cost increase determination. Per FAA policy, after the ADO reviews the waiver request, the ADO must send a notification to the requester informing them of the approval or disapproval of the waiver. The ADO must use the following language in this notification for project specific waivers: *I have reviewed the request for Waiver of Buy American Requirement submitted by XXX for the use of XXXXX equipment on the subject project. The information submitted by XXXX satisfies the requirement for waiver of the requirements of 49 USC § 50101 that including domestic material will increase the cost of the overall project by more than 25%. The waiver is hereby approved for use on this AIP grant project*. The ADO must place a copy of the notifications in the grant file. Following this notification no further action is required.

X-5. National Buy American Waiver.

APP-500 may issue National Waivers for certain equipment/material that is used frequently in AIP funded projects. APP-500 will list these National Waivers on the FAA Office of Airports website under the Buy American Conformance List. Any equipment or materials on the Buy American Conformance List do not need additional waiver materials. All personnel not in APP-500 must direct any manufacturer seeking to be added to this Buy American Conformance List to APP-500.

X-6. Definitions.

To assist in making Buy American Waiver determinations the following definitions apply:

Table X-3 Buy American Specific Definitions

Buy American Waiver specific definitions include…
a. Project. The *Project* is generally the project that is being bid or procured. The *Project* does not extend over multiple grants or phases, even though the overall project may be phased or may be built in multiple bid packages.
b. Facility or Equipment. This will be defined differently depending on the project. For a building, the portion of the building that is being funded under the AIP grant is the *facility* listed in the waiver. For other projects, the bid items as described in the current version of Advisory Circular 150/5370-10, Standards for Specifying Construction of Airports, will generally be the *equipment* referred to in the waiver except for airfield electrical equipment. For airfield electrical equipment, the L- items listed in the Addendum to the current version of Advisory Circular 150/5345-53, Airport Lighting Equipment Certification Program, will generally be the *equipment* referred to in the waiver. For a vehicle or single piece of equipment like a snow plow or ARFF vehicle, the single vehicle itself is the *equipment*.
c. Final Assembly Location. Final assembly is a process whereby assembly is meaningful and complex utilizing a substantial amount of time and resources, a number of different assembly operations, and a high level of skilled labor. The Final Assembly Questionnaire must be completed in order to determine whether final assembly occurs at the recorded site.
d. Nonavailable Items. By FAA policy, the list of items that have been determined nonavailable per 48 CFR § 25.104 are excluded from the Buy American preference requirements for AIP funded projects. This list includes petroleum products; therefore, asphalt is a nonavailable item per this list. In addition, the FAA has determined that cement and concrete are also nonavailable items excluded from the Buy American preference requirements (although the steel used for reinforcement, ties, stirrups, etc. must meet Buy American).

§50101. Buying goods produced in the United States

(a) PREFERENCE.—The Secretary of Transportation may obligate an amount that may be appropriated to carry out section 106(k), 44502(a)(2), or 44509, subchapter I of chapter 471 (except section 47127), or chapter 481 (except sections 48102(e), 48106, 48107, and 48110) of this title for a project only if steel and manufactured goods used in the project are produced in the United States.

(b) WAIVER.—The Secretary may waive subsection (a) of this section if the Secretary finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) the steel and goods produced in the United States are not produced in a sufficient and reasonably available amount or are not of a satisfactory quality;

(3) when procuring a facility or equipment under section 44502(a)(2) or 44509, subchapter I of chapter 471 (except section 47127), or chapter 481 (except sections 48102(e), 48106, 48107, and 48110) of this title—

(A) the cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components of the facility or equipment; and

(B) final assembly of the facility or equipment has occurred in the United States; or

(4) including domestic material will increase the cost of the overall project by more than 25 percent.

(c) LABOR COSTS.—In this section, labor costs involved in final assembly are not included in calculating the cost of components.

(Pub. L. 103–272, §1(e), July 5, 1994, 108 Stat. 1298, §49101; renumbered §50101 and amended Pub. L. 104–287, §5(88)(D), (89), Oct. 11, 1996, 110 Stat. 3398.)

HISTORICAL AND REVISION NOTES
PUB. L. 103–272

Revised Section	*Source (U.S. Code)*	*Source (Statutes at Large)*
49101(a)	49 App.:2226a(a).	Nov. 5, 1990, Pub. L. 101–508, §9129, 104 Stat. 1388–371.
49101(b)	49 App.:2226a(b).	
49101(c)	49 App.:2226a(c).	

In this chapter, the word "goods" is substituted for "product" and "products" for consistency.

In subsection (a), the words "Notwithstanding any other provision of law" are omitted as surplus. The words "after November 5, 1990" are omitted as obsolete.

In subsection (b), before clause (1), the words "The Secretary may waive" are substituted for "shall not apply" for consistency. In clause (2), the words "steel and goods" are substituted for "materials and products" for consistency. In clause (4), the word "contract" is omitted as surplus.

PUB. L. 104–287, §5(89)

This makes a clarifying amendment to 49:50101(a) and (b)(3), 50102, 50104(b)(1), and 50105, as redesignated by clause (88)(D) of this section, because 49:47106(d) was struck by section 108(1) of the Federal Aviation Administration Authorization Act of 1994 (Public Law 103–305, 108 Stat. 1573).

AMENDMENTS

1996—Pub. L. 104–287, §5(88)(D), renumbered section 49101 of this title as this section.

Subsecs. (a), (b)(3). Pub. L. 104–287, §5(89), substituted "section 47127" for "sections 47106(d) and 47127".

USE OF DOMESTIC PRODUCTS

Pub. L. 103–305, title III, §305, Aug. 23, 1994, 108 Stat. 1592, provided that:

"(a) PROHIBITION AGAINST FRAUDULENT USE OF 'MADE IN AMERICA' LABELS.—(1) A person shall not intentionally affix a label bearing the inscription of 'Made in America', or any inscription with that meaning, to any product sold in or shipped to the United States, if that product is not a domestic product.

"(2) A person who violates paragraph (1) shall not be eligible for any contract for a procurement carried out with amounts authorized under this title [enacting section 47509 of this title, amending sections 44505 and 48102 of this title, and enacting provisions set out as notes under this section and section 40101 of this title], including any subcontract under such a contract pursuant to the debarment, suspension, and ineligibility procedures in subpart 9.4 of chapter 1 of title 48, Code of Federal Regulations, or any successor procedures thereto.

"(b) COMPLIANCE WITH BUY AMERICAN ACT.—(1) Except as provided in paragraph (2), the head of each office within the Federal Aviation Administration that conducts procurements shall ensure that such procurements are conducted in compliance with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a through 10c [41 U.S.C. 10a—10b–1], popularly known as the 'Buy American Act').

"(2) This subsection shall apply only to procurements made for which—

"(A) amounts are authorized by this title to be made available; and

"(B) solicitations for bids are issued after the date of the enactment of this Act [Aug. 23, 1994].

"(3) The Secretary, before January 1, 1995, shall report to the Congress on procurements covered under this subsection of products that are not domestic products.

"(c) DEFINITIONS.—For the purposes of this section, the term 'domestic product' means a product—

"(1) that is manufactured or produced in the United States; and

"(2) at least 50 percent of the cost of the articles, materials, or supplies of which are mined, produced, or manufactured in the United States."

Similar provisions were contained in the following prior authorization act: Pub. L. 102–581, title III, §305, Oct. 31, 1992, 106 Stat. 4896.

PURCHASE OF AMERICAN MADE EQUIPMENT AND PRODUCTS

Pub. L. 103–305, title III, §306, Aug. 23, 1994, 108 Stat. 1593, provided that:

"(a) SENSE OF CONGRESS.—It is the sense of Congress that any recipient of a grant under this title [enacting section 47509 of this title, amending sections 44505 and 48102 of this title, and enacting provisions set out as notes under this section and section 40101 of this title], or under any amendment made by this title, should purchase, when available and cost-effective, American made equipment and products when expending grant monies.

"(b) NOTICE TO RECIPIENTS OF ASSISTANCE.—In allocating grants under this title, or under any amendment made by this title, the Secretary shall provide to each recipient a notice describing the statement made in subsection (a) by the Congress."

FAA
Office of Airports

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

NOTICE: L-823 Connectors do not have independent utility needed to consider it as a component that warrants a Buy American waiver. For purposes of Buy American Preferences, the FAA considers these products as sub-components of the larger airfield lighting equipment being installed.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Potters Industries (Flex-O-Lite)	Reflective Media TTB 13215D Type IA (Flex-O-Lite) Glass Beads	8/27/2022
Type III Equipment/Building	GBA Components, LLC	Inpavement Light EB-83A Coated Bolts	8/7/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-850D(L) RSRT212XXXFXXXX1 Inpavement Runway Threshold Light	7/30/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852A (LED) Model RSTA21XXXNXXX2X1 Inpavement Taxiway Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852B (LED) Model RSTB21XXXNXXX2X1 Inpavement Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852C (LED) Model RSTC21XXXNXXX2X1 Inpavement Taxiway Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852D (LED) Model RSTD21XXXNXXX2X1 Inpavement Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852J (LED) Model RSTJ21XXXCXXX2X1 Inpavement Taxiway Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852K(LED) Inpavement Taxiway Centerline Light Model RSTK21XXXCXXX2X1	7/17/2022

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852S (LED) Model RSSB21XXXNRNX2X1 Inpavement Stop Bar Light	7/17/2022
Type III Equipment/Building	FLash Technology	L-880 (LED) Precision Approach Path Indicator	7/17/2022
Type III Equipment/Building	Flash Technology	Flash Technology L-881 (LED) Precision Approach Path Indicator	7/17/2022
Type III Equipment/Building	Potters Industries (Flex-O-Lite)	Reflective Media TT-B 1325D Type III (Flex-O-Lite) Glass Beads, 1.9 Index of Refraction	7/17/2022
Type III Equipment/Building	ADB Safegate	L-850A(L) RSRC11XXXNXXXXX1 Inpavement Runway Centerline Light	6/18/2022
Type III Equipment/Building	ADB Safegate	L-850B(L) RSRZ11XX1XWNXXX1 Inpavement Touchdown Zone Light	6/18/2022
Type III Equipment/Building	ADB Safegate	L-850C (L) RSRE11XXXCXXXXX1 Inpavement Runway Edge Light	6/18/2022
Type III Equipment/Building	ADB Safegate	L-850D(L) RSRN212XXXRXXXX1 Inpavement Runway End Light	6/18/2022
Type III Equipment/Building	ADB Safegate	L-850T(L) RSRS21XX1NRNRXX1 Runway Status Light	6/18/2022
Type III Equipment/Building	M-B Companies, Inc.	Carrier Vehicle and Broom Attachment	5/21/2022
Type III Equipment/Building	Airport Lighting Company	L-821 Airport Lighting Control Panel	2/26/2022
Type III Equipment/Building	Airport Lighting Company	L-880 LED Precision Approach Path Indicator	2/26/2022

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Airport Lighting Company	L-881 LED Abbreviated Precision Approach Path Indicator	2/26/2022
Type III Equipment/Building	ADB Safegate	High Intensity Runway Edge L-862(L) ERES2YW33S00002	11/27/2021
Type III Equipment/Building	ADB Safegate	High Intensity Runway Edge Light L-862(L) ERES2GR13SF0002	11/27/2021
Type III Equipment/Building	ADB Safegate	High Intensity Runway Edge Light L-862(L) ERES2WY33S00002	11/27/2021
Type III Equipment/Building	Webasto Charging Systems Incorportated	Posicharge DVS 300 Electric Vehicle Charger	11/27/2021
Type III Equipment/Building	Multi-Electric Manufacturing	LED E Runway Elevated Threshold End Light	9/18/2021
Type III Equipment/Building	Multi-Electric Manufacturing	LED Runway Elevated Edge - L-862 (L)	9/18/2021
Type III Equipment/Building	Airport Lighting Company	L-890 Lighting Control & Monitoring System	7/17/2021
Type III Equipment/Building	Airport Lighting Company	High Intensity Runway Edge Light, L-862 LED	5/8/2021
Type III Equipment/Building	Airport Lighting Company	L-861SE LED Medium Intensity Runway & Taxiway Edge Light	5/8/2021
Type III Equipment/Building	Airport Lighting Company	L-862 E LED HIgh Intensity Runway Threshold Light	5/8/2021
Type III Equipment/Building	Hali-Brite Incorporated	L-801 A (LED) Medium Intensity Beacon	4/24/2021
Type III Equipment/Building	Hali-Brite Incorportated	L-802 A (LED) High Intensity Beacon	4/24/2021

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Musco Lighting	TLC for LED® Light-Structure System™ Apron Flood Lighting	4/11/2021
Type III Equipment/Building	Flight Light Inc.	L-810 Obstruction Light Single Head LED	4/3/2021
Type III Equipment/Building	Flight Light Inc.	L-810 Obstuctruction Light Double Head LED	4/3/2021
Type III Equipment/Building	Airport Lighting Company	L-847 Switch, Circuit Selector	3/20/2021
Type III Equipment/Building	ADB Safegate	L-849 -L Runway End Identification Lights - E1101012	8/8/2020
Type III Equipment/Building	Webasto Charging Systems, Incorporated	DVS 400 Electric Charging Station	5/2/2020
Type III Equipment/Building	Webasto Charging Systems, Incorporated	MVS 400 Electric Charging Station	5/2/2020
Type III Equipment/Building	Webasto Charging Systems, Incorporated	MVS800 Electric Charging Station	5/2/2020
Type III Equipment/Building	Hali-Brite Incorporated	L-893, Lighted Visual Aid to Indicate Temporary Runway Closure LED RCM-D L-893 (L)	4/26/2020
Type III Equipment/Building	Hali-Brite incorporated	L-893, Lighted Visual Aid to Indicate Temporary Runway Closure, LED RCM-D	4/26/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG01S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG01S00100	4/11/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG01SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG02S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG0ASL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG0BSL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG0CSL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG0CSM0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG01S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG01SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG02S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG02S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG03S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG03S00100	4/11/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG03SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG03SF0100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG04S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG04S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG04SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG04SF0100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG05S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG05SC0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG05SC0100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG06SC0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG07S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG07SC0000	4/11/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG07SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG09S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG0BSM0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG0CSL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN09SL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG01S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR01S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR03S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY02S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6WY09S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8RG05SC0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8RN05SC0000	4/11/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8RR05S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG28SF0002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RN01S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR03S00102	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR35S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR38S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY28S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY31S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY33S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY33S00102	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY35S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2WW31S00002	4/11/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2WW31S00102	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2WW33S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2WW33S00102	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2YG31SF0002	4/11/2020
Type III Equipment/Building	ADb Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR03S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN05MI0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN05SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN05SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN09MI0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN09MI002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN11SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN15SF0002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR08SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR11MF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR11SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR13MF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR13SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR13SM0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR15MF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR15SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR19SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR25MF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR25SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR29SF0002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GW31SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GY33SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GY35SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG21SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG23SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG25SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG25SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG21MF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG21SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG23MF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG23SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG25SF0102	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG29SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG31SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RN01M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RN05S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RN09M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR01S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR03S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR15S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR25S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR35S00002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RW31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RY23S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RY31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RY31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RY35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WG31SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WR31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW31S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW33M00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW33S00002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW33S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW35M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW35S01102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW39M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY31S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY33M00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY33S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY39M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY39S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YG33SF0102	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YG35SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR13S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR39M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR39S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW33M00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW33S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW35M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW39M00002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW39S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN05SI0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN11SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN13SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN13SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN18SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR05SI0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR11SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR11SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR12SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR13SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR15SF0002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR18SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GY31SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GY33SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GY33SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GY35SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2NG21SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2NG23SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2NG23SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2NG28SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG21SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG22SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG23SF0002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG23SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG25SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RN05S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR01S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862(L) High Intensity Runway Edge Light EREL2GN13SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG21SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG21SF0002	4/4/2020
Type III Equipment/Building	ADB safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG25SF0002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-826 L L-862 Lights, Runway Edge, High Intensity EREL 24 IN N/G W/ARC 1.5 CPLG 12 FAA	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 14 IN G/N N/ARC 2 CPLG 11.5	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 14 IN G/N W/ARC 2 CPLG 11.5	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 14 IN G/R W/ARC 2 CPLG 11.5 FAA	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 24 IN G/N W/ARC 1.5 CPLG 12	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 24 IN G/Y W/ARC 1.5 CPLG 12 FAA	3/15/2020
Type III Equipment/Building	Safety Coatings Inc	Marking TTP-1952F Type I Black	3/15/2020
Type III Equipment/Building	Safety Coatings Inc	Marking TTP-1952F Type I Blue	3/15/2020
Type III Equipment/Building	Safety Coatings Inc	Marking TTP-1952F Type I Red	3/15/2020
Type III Equipment/Building	Safety Coatings Inc	Marking TTP1952F Type I L.F. Yellow	3/15/2020
Type III Equipment/Building	Safety coatings Inc	Marking Type 1952F Type I White	3/15/2020
Type III Equipment/Building	Diamond Vogel	Marking - 7503 Blue Waterborne Traffic Paint	2/17/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Diamond Vogel	Marking - UC 1509 White Waterborne Traffic Paint	2/17/2020
Type III Equipment/Building	Diamond Vogel	Marking - UC 3584 Yellow Waterborne Traffic Paint	2/17/2020
Type III Equipment/Building	Diamond Vogel	Marking - UC 5503 Red Waterborne Traffic Paint	2/17/2020
Type III Equipment/Building	Diamond Vogel	Marking - UC 9507 Black Waterborne Traffic Paint	2/17/2020
Type III Equipment/Building	Avlite Systems	L-880 LED Precision Approach Path Indicator	1/24/2020
Type III Equipment/Building	Avlite Systems	L-881 LED Abbreviated Precision Approach Path Indicator	1/24/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG07S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR01S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR03S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR07S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW01S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW02S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW02S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW05S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW05S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW06S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW07S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW09SL0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW09SM0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0ASL0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0ASM0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0BSL0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0BSM0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0CSL0000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0CSM0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY01S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY02S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY02S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY05S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY05S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY06S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY07S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG02S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YN03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR04S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY01S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6NG09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6NR09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6RG09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6WW09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8RR05SC0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8WW05S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8WY05S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG09SM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN09SM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0ASL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0ASM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0BSL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0BSM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0CSL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0CSM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR01S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR01S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR02S00000	11/23/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR03S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR03S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR04S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR04S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR07S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR09S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW09SL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW09SM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0ASL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0ASM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0BSL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0BSM0000	11/23/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0CSL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0CSM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG01S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG01S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG03S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG03S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR04S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG03S00100	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG03S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG03SF0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG04S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG04S00100	11/16/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG07S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG09SL0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG09SM0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR01S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR01S00100	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR03S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR03S00100	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR04S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR04S00100	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2RG0ASL0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2RG0ASM0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2RG0BSL0000	11/16/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2RG0CSM0000	11/16/2019
Type III Equipment/Building	Vaisala	In-Pavement Stationary Runway Weather Information System RWS200	11/16/2019
Type III Equipment/Building	Astronics DME	L-852S Inpavement Taxiway Lights L-R-1-0	10/26/2019
Type III Equipment/Building	Astronics DME	L-852T-L 1 G2 Inpavement Taxiway Lights	10/26/2019
Type III Equipment/Building	Astronics DME	L-852X Inpavement Taxiway Lights L-G2	10/26/2019
Type III Equipment/Building	Astronics DME	L-852X-L G2 Inpavement Taxiway Lights	10/26/2019
Type III Equipment/Building	Astronics DME	L-862L HIgh Intensity runway Edge Lights	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 Black Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 Green Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 Red Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 White Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 Yellow Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Millerbernd Manufacturing Company	L-867 Light Base, Non-Load Bearing	10/26/2019
Type III Equipment/Building	Millerbernd Manufacturing Company	L-868 Light Base, Load Bearing	10/26/2019
Type III Equipment/Building	Millerbernd Manufacturing Company	L-894 Elevated Light Cover 12"	10/26/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Millerbernd Manufacturing Company	L-894 Elevated Light Cover 16"	10/26/2019
Type III Equipment/Building	Wix Support Equipment	Electric Vehicle Charging Station Cable Mangement System	10/26/2019
Type III Equipment/Building	ADB Safegate	L-862 (L) High Intensity Runway Edge Light EREL2GN13SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN13SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN15SF0002	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN15SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR15SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GY33SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG23SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-861 L Runway & Taxiway Edge Medium Intensity Lights	10/1/2019
Type III Equipment/Building	ADB Safegate	L-862 E L Runway Edge High Intensity Lights ERES2WW35S00002	10/1/2019
Type III Equipment/Building	ADB Safegate	L-862 Runway Edge High Intensity Lights EREL2RG21SF0002	10/1/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Runway Edge High Intensity Lights EREL2WW35S00002	10/1/2019
Type III Equipment/Building	Minit charger, LLC	ALT22-480-1 Altus 22kW Dual Port Charger with BIW Cables	10/1/2019
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 E LED Inpavement Taxiway Light	10/22/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 F LED Inpavement Taxiway Light	10/22/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 S LED Inpavement Taxiway Light	10/22/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 T LED Inpavement Taxiway Light	10/22/2018
Type III Equipment/Building	Astronics DME Corporation	L-804 V Holding Poisition Edge Light	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-829 Monitored Constant Current Regulator	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-849 I LED Runway End Indentification Lights	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-850 A LED Runway Inpavement Lights	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-850 B LED Runway Inpavement Lights	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-850 T Runway Inpavement Light	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-858 Runway and Taxiway Signs	8/27/2018
Type III Equipment/Building	Kodiack America, LLC	Snow Removal Equipment - Dual Engine Chassis w/ Rwy Broom & Air Blast	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 A LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 B LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 C LED Inpavement Runway Light	8/27/2018

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 D LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 E LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 T LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Ennis-Flint Company	P-620 AirMark Preformed Thermoplastic Pavement Markings	8/4/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 A LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 B LED Inpavement Taxiay Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 C LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 D LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 J LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 K LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Airport Lighting Company	L-828 Constant Current Regulator	7/24/2018
Type III Equipment/Building	Airport Lighting Company	L-829 Monitored Constant Current Regulator	7/24/2018
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 G LED Inpavement Taxiaway Light	7/22/2018
Type III Equipment/Building	Hughey & Phillips	L-810 Low Intensity LED , Double, VAC	1/21/2017
Type III Equipment/Building	Hughey & Phillips	L-810 Low Intensity LED, Single, VAC	1/21/2017
Type III Equipment/Building	Astronics DME Corporation	L-858 B LED Runway Runway & Taxiway Signs	10/17/2016
Type III Equipment/Building	Astronics DME Corporation	L-858 L LED Runway & Taxiway Signs	10/17/2016
Type III Equipment/Building	Astronics DME Corporation	L-858 R LED Runway & Taxiway Signs	10/17/2016
Type III Equipment/Building	Eaton Crouse-Hinds	L-850 C Runway Inpavement Lights	10/10/2016
Type III Equipment/Building	Vaisala	AW20, AWOS III	8/1/2016

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS A	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS AV	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS I	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS II	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS III	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS IIIP	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS IIIPT	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS IIIT	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS IV Z	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS A	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS AV	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS II	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS IIIP	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS IIIPT	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS IIIT	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS IV Z	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWS I	8/1/2016
Type III Equipment/Building	Jaquith Industries	L-894 12" Elevated Light Cover Baseplate	5/17/2016
Type III Equipment/Building	Jaquith Industries	L-894 16" Elevated Light Cover Baseplate	5/17/2016
Type III Equipment/Building	Jaquith Industries	L-895 Light Mounting Stake	5/17/2016

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	The Sherwin-Williams Company	P-620, 1952, TT-P-Hotline Waterborne Durable Type III - White Marking Paint TM2452	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, 1952, TT-P-Hotline Waterborne Durable Type III - Yellow Marking Paint TM2453	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P- 1952, Hotline Waterborne Type I/II - Yellow Marking Paint TM2259	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952 Hotline Waterborne Type I/II w Algaecide, Fungicide, & Rust Inhibitor - Red Marking Paint TM2544	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952 Hotline Waterborne Type I/II - White Marking Paint TM2152	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952 Hotline Waterborne Type III w Algaecide, Fungicide, & Rust Inhibitor - White Marking Paint TM2564	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Durable Type III - Black Marking Paint TM2140	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Durable Type III - Blue Marking Paint TM2142	5/14/2016

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Durable Type III - Green Marking Paint TM2143	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Durable Type III - Red Marking Paint TM2141	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Black Marking Paint TM2221	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Blue Marking Paint TM2224	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Green Marking Paint TM2226	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Red Marking Paint TM2222	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Yellow Marking Paint TM2153	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II w Algaecide, Fungicide, & Rust Inhibitor - Black Marking Paint TM2543	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type III w Algaecide, Fungicide, & Rust Inhibitor - Blue Marking Paint TM2545	5/14/2016

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type III w Algaecide, Fungicide, & Rust Inhibitor - Yellow Marking Paint TM2565	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne, Type I/II - White Marking Paint TM2248	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Type III w Agaecide & Rust Inihibitor - Black Marking Paint TM2540	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Type III w Algaecide, Fungicide & Rust Inhibitor - White Marking Paint TM2538	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Type III w Algaecide, Fungicide, & Rust Inihibitor - Yellow Marking Paint TM2539	5/14/2016
Type III Equipment/Building	Boshchung America, LLC	Airport Winter Safety and Operations, RWIS	1/2/2016
Type III Equipment/Building	Astronics DME Corporation	L-804 Holding Position Edge Light	8/4/2015
Type III Equipment/Building	ADB Safegate	L-806 LED, Wind Cones-Frangible	5/15/2015
Type III Equipment/Building	ADB Safegate	L-806 Wind Cones - Frangible	5/15/2015
Type III Equipment/Building	ADB Safegate	L-850 D, Incandescent Inpavement Lights	5/15/2015
Type III Equipment/Building	ADB Safegate	L-850 E, Incandescent Inpavement Lights	5/15/2015

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-850 F, Incandescent Inpavement Lights	5/15/2015
Type III Equipment/Building	ADB Safegate	L-861 E, LED Runway Edge, Medium Intensity Lights	5/15/2015
Type III Equipment/Building	ADB Safegate	L-861 LED, Medium Intensity Runway Edge Lights	5/15/2015
Type III Equipment/Building	ADB Safegate	L-804 LED, Holding Position Edge Light	5/5/2015
Type III Equipment/Building	ADB Safegate	L-810 LED, Obstruction Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-849 C, LED, Runway End Identification Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-849 E, LED, Runway End Identification Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 A, Q/I, Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 B, Q/I Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 C LED, Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 C, Q/I Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 D, LED Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 A, LED, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 A, Q, Taxiway, Inpavement Lights	5/5/2015

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-852 B, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 B, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 C, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 C, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 D, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 D, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 E, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 G, LED, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 G, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 J, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 S, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 T, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-858, LED, Runway and Taxiway Signs	5/5/2015
Type III Equipment/Building	ADB Safegate	L-861 SE, Q, Runway Edge, Medium Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-861 T, LED Taxiway Edge, Medium Intensity Lights	5/5/2015

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861, Q, Runway Edge, Medium Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-861E, Q, Runway Edge, Medium Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-862 E, Q, Runway Edge, High Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-862, Q, Runway Edge, High Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-880 LED, Precision Approach Path Indicator	5/5/2015
Type III Equipment/Building	ADB Safegate	L-881 LED, Abbreviated Precision Approach Path Indicator	5/5/2015
Type III Equipment/Building	Atg Airports, Ltd.	L-850 B Runway Inpavement Lights	2/2/2015
Type III Equipment/Building	Atg Airports, Ltd.	L-850 A Runway Inpavement Lights	1/20/2015
Type III Equipment/Building	Atg Airports, Ltd.	L-850 C Runway Inpavement Lights	1/17/2015
Type III Equipment/Building	Astronics DME Corporation	L-849 A LED Runway End Identification Lights	10/27/2014
Type III Equipment/Building	Rheinmetall Defence	DEBRA FOD	10/21/2014
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B Black Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B Blue Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B Red Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B White Runway Marking Paint	8/16/2014

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B Yellow Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Black Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Black Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Blue Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Blue Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Green Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Green Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Red Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Red Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E White Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E White Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Yellow Type I/II Fast Dry Runway Marking Paint	8/16/2014

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Yellow Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Manairco	L-861 T LED Runway & Taxiway Edge, Medium Intensity Lights	6/27/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-850 A LED Runway Inpavement Lights	6/16/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-850 B LED Runway Inpavement Lights	6/16/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 10,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 12,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 15,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 2,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 20,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 25,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 30,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 35,000 Gallon DWT Fuel Storage Tank	5/13/2014

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Containment Solutions	CSI Tank 4 - 1,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 4 - 600 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 4,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 2,500 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 3,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 5,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 6,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 8 - 12,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 8 - 8,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 8 -15,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 8 -5,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Service Wire Company	L-824, Underground Electrical Cables for Airfield Circuits	5/4/2014

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Airport Lighting Company	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	3/29/2014
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Black Runway Marking Paint (5385)	3/24/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 A LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 B LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 C LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 D LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 J LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 K LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Astronics DME Corporation	L-852 B LED Taxiway, Inpavement Lights	11/16/2013
Type III Equipment/Building	Astronics DME Corporation	L-852 C LED Taxiway, Inpavement Lights	11/16/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 E LED Runway & Taxiway Edge, Medium Intensity Lights	11/16/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 SE LED Runway & Taxiway Edge, Medium Intensity Lights	11/16/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Black Runway Marking Paint (5383)	10/19/2013

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Blue Runway Marking Paint (5274)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Blue Runway Marking Paint (5344)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Blue Runway Marking Paint (5384)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Green Runway Marking Paint (5376)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Green Runway Marking Paint (5386)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Red Runway Marking Paint (5345)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Red Runway Marking Paint (5375)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B White Runway Marking Paint (5281)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Yellow Runway Marking Paint (5342)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Yellow Runway Marking Paint (5372)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Yellow Runway Marking Paint (5382)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	IL SPEC Red Runway Marking Paint (5408)	10/19/2013

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Davies Imperial Coatings, Inc.	IL SPEC Yellow Runway Marking Paint (4636)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Blue Runway Marking Paint (4834)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Green Runway Marking Paint (5192)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Red Runway Marking Paint (4836)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Yellow Runway Marking Paint (4477)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Yellow Runway Marking Paint (8511)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Yellow Runway Marking Paint (9511)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type III Blue Runway Marking Paint (5433)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type III Green Runway Marking Paint (5435)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type III Red Runway Marking Paint (5434)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type III Yellow Runway Marking Paint (5431)	10/19/2013
Type III Equipment/Building	Airport Lighting Company	L-804, Holding Position Edge Light	9/21/2013
Type III Equipment/Building	Honeywell Airport Systems	L-828 F20 Constant Current Regulator	9/21/2013

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Honeywell Airport Systems	L-828 W10 Constant Current Regulator	9/21/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829 S04 Constant Current Regulator with Monitor	9/21/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829-F04, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829-F30, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829-F70, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829-S30, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829-S70, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Amerace - Thomas & Betts Corporation	L-830-16 Isolation Transformer, 60Hz, 10/15 Watts, 6.6/6.6 Amperes	7/9/2013
Type III Equipment/Building	Amerace - Thomas & Betts Corporation	L-830-17 Isolation Transformer, 60Hz, 20/25 Watts, 6.6A/6.6A Amperes	7/9/2013
Type III Equipment/Building	Astronics DME Corporation	L-852 D LED Taxiway, Inpavement Lights	7/7/2013
Type III Equipment/Building	Astronics DME Corporation	L-852 A LED Taxiway, Inpavement Lights	3/26/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 E Halogen Edge Light	3/26/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 Halogen Lights	3/26/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 T - Halogen Taxiway Light	3/26/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 T LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Point Light Corporation	L-861 E LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Point Light Corporation	L-861 SE LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Point Light Corporation	L-861 T LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Point Light Corporation	L-862 E LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Advanced Drainage Systems (ADS)	D-705 10" Pipe Underdrain w/sock	3/10/2013
Type III Equipment/Building	Advanced Drainage Systems (ADS)	D-705 4" Pipe Underdrain w/sock	3/10/2013
Type III Equipment/Building	Advanced Drainage Systems (ADS)	D-705 6" Pipe Underdrain w/sock	3/10/2013
Type III Equipment/Building	Advanced Drainage Systems (ADS)	D-705 8" Pipe Underdrain w/sock	3/10/2013
Type III Equipment/Building	DME (Astronics)	L-852T-L-X LED, Inpavement, OMNI	3/9/2013
Type III Equipment/Building	Vaisala	AWOS A	1/6/2013
Type III Equipment/Building	Vaisala	AWOS A/V	1/6/2013
Type III Equipment/Building	Vaisala	AWOS I	1/6/2013
Type III Equipment/Building	Vaisala	AWOS II	1/6/2013
Type III Equipment/Building	Vaisala	AWOS III, III-T, III-P, III-PT, III-PTZ	1/6/2013
Type III Equipment/Building	Kodiack America, LLC	Snow Blower & Runway Broom Equipment	10/10/2012
Type III Equipment/Building	ADB Safegate	L-830, Isolation Transformer, 60Hz	7/28/2012
Type III Equipment/Building	TREX Aviation Systems	FOD Finder XM-Mobile	5/25/2012
Type III Equipment/Building	Stratech Systems Limited	iFerret TM FOD System	5/5/2012

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-849 A, LED Runway End Identification Lights	5/4/2012
Type III Equipment/Building	ADB Safegate	L-850 A, LED Runway Inpavement Lights	5/4/2012
Type III Equipment/Building	ADB Safegate	L-850 B, LED Runway Inpavement Lights	5/4/2012
Type III Equipment/Building	ADB Safegate	L-852 K, LED Taxiway Inpavement Lights	5/4/2012
Type III Equipment/Building	ADB Safegate	L-852 S, LED Taxiway Inpavement Lights	5/4/2012
Type III Equipment/Building	Vaisala	Inpavement Runway Sensors	5/4/2012
Type III Equipment/Building	Precision Control Systems	L-890, Lighting Control & Monitoring System	4/3/2012
Type III Equipment/Building	All Weather, Inc.	AWOS I - 900 Series	11/27/2011
Type III Equipment/Building	All Weather, Inc.	AWOS II - 900 Series	11/27/2011
Type III Equipment/Building	All Weather, Inc.	AWOS III - 3000 Series	11/27/2011
Type III Equipment/Building	All Weather, Inc.	AWOS III - 900 Series	11/27/2011
Type III Equipment/Building	FlexStake, Inc.	L-853, Retro reflective Markers	9/11/2011
Type III Equipment/Building	QinetiQ	Tarsier FOD System	9/11/2011
Type III Equipment/Building	TREX Aviation Systems	FOD Finder XF -Fixed	9/11/2011
Type III Equipment/Building	X-Sight	FODetect Systems	7/26/2011
Type III Equipment/Building	Flash Technology	L-856, High Intensity Obstruction Lights	3/28/2011
Type III Equipment/Building	Flash Technology	L-864, Red Obstruction Lights	3/28/2011

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Sherwin Industries, Inc.	L-893, Lighted Visual Aid for Runway Closure	3/28/2011
Type III Equipment/Building	ADB Safegate	L-854, Radio Controls	2/1/2011
Type III Equipment/Building	ADB Safegate	L-860, Low Intensity Runway Edge Lights	2/1/2011
Type III Equipment/Building	Flight Light	L-810, Lights-Obstruction (Various Types)*	1/18/2011
Type III Equipment/Building	Flight Light	L-828, Constant Current Regulators (Various Types)*	1/18/2011
Type III Equipment/Building	Flight Light	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	1/18/2011
Type III Equipment/Building	Southwire Company	L-824, Underground Electrical Cables for Airfield Circuits	1/16/2011
Type III Equipment/Building	Nehring Electrical Works	L-824, Underground Electrical Cables for Airfield Circuits	11/23/2010
Type III Equipment/Building	Point Light Corporation	L-806, Wind Cones-Frangible	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-807, Wind Cones-Rigid	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-810, Lights-Obstruction	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-862, Runway Edge-Threshold-Stop Bar Lights	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-864, Red Obstruction Lights	11/20/2010
Type III Equipment/Building	Amerace - Thomas & Betts Corporation	L-830-1, Isolation Transformer, 60Hz 30/45 Watts, 6.6/6.6A	9/19/2010

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Tenco Industries Inc.	202 LMM Snow Blower	8/27/2010
Type III Equipment/Building	Flash Technology	L-865, White Obstruction Lights	8/17/2010
Type III Equipment/Building	Rural Electric	L-854, Radio Controls	8/17/2010
Type III Equipment/Building	ADB Safegate	L-821, Airport Lighting Control Panel	8/7/2010
Type III Equipment/Building	Flash Technology	L-849, Runway End Identification Lights	6/21/2010
Type III Equipment/Building	Flash Technology	L-859, Flashing Omnidirectional Lights	6/21/2010
Type III Equipment/Building	Airport Lighting Company	L-880, Precision Approach Path Indicator	4/27/2010
Type III Equipment/Building	Airport Lighting Company	L-881, Abbreviated Precision Approach Path Indicator	4/27/2010
Type III Equipment/Building	Neubert Aero Corp	Dynamic Friction Decelerometer	4/27/2010
Type III Equipment/Building	Neubert Aero Corp	Dynamic Friction Tester	4/27/2010
Type III Equipment/Building	Rural Electric	L-821, Airport Lighting Control Panel	4/27/2010
Type III Equipment/Building	Rural Electric	L-890, Lighting Control & Monitoring System	4/27/2010
Type III Equipment/Building	Safe-Hit	L-853, Retroreflective Markers	3/20/2010
Type III Equipment/Building	Daimler	Freightliner M2 Carrier Vehicle	1/12/2010
Type III Equipment/Building	Millard Towers Limited	L-891 - Low Impact Resistant Structures	12/22/2009
Type III Equipment/Building	Millard Towers Limited	L-892 - Frangible Support Structure	12/22/2009
Type II - Insufficient Quantity and/or Quality	OCEM	L-852 S LED Taxiway Inpavement Lights	12/1/2009
Type III Equipment/Building	Prysmian Cables and Systems, Inc.	L-824, Underground Electrical Cables for Airfield Circuits	10/4/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Airport Lighting Company	L-861 Runway & Taxiway Edge, Medium Intensity Lights	9/13/2009
Type III Equipment/Building	Airport Lighting Company	L-862, Runway Edge-Threshold-Stop Bar Lights	9/13/2009
Type III Equipment/Building	Strobe Approach Lighting Technology, LLC	L-849, Runway End Identification Lights	8/25/2009
Type III Equipment/Building	Strobe Approach Lighting Technology, LLC	L-859, Flashing Omnidirectional Lights	8/25/2009
Type III Equipment/Building	LoneStar	P-632, Bituminous Pavement Rejuvenator	8/17/2009
Type III Equipment/Building	Pavement Rejuvenation International, LP	P-632, Bituminous Pavement Rejuvenator	8/16/2009
Type III Equipment/Building	Soundproof Windows	Single Hung 36 X 72 Window	8/14/2009
Type III Equipment/Building	ADB Safegate	L-828, Constant Current Regulators	7/28/2009
Type III Equipment/Building	ADB Safegate	L-829, Monitored Constant Current Regulators	7/28/2009
Type III Equipment/Building	ADB Safegate	L-890, Lighting Control & Monitoring System	7/28/2009
Type III Equipment/Building	Airfield Guidance Sign Manufacturers, Inc.	L-858, Runway & Taxiway Signs	7/28/2009
Type III Equipment/Building	Rural Electric	L-867, Non-Load Bearing Light Box	7/24/2009
Type III Equipment/Building	Rural Electric	L-868, Load Bearing Light Box	7/24/2009
Type III Equipment/Building	ADB Safegate	L-890, Lighting Control & Monitoring System	7/20/2009
Type III Equipment/Building	Olson Industries	L-867, Non-Load Bearing Light Box	7/19/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Olson Industries	L-868, Load Bearing Light Box	7/19/2009
Type III Equipment/Building	Standard Signs, Inc.	L-858, Runway & Taxiway Signs	7/10/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-890, Lighting Control & Monitoring System	6/30/2009
Type III Equipment/Building	Airport Lighting Equipment	L-867, Non-Load Bearing Light Box	6/29/2009
Type III Equipment/Building	Airport Lighting Equipment	L-868, Load Bearing Light Box	6/29/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-801, Beacons-Medium Intensity	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-802, Beacons-High Intensity	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-804 Holding Position Edge Light	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-806, Wind Cones-Frangible	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-807, Wind Cones-Rigid	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-823, Primary Connector Kits	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-828, Constant Current Regulators	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-829, Regulators, Constant Current with Monitor	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-830, Isolation Transformers, 60Hz	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-847, Circuit Selector Switch	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-852, Taxiway Inpavement Lights	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-858, Runway & Taxiway Signs	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-862, Runway Edge-Threshold-Stop Bar Lights	6/28/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Eaton Crouse-Hinds	L-880, Precision Approach Path Indicator	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-881, Abbreviated Precision Approach Path Indicator	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-884, Power & Control Unit	6/28/2009
Type III Equipment/Building	ADB Safegate	L-804, Holding Position Edge Light	6/26/2009
Type III Equipment/Building	ADB Safegate	L-807, Wind Cones-Rigid	6/26/2009
Type III Equipment/Building	ADB Safegate	L-810, Lights-Obstruction	6/26/2009
Type III Equipment/Building	ADB Safegate	L-827, Monitors-Regulator	6/26/2009
Type III Equipment/Building	ADB Safegate	L-828, Constant Current Regulators	6/26/2009
Type III Equipment/Building	ADB Safegate	L-829, Monitored Constant Current Regulators	6/26/2009
Type III Equipment/Building	ADB Safegate	L-847, Circuit Selector Switch	6/26/2009
Type III Equipment/Building	ADB Safegate	L-853, Retroreflective Markers	6/26/2009
Type III Equipment/Building	ADB Safegate	L-858, Runway & Taxiway Signs	6/26/2009
Type III Equipment/Building	ADB Safegate	L-861 Runway & Taxiway Edge, Medium Intensity Lights	6/26/2009
Type III Equipment/Building	ADB Safegate	L-862, Runway Edge-Threshold-Stop Bar Lights	6/26/2009
Type III Equipment/Building	ADB Safegate	L-880, Precision Approach Path Indicator	6/26/2009
Type III Equipment/Building	ADB Safegate	L-881, Abbreviated Precision Approach Path Indicator	6/26/2009
Type III Equipment/Building	ADB Safegate	L-884, Power & Control Unit	6/26/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Halibrite	L-801, Beacons-Medium Intensity	6/23/2009
Type III Equipment/Building	Halibrite	L-802, Beacons-High Intensity	6/23/2009
Type III Equipment/Building	Halibrite	L-806, Wind Cones-Frangible	6/23/2009
Type III Equipment/Building	Halibrite	L-807, Wind Cones-Rigid	6/23/2009
Type III Equipment/Building	Halibrite	L-893, Lighted Visual Aid for Runway Closure	6/23/2009
Type III Equipment/Building	Manairco	L-801, Beacons-Medium Intensity	6/23/2009
Type III Equipment/Building	Manairco	L-828, Constant Current Regulators	6/23/2009
Type III Equipment/Building	Manairco	L-861 Runway & Taxiway Edge, Medium Intensity Lights	6/23/2009
Type III Equipment/Building	Multi-Electric	L-804, Holding Position Edge Light	6/23/2009
Type III Equipment/Building	Multi-Electric	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	6/23/2009
Type III Equipment/Building	Multi-Electric	L-862, Runway Edge-Threshold-Stop Bar Lights	6/23/2009
Type III Equipment/Building	Multi-Electric	L-880, Precision Approach Path Indicator	6/23/2009
Type III Equipment/Building	Multi-Electric	L-881, Abbreviated Precision Approach Path Indicator	6/23/2009
Type III Equipment/Building	DME	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	6/21/2009
Type III Equipment/Building	DME	L-862, Runway Edge-Threshold-Stop Bar Lights	6/21/2009
Type III Equipment/Building	Integro	L-830, Isolation Transformers, 60Hz	6/21/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 10/7/2022)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Jaquith Industries	L-867, Non-Load Bearing Light Box	6/21/2009
Type III Equipment/Building	Jaquith Industries	L-868, Load Bearing Light Box	6/21/2009
Type III Equipment/Building	Jaquith Industries	L-891 - Low Impact Resistant Structures	6/21/2009
Type III Equipment/Building	Jaquith Industries	L-892 - Frangible Support Structure	6/21/2009

The following components or subcomponents are steel or manufactured goods that have an FAA specification number and have been determined to be 1) 100% United States product and 2) produced in the United States.

Waiver Type	Manufacturer	Product	Effective Date
100% US and US Final Assembly	Integro	L-823 Plug and Receptacle, Cable Connectors	6/10/2009
100% US and US Final Assembly	MCB Industries	EB-83 bolts	1/31/2011
100% US and US Final Assembly	MCB Industries	2-part washers (used with 3/8" x 16 by various length bolts)	10/14/2015
100% US and US Final Assembly	MCB Industries	18-8 fasteners (various length bolts)	12/27/2016

GENERAL CIVIL RIGHTS PROVISIONS

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

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

CIVIL RIGHTS – TITLE VI ASSURANCES

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

Title VI Clauses for Compliance with Nondiscrimination Requirements:

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

1. **Compliance with Regulations:** The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

3. **Solicitations for Subcontracts, including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the contractor's obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.

4. **Information and Reports:** The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of a Contractor's noncompliance with the non-discrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

    a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or

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

Incorporation of Provisions: The Contractor will include the provisions of paragraphs one through six

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

Title VI List of Pertinent Nondiscrimination Acts and Authorities

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

- Title VI of the Civil Rights Act of 1964 (42 USC § 2000d *et seq*., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);
- 49 CFR part 21 (Non-discrimination in Federally-assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Section 504 of the Rehabilitation Act of 1973 (29 USC § 794 *et seq*.), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27;
- The Age Discrimination Act of 1975, as amended (42 USC § 6101 *et seq*.) (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982 (49 USC § 471, Section 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987 (PL 100-209) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 USC §§ 12131 – 12189) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;
- The Federal Aviation Administration's Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination

because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC 1681 et seq).

CONTRACT WORK HOURS AND SAFETY STANDARDS ACT REQUIREMENTS

1. Overtime Requirements.

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

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

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

3. Withholding for Unpaid Wages and Liquidated Damages.

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

4. Subcontractors.

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

DAVIS-BACON REQUIREMENTS

1. Minimum Wages.

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

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

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

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

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

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

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

(C) In the event the Contractor, the laborers, or mechanics to be employed in the classification, or their representatives, and the contracting officer do not agree on the proposed classification and

wage rate (including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

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

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

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

2. Withholding.

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

3. Payrolls and Basic Records.

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

costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

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

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

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

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

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

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

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

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

4. Apprentices and Trainees.

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

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage

determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination that provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

5. Compliance with Copeland Act Requirements.

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

6. Subcontracts.

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

7. Contract Termination: Debarment.

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

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

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

9. Disputes Concerning Labor Standards.

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

10. Certification of Eligibility.

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

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

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

COPELAND "ANTI-KICKBACK" ACT

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

ENERGY CONSERVATION REQUIREMENTS

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

PROCUREMENT OF RECOVERED MATERIALS

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

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

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

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

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

RIGHTS TO INVENTIONS

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

VETERAN'S PREFERENCE

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

DISTRACTED DRIVING

Texting When Driving

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

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

CLEAN AIR AND WATER POLLUTION CONTROL

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 USC § 740-7671q) and the Federal Water Pollution Control Act as amended (33 USC § 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

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

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PART 0.F – DBE FORMS

Disadvantaged Business Enterprise (DBE)
Contract Goal Verification and Good Faith Efforts (GFE)
Documentation For Construction

Project #:	**County:**
DBE Project Goal:	**Prime Contractor:**

As required by the specifications "*Disadvantaged Business Enterprise Requirements*," the dollar amount of each subcontract (both DBE and non-DBE firms) for all subcontractors, manufacturers, suppliers, and trucking companies is due by the close of business, 4:30 P.M. Hawaii Standard Time (HST) five (5) days after bid opening. **Failure to provide required information sufficient to evaluate the bid/proposal shall be cause for bid/proposal rejection.**

Calculation of the DBE contract goal for this project is the proportionate contract dollar value of work performed, materials, and goods to be supplied by DBEs. DBE credit shall not be given for mobilization, force account items, and allowance items. This DBE contract goal is applicable to all the contract work performed for this project and is calculated as follows:

1. DBE contract goal percentage = Contract Dollar Value of the work to be performed by DBE subcontractors and manufacturers, plus 60% of the contract dollar value of DBE suppliers, divided by the sum of all contract items (sum of all contract items is the total amount for comparison of bids less mobilization, force account items, and allowance items).

2. The Department shall adjust the bidder's/offeror's DBE contract goal to the amount of the project goal if it finds that the bidder/offeror met the goal but erroneously calculated a lower percentage. If the amount the bidder/offeror submits as its contract goal exceeds the project goal, the bidder/offeror shall be held to the higher goal.

Name of Subcontractor, Supplier, Manufacturer, and Trucking Company	DBE (Y/N)	Bid Item Number and Description	Approx. Quantity/ Hours	Unit	Unit Price/ Rate	Dollar Amount

A. Dollar amount of the work to be performed by DBE subcontractors, manufacturers, and trucking companies, plus 60% of the dollar amount of DBE suppliers	
B. Sum of all work items less mobilization, force account items, allowance items	
A/B = DBE contract goal	

NAME and SIGNATURE of AUTHORIZED REPRESENTATIVE of PRIME CONTRACTOR: DATE:

_____ _____

Summary of Good Faith Efforts (GFE)

As required by the specifications "*Disadvantaged Business Enterprise Requirements*," documentation of GFE shall be submitted by the close of business, 4:30 P.M. HST five (5) days of bid opening. **The bidder/offeror shall respond to the following questions and describe efforts to obtain DBE participation whether or not the DBE project goal is met.** Responses must be sufficient to properly evaluate the bidder's/offeror's good faith efforts. Copies of correspondence return receipts, telephone logs, or other documentation will be required to support GFE. Attach additional sheets, if necessary. Based on responses given, HDOT shall make a determination of the bidders' GFE. **Failure to provide required information sufficient to evaluate the bid/proposal shall be cause for bid/proposal rejection.**

1. Did you submit the required information by the close of business, 4:30 P.M. HST, five (5) days after bid opening (i.e. DBE name, address, NAICS code, description of work, project name, and number)?

2. Explain your GFE if any, to solicit through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform part or all of the work to be included under the contract.

    a. Explain your GFE if any, to solicit the participation of potential DBEs as early in the procurement process as practicable.

    b. Explain your GFE if any, to allow sufficient time for the DBEs to properly inquire about the project and respond to the solicitation.

    c. Explain your GFE if any, to take appropriate steps to follow up with interested DBEs in a timely manner to facilitateparticipation by DBEs in this project.

3. Explain your GFE if any, to identify and break up portions of work that can be performed by DBEs in order to increase the likelihood that a DBE will be able to participate, and that the DBE goal could be achieved (e.g. breaking out contract items into economically feasible units to facilitate DBE participation even when you might otherwise prefer to self-perform these work items).

4. Explain your GFE if any, to make available or provide interested DBEs with adequate information about the plans, specifications, and requirements of the project in a timely manner, and assist them in responding to your solicitation.

5. Explain your GFE if any, to negotiate in good faith with interested DBEs. Evidence of such negotiations includes documenting: a) the names, addresses and telephone numbers of DBEs that were contacted; b) a description of the information that was providedto DBEs regarding the plans and specifications; and c) detailed explanation for not utilizing individual DBEs on the project.

6. Did you solely rely on price in determining whether to use a DBE? If yes please explain. The fact that there may be additional or higher costs associated with finding and utilizing DBEs are not, by themselves, sufficient reasons for your refusal to utilize a DBE or

NAME and SIGNATURE of AUTHORIZED REPRESENTATIVE of PRIME CONTRACTOR: DATE:

_____ _____

failure to meet the DBE goal, provided that such additional costs are not unreasonable. Also, the ability or desire to perform a portion of the work with your own forces, that could have been undertaken by an available DBE, does not relieve you of the responsibility to make good faith efforts to meet the DBE goal, and to make available and solicit DBE participation in other areas of the project to meet the DBE goal.

7. Did you reject DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities? If yes, please explain. The DBEs standing within the industry, membership in specific groups, organizations or associates, and political or social affiliation are not legitimate basis for the rejection or non-solicitation of bids from particular DBEs.

8. Explain your GFE to assist interested DBEs in obtaining bonding, lines of credit, or insurance.

9. Explain your GFE if any, to assist interested DBEs in obtaining necessary equipment, supplies, materials or related assistance or services.

10. If you selected a non-DBE over a DBE subcontractor, please provide the quotes of each DBE and non-DBE subcontractor submitted to you for work on the contract; and for each DBE that was contacted but not utilized for a contract, provide a detailed written explanation for each DBE detailing the reasons for not utilizing or allowing the DBE to participate in the contract.

11. Explain your GFE if any, to effectively use the services of available minority/women community organizations, minority/women business groups, contractors' groups, and local, state and federal minority/women business assistance offices or other organizations to provide assistance in recruitment and placement of DBEs.

NAME and SIGNATURE of AUTHORIZED REPRESENTATIVE of PRIME CONTRACTOR: DATE:

_____ _____

Disadvantaged Business Enterprise (DBE)
Contract Goal Verification and Good Faith Efforts (GFE)
Documentation For Construction
INSTRUCTIONS

Project #	Self-explanatory
County	County where project is located
DBE Project Goal	Indicate DBE goal listed in the proposal on P-1
Prime Contractor	Name of prime contractor
Name of Subcontractor, Supplier, Manufacturer, and Trucking Company	Company name of subcontractor, supplier, manufacturer, or trucking firm
DBE (Y/N)	Y for yes and N for no
Bid Item Number and Description	Pay item and description
Approx. Quantity/ Hours	Self-explanatory
Unit	Unit of measure
Unit Price/ Rate	Self-explanatory
Dollar Amount	Total dollar amount committed to subcontractor, supplier, manufacturer, or trucking firm
A. Dollar amount of the work to be performed by DBE subcontractors, manufacturers, and trucking companies, plus 60% of the dollar amount of DBE suppliers	Total amount of DBE participation
B. Sum of all work items less mobilization, force account items, allowance items	List total of work items minus mobilization, force accounts and allowances. DBE credit shall not be given for mobilization, force account items, and allowance items.
A/B = DBE contract goal	Self-explanatory
Name and Signature of Authorized Representative of Prime Contractor	Self-explanatory (Note: bidder must sign and date every page of form.)
Date	Date form is signed
Summary of Good Faith Efforts (GFE)	Complete by answering questions in detail and providing documentation to support how bidder demonstrated good faith efforts to meet the goal, irrespective of whether or not the goal was met.

Disadvantaged Business Enterprise (DBE)
Confirmation and Commitment Agreement
Trucking Company

This commitment is subject to the award and receipt of a signed contract from the Hawaii Department of Transportation (HDOT) for the subject project. DBEs must be certified by the bid opening date.

Project #:	**County:**
NAICS CODE/DESCRIPTION OF WORK:	**SECONDARY NAICS CODE:**

*All quantities and units should match the bid tab item whenever possible.

The prime contractor shall inform HDOT the dates when the trucking firm starts and completes all work under the subcontract.

Estimated Beginning Date (Month/Year):	**Estimated Completion Date (Month/Year):**

TRUCKING COMPANY:	Item No.	Item Description	Unit	Unit Price / Rate	Amount
				$	$
				$	$
				$	$
			TOTAL COMMITMENT AMOUNT		**$**

1. Number of hours contracted or quantities to be hauled: _____
2. Number of fully operational trucks to be used: _____ Tractor/trailers: _____ Dump trucks: _____
3. Number of fully operational trucks owned by DBE: _____ Dump trucks: _____ Tractors/trailers: _____
4. If Owner Operators or additional trucking companies are to be used answer the following:

Name of Trucking Company	**DBE Y/N**	**Estimated Dollar Amount to be Contracted**	**Number and Type of Trucks (specify)**
		$	
		$	

The prime contractor certifies by signature on this agreement to utilize the DBE trucking company as listed on the agreement form. If a DBE trucking company is unable to perform the work as listed on this agreement form, the prime contractor will follow the substitution/replacement approval process as outlined in the contract DBE requirements. **IMPORTANT! The signatures of the DBE, prime contractor, and subcontractor (only if the DBE will be a second tier sub) confirms that all information on this Agreement is true and correct. Parties should sign Agreement in the order in which they are listed.**

DBE NAME:		Name/Title (please print):
Address:		Signature:
Phone:	Fax:	
Email:		Date:
Prime Contractor:		Name/Title (please print):
Address:		Signature:
Phone:	Fax:	
Email:		Date:
Subcontractor (only if the DBE will be a second tier sub):		Name/Title (please print):
Address:		Signature:
Phone:	Fax:	
Email:		Date:

HDOT retains the information collected through this form. With few exceptions, you are entitled on request to be informed about the information that we collect about you.

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Disadvantaged Business Enterprise (DBE)
Confirmation and Commitment Agreement
Trucking Company
INSTRUCTIONS

The purpose of this agreement is to secure the commitment of the bidder/offeror to utilize the listed DBE trucking company, and the DBE's confirmation that it will perform work for the bidder/offeror on this project. The information on this form shall be provided by the DBE.

Project #	Self-explanatory
County	County where project is located
NAICS Code/Description of Work	Primary North American Industry Classification System code under which DBE is certified to performand description of work to be done
Secondary NAICS Code	List other NAICS codes firm is certified to perform
Estimated Beginning Date (Month/Year)	Date DBE shall begin work on the project
Estimated Completion Date (Month/Year)	Date DBE's work will be completed
Trucking Company	Name of DBE trucking company
Item No.	List pay item number
Item Description	Description of item
Unit	Unit of measure – e.g. weight or hours
Unit Price/Rate	Cost per unit or hourly rate
Amount	Total amount per pay item
Total Commitment Amount	Sum of all pay items and total commitment of bidder/offeror to DBE
Number of hours contracted or quantities to be hauled	Approximate number of hours or tonnage to be hauled
Number of fully operational trucks to be used:	Total number of trucks to be used for the project
Tractor/Trailers	Number of tractor trailers to be used
Dump Trucks	Number of dump trucks to be used
Number of fully operational trucks owned by DBE	Number of listed DBE's trucks to be used on thisproject
Name of Trucking Company	If other trucking companies (DBE or non-DBE) are to be leased, list name and information about type of trucks in this section
Estimated Dollar Amount to be Contracted	Provide information about estimated cost to lease trucks
Number of Dump Trucks, Tractor/Trailer	Self-explanatory
DBE NAME	DBE Company name
Name/Title	Name and title of DBE's representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of DBE's representative
Date	Date agreement is signed
Prime Contractor	Company name

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Name/Title	Name and title of prime contractor's representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of prime contractor's representative
Date	Date agreement is signed
Subcontractor (only if the DBE will be a second tier sub):	Name of subcontractor only if the listed DBE trucking company will be performing work under this subcontractor
Name/Title	Name and title of the subcontractor's representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of subcontractor
Date	Date agreement is signed

Disadvantaged Business Enterprise (DBE)
Confirmation and Commitment Agreement
Subcontractor, Manufacturer, or Supplier

This commitment is subject to the award and receipt of a signed contract from the Hawaii Department of Transportation (HDOT) for the subject project. DBEs must be certified by the bid opening date.

Project #:	**County:**
NAICS CODE/DESCRIPTION OF WORK:	**SECONDARY NAICS CODE:**

*All quantities and units should match the bid tab item whenever possible.

The prime contractor shall inform HDOT of the dates when the subcontractor starts and completes all work under the subcontract.

Estimated Beginning Date (Month/Year):	**Estimated Completion Date (Month/Year):**

SUBCONTRACTOR:	Item No.	Item	Approx. Quantity	Unit	Unit Price	Amount
					$	$
					$	$
					$	$
					$	$
	TOTAL COMMITMENT AMOUNT					$

MANUFACTURER:	Item No.	Item	Approx. Quantity	Unit	Unit Price	Amount
					$	$
					$	$
	TOTAL COMMITMENT AMOUNT					$

SUPPLIER:	Item No.	Item	Approx. Quantity	Unit	Unit Price	Amount
					$	$
					$	$
	TOTAL COMMITMENT AMOUNT					$

The prime contractor certifies by signature on this agreement that subcontracts will be executed between the prime contractor and the DBE subcontractors as listed on the agreement form. If a DBE subcontractor is unable to perform the work as listed on this agreement form, the prime contractor will follow the substitution/replacement approval process as outlined in the contract DBE requirements. **IMPORTANT! The signatures of the DBE, prime contractor, and subcontractor (only if the DBE will be a second tier sub) confirms that all information on this Agreement is true and correct. Parties should sign Agreement in the order in which they are listed.**

DBE NAME:		Name/Title (please print):
Address:		Signature:
Phone:	Fax:	
Email:		Date:
Prime Contractor:		Name/Title (please print):
Address:		Signature:
Phone:	Fax:	
Email:		Date:
Subcontractor (only if the DBE will be a second tier sub):		Name/Title (please print):
Address:		Signature:
Phone:	Fax:	
Email:		Date:

HDOT retains the information collected through this form. With few exceptions, you are entitled on request to be informed about the information that we collect about you.

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Disadvantaged Business Enterprise (DBE)
Confirmation and Commitment Agreement
Subcontractor, Manufacturer, or Supplier
INSTRUCTIONS

The purpose of this agreement is to secure the commitment of the bidder/offeror to utilize the listed DBE, and the DBE's confirmation that it will perform work for the bidder/offeror on this project. The information on this form shall be provided by the DBE.

Project #	Self-explanatory
County	County where project is located
NAICS Code/Description of Work	Primary North American Industry Classification System code under which DBE is certified to performand description of work to be done
Secondary NAICS Code	List other NAICS codes firm is certified to perform
Estimated Beginning Date (Month/Year)	Date DBE shall begin work on the project
Estimated Completion Date (Month/Year)	Date DBE's work will be completed
Subcontractor	Name of DBE subcontractor (company name)
Item No.	List pay item number
Item	Description of item
Approx. Quantity	Self-explanatory
Unit	List unit of measure
Unit Price	Cost per unit
Amount	Total amount per pay item
Total Commitment Amount	Sum of all pay items and total commitment of bidder/offeror to DBE
Manufacturer	Name of DBE manufacturer
Supplier	Name of DBE supplier (aka regular dealer)
DBE NAME	DBE Company name
Name/Title	Name and title of DBE's representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of DBE's representative
Date	Date agreement is signed
Prime Contractor	Company name
Name/Title	Name and title of prime contractor’s representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of prime contractor’s representative
Date	Date agreement is signed
Subcontractor (only if the DBE will be a second tier sub):	Name of subcontractor only if the listed DBE will be performing work under this subcontractor as a second tier subcontractor/supplier/manufacturer

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Name/Title	Name and title of the subcontractor's representative that the listed DBE will work under as a second tier subcontractor/supplier/manufacturer
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of subcontractor's representative
Date	Date agreement is signed

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PART 0.G – SAMPLE FORMS

C O N T R A C T

THIS AGREEMENT, made this day _____, by and between the STATE OF HAWAII, by its Director of Transportation, hereinafter referred to as "STATE", and «CONTRACTOR», «STATE_OF_INCORPORATON», whose business/post office address is «ADDRESS» hereinafter referred to as "CONTRACTOR",

WITNESSETH: That for and in consideration of the payments hereinafter mentioned, the CONTRACTOR hereby covenants and agrees with the STATE to complete in place, furnish and pay for all labor and materials necessary for

"«PROJECT_NAME_AND_NO»",

or such a part thereof as shall be required by the STATE, the total amount of which labor, materials and construction shall be computed at the unit and/or lump sum prices set forth in the attached proposal schedule and shall be the sum of «BASIC»----- DOLLARS ($«BASIC_NUMERIC») as follows:

TOTAL AMOUNT FOR COMPARISON OF BIDS…….…...……$«BASIC_NUMERIC»

which shall be provided from the following funds:

Federal Funds.....……..……..…...
State Funds.....……..……...
TOTAL AMOUNT.....……..….

all in accordance with the specifications, the special provisions, if any, the notice to bidders, the instructions to bidders, the proposal and plans for «PROJECT_NO_ONLY», and any supplements thereto, on file in the office of the Director of Transportation. These documents, together with all alterations, amendments, and additions thereto and deductions therefrom, are attached hereto or incorporated herein by reference and made a part of this contract.

The CONTRACTOR hereby covenants and agrees to complete such construction within «WORKING_DAYS» , from the date indicated in the notice to proceed from the STATE, subject, however, to such extensions as may be provided for under the specifications.

For and in consideration of the covenants, undertakings and agreements of the CONTRACTOR herein set forth and upon the full and faithful performance thereof by the CONTRACTOR, the STATE hereby agrees to pay the CONTRACTOR the sum of «BASIC»-----DOLLARS ($«BASIC_NUMERIC») in lawful money, but not more than such part of the same as is actually earned according to the STATE's determination of the actual quantities of work performed and materials furnished by the CONTRACTOR at the unit or lump sum prices set forth in the attached proposal schedule. Such payment, including any extras, shall be made, subject to such additions or deductions hereto or hereafter made in the manner and at the time prescribed in the specifications and this contract.

An additional sum of «EXTRAS»-----DOLLARS ($«EXTRA_NUMERIC») is hereby provided for extra work and shall be provided from the following funds:

Federal Funds…….....……
State Funds……
Total……..…….…...

Where Federal funds are involved, it is covenanted and agreed by and between the parties hereto that the sum of ----«FEDERAL_BASIC»----DOLLARS ($«FEDERAL_BASIC_NUMERIC») and ----«FEDERAL_EXTRAS»----DOLLARS ($«FEDERAL_EXTRAS_NUMERIC»), a portion of the contract price and extras, respectively, shall be paid out of the applicable Federal funds, and that this contract shall be construed to be an agreement to pay said sums to the Contractor only out of the aforesaid Federal funds if and when such Federal funds shall be received from the Federal Government, and that this contract shall not be construed to be a general agreement to pay said portions at all events out of any funds other than those which may be so received from the Federal Government; provided, that if the Federal share of the cost of the project is not immediately forthcoming from the Federal Government, the STATE may advance the CONTRACTOR the anticipated Federal reimbursement of the cost of the completed portions of the work from funds which have been appropriated by the STATE for its pro rata share.

All words used herein in the singular shall extend to and include the plural. All words used in the plural shall extend to and include the singular. The use of any gender shall extend to and include all genders.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be duly executed the day and year first above written.

STATE OF HAWAII

_____
Director of Transportation

«CONTRACTOR»

_____
Signature

_____
Print name

_____
Print Title

_____
Date

PERFORMANCE BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

_____
(Name and Street Address of Bonding Company)

as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Obligee, in the amount of _____

_____
DOLLARS ($_____), to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed a Contract with Obligee on _____, for the following project:_____
_____
_____
_____
_____
_____
hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that:

If the Principal shall promptly and faithfully perform, and fully complete the Contract in strict accordance with the terms of the Contract as said Contract may be modified or amended from time to time; then this obligation shall be void; otherwise to remain in full force and effect.

Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

In the event of Default by the Principal, of the obligations under the Contract, then after written Notice of Default from the Obligee to the Surety and the Principal and subject to the limitation of the penal sum of this bond, Surety shall remedy the Default, or take over the work to be performed under the Contract and complete such work, or pay moneys to the Obligee in satisfaction of the surety's performance obligation on this bond.

Signed this _____ day of _____, _____.

(Seal) _____
Name of Principal (Contractor)

* _____
Signature

_____
Title

(Seal) _____
Name of Surety

* _____
Signature

_____
Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

PERFORMANCE BOND

KNOW TO ALL BY THESE PRESENTS:

That we,_____
(full legal name and street address of Contractor)

as Contractor, hereinafter called Contractor, is held and firmly bound unto the

_____
(State/County entity)

its successors and assigns, as Obligee, hereinafter called Obligee, in the amount

_____DOLLARS ($_____),
(Dollar amount of Contract)

lawful money of the United States of America, for the payment of which to the said Obligee, well and truly to be made, Contractor binds itself, its heir, executors, administrators, successors and assigns, firmly by these presents. Said amount is evidenced by:

☐ **Legal Tender**;

☐ **Share Certificate** unconditionally assigned to or made payable at sight to _____
Description:_____
_____;

☐ **Certificate of Deposit**, No. _____, dated _____ issued by _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Cashier's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Teller's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Treasurer's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Official Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Certified Check** No. _____, dated _____accepted by a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to_____;

WHEREAS:

The Contractor has by written agreement dated _____ entered into a contract with Obligee for the following Project:_____
_____
_____
hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE,

The Condition of this obligation is such that, if Contractor shall promptly and faithfully perform the Contract in accordance with, in all respects, the stipulations, agreements, covenants and conditions of the Contract as it now exists or may be modified according to its terms, and shall deliver the Project to the Obligee, or to its successors or assigns, fully completed as in the Contract specified and free from all liens and claims and without further cost, expense or charge to the Obligee, its officers, agents, successors or assigns, free and harmless from all suits or actions of every nature and kind which may be brought for or on account of any injury or damage, direct or indirect, arising or growing out of the doing of said work or the repair or maintenance thereof or the manner of doing the same or the neglect of the Contractor or its agents or servants or the improper performance of the Contract by the Contractor or its agents or servants or from any other cause, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

AND IT IS HEREBY STIPULATED AND AGREED that suit on this bond may be brought before a court of competent jurisdiction without a jury, and that the sum or sums specified in the said Contract as liquidated damages, if any, shall be forfeited to the Obligee, its successors or assigns, in the event of a breach of any, or all, or any part of, covenants, agreements, conditions, or stipulations contained in the Contract or in this bond in accordance with the terms thereof.

The amount of this bond may be reduced by and to the extent of any payment or payments made in good faith hereunder.

Signed and sealed this _____ day of _____, _____.

(Seal) _____
Name of Contractor

_____
Signature*

_____
Title

*ALL SIGNATURES MUST BE
ACKNOWLEDGED BY A NOTARY PUBLIC

LABOR AND MATERIAL PAYMENT BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

_____,
(Name and Street Address of Bonding Company)
as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Obligee, in the amount of _____

_____
_____ Dollars ($_____), to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed Contract with the Obligee on _____ for the following project:_____
_____
_____
_____
_____
hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to any Claimant, as hereinafter defined, for all labor and materials supplied to the Principal for use in the performance of the Contract, then this obligation shall be void; otherwise to remain in full force and effect.

1. Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

2. A "Claimant" shall be defined herein as any person who has furnished labor or materials to the Principal for the work provided in the Contract.

Every Claimant who has not been paid amounts due for labor and materials furnished for work provided in the Contract may institute an action against the Principal and its Surety on this bond at the time and in the manner prescribed in Section 103D-324, Hawaii Revised Statutes, and have the rights and claims adjudicated in the action, and judgment rendered thereon; subject to the Obligee's priority on this bond. If the full amount of the liability of the Surety on this bond is insufficient to pay the full amount of the claims, then after paying the full amount due the Obligee, the remainder shall be distributed pro rata among the claimants.

Signed this _____ day of _____, _____.

(Seal) _____
Name of Principal (Contractor)

* _____
Signature

_____
Title

(Seal) _____
Name of Surety

* _____
Signature

_____
Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

LABOR AND MATERIAL PAYMENT BOND

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full legal name and street address of Contractor)

as Contractor, hereinafter called Contractor, is held and firmly bound unto _____
(State/County entity)

its successors and assigns, as Obligee, hereinafter called Obligee, in the amount

_____DOLLARS ($_____),
(Dollar amount of Contract)

lawful money of the United States of America, for the payment of which to the said Obligee, well and truly to be made, Contractor binds itself, its heir, executors, administrators, successors and assigns, firmly by these presents. Said amount is evidenced by:

☐ **Legal Tender**;

☐ **Share Certificate** unconditionally assigned to or made payable at sight to_____
_____
Description:_____
_____

☐ **Certificate of Deposit**, No. _____, dated _____ issued by _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Cashier's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Teller's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Treasurer's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Official Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Certified Check** No. _____, dated _____ accepted by a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

WHEREAS:

The Contractor has by written agreement dated _____ entered into a contract with Obligee for the following Project:_____
_____
_____ hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE,

The condition of this obligation is such that, if Contractor shall promptly and faithfully perform the Contract in accordance with, in all respects, the stipulations, agreements, covenants and conditions of the Contract as it now exists or may be modified according to its terms, free from all liens and claims and without further cost, expense or charge to the Obligee, its officers, agents, successors or assigns, free and harmless from all suits or actions of every nature and kind which may be brought for or on account of any injury or damage, direct or indirect, arising or growing out of the doing of said work or the repair or maintenance thereof or the manner of doing the same or the neglect of the Contractor or its agents or servants or the improper performance of the Contract by the Contractor or its agents or servants or from any other cause, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

AND IT IS HEREBY STIPULATED AND AGREED that suit on this bond may be brought before a court of competent jurisdiction without a jury, and that the sum or sums specified in the said Contract as liquidated damages, if any, shall be forfeited to the Obligee, its successors or assigns, in the event of a breach of any, or all, or any part of, covenants, agreements, conditions, or stipulations contained in the Contract or in this bond in accordance with the terms thereof.

AND IT IS HEREBY STIPULATED AND AGREED that this bond shall inure to the benefit of any and all persons entitled to file claims for labor performed or materials furnished in said work so as to give any and all such persons a right of action as contemplated by Sections 103D-324(d) and 103D-324(e), Hawaii Revised Statutes.

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

Signed this _____ day of _____, _____.

(Seal) _____
Name of Contractor

_____
Signature*

_____
Title

*ALL SIGNATURES MUST BE
ACKNOWLEDGED BY A NOTARY PUBLIC

CHAPTER 104, HRS COMPLIANCE CERTIFICATE

The undersigned bidder does hereby certify to the following:

1. Individuals engaged in the performance of the contract on the job site shall be paid:

A. Not less than the wages that the director of labor and industrial relations shall have determined to be prevailing for corresponding classes of laborers and mechanics employed on public works projects; and

B. Overtime compensation at one and one-half times the basic hourly rate plus fringe benefits for hours worked on Saturday, Sunday, or a legal holiday of the State or in excess of eight hours on any other day.

2. All applicable laws of the federal and state governments relating to workers' compensation, unemployment compensation, payment of wages, and safety shall be fully complied with.

DATED at Honolulu, Hawaii, this _____ day of _____, 20___.

_____ «CONTRACTOR»
Name of Corporation, Partnership, or Individual

_____
Signature and Title of Signer

Notary Seal
NOTARY ACKNOWLEDGEMENT

Subscribed and sworn before me this
_____day of_____
Notary signature_____
Notary public, State of _____
My Commission Expires:_____

Notary Seal
NOTARY CERTIFICATION

Doc. Date: _____ #Pages: ____
Notary Name: _____ _____Circuit
Doc. Description: _____
_____
Notary signature_____
Date _____

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HONOLULU, HAWAII

SPECIFICATIONS

PART I

GENERAL PROVISIONS

The Hawaii Department of Transportation AIR and WATER Transportation Facilities Division General Provisions for Construction Projects dated 2016 is not physically included in these specifications. The General Provisions are available at

http://hidot.hawaii.gov/administration/con/

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PART II – TECHNICAL PROVISIONS

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01005 - DESCRIPTION OF WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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 must be in accordance with the Construction Safety and Phasing Plan (CSPP) and Safety Risk Management Document (SRMD), as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

A. The work to be performed under this Contract must include furnishing and paying for all machinery, tools, equipment, labor, and materials necessary for Drainage and Wind Cone Improvements at Hilo International Airport (ITO), including all related work as called for on the plans and these specifications in place, complete, and ready for use. The work involves but is not limited to the following:

1. Demolition of broken asphalt concrete in front of the Army National Guard Aviation Ramp. Grading and grassing of the demolished area.
2. Regrading of the grassed area near the General Aviation Ramp, Taxiway C, and Taxiway J.
3. Installation of dry wells in various locations to address ponding issues around the airfield.
4. Installation and calibration of Compass Rose.
5. Relocation and installation of wind cones near the Runway 8, Runway 21, and Runway 26 ends.

1.03 SUMMARY

A. Section Includes:
1. Permits
2. Construction Safety and Phasing Plan (CSPP)
3. Safety Risk Management Document (SRMD)
4. Allowance
5. Hours of Work for Construction

6. Site Visit
7. Coordination
8. Safety
9. Vehicle Parking
10. Provisions for Field Office/Storage Space
11. Protection of Existing Structures and Improvements
12. Temporary Construction Signs
13. Operations of Airport Facilities During Construction
14. Construction Stakes, Lines, and Grades
15. Operations and Storage Areas
16. Disposal of Excess Soil Materials
17. Contractor-Furnished Products
18. Cleaning Up
19. Verification of Dimensions
20. Standards and Codes
21. Special Project Requirements

1.04 PERMITS

A. The Contractor is responsible for any permits, if required, before starting the construction.

B. The Contractor is responsible for the preparation and submittal of application document(s) to the appropriate permitting agency, payment of application fee(s), and all other work necessary to obtain all required permit(s) prior to starting construction operations at the project site. Construction operations must not start until all required permits are approved by the appropriate permitting agencies and copies submitted to the State Project Manager for the record.

C. A Grading Permit has been approved for the project. The Contractor shall abide by, update, and closeout the Grading Permit throughout the project.

D. Prior to the start of any work the Contractor must sign the HDOTA "Permit To Discharge Into the State Airport Drainage System Relating to Construction Projects" form. The permit has been prepared by the Designer, but the Contractor may make revisions prior to signing.

E. Prior to the start of any work the Contractor shall agree to and sign on as the "Authorized Representative" of the NPDES permit associated with the project.

F. If tall equipment or vehicles are anticipated to be used, prior to the start of any work, an FAA Form 7460-1 must be filed/submitted and

approved by the FAA. The FAA requires a minimum of 45 days to review and approve 7460-1 filings. Work must not begin until approval is received from the FAA. Prior to award, the State may file the FAA Form 7460-1 based on the type of equipment or vehicles anticipated to be used. Should the actual type of equipment or vehicles to be used by the Contractor be different from that initially filed by the State and a new submission would be required, the Contractor must fill out and submit any required FAA Form 7460-1's for approval.

G. Prior to the start of any runway or taxiway closures the Contractor must fill out and submit a Strategic Event Notification Form to the FAA 45 days prior to the scheduled runway and taxiway closures.

H. Bidders are responsible for researching and confirming which permits are and are not necessary for this project. Bidders must exercise due diligence in researching what permits, if any, are required beyond those mentioned in Part 1.04 above. If a permit beyond those mentioned in Part 1.04 above is found to be necessary for this project, then bidders must factor the additional cost of obtaining this permit into their bid. Permits that are found to be required after bid opening must be obtained at no additional cost to the State.

I. All fines levied against this project as a result of failing to apply for a required permit prior to starting work must be borne entirely by the Contractor.

J. All work necessary for researching permits, determining their necessity for this project, preparation and submittal of permit application document(s), payment of application fee(s), etc. up to the issuance of the approved permit(s) are considered incidental to the Contract.

1.05 CONSTRUCTION SAFETY AND PHASING PLAN

A. The Construction Safety and Phasing Plan (CSPP) is a safety document approved by the State of Hawaii Airports Division (HDOTA), Federal Aviation Administration (FAA), Air Traffic Control (ATC), Airlines, and other stakeholders.

B. The Contractor must adhere to the project phasing, work hours, haul routes, closures, and other project specific safety procedures listed in the CSPP.

C. The Contractor must create a Safety Plan Compliance Document (SPCD) in accordance with the most up to date FAA Advisory

Circular (AC) 150/5370-2 *Operational Safety on Airports During Construction*, to detail how the Contractor will comply with the CSPP.

D. Unless otherwise notified, the Contractor must be responsible for updating the "Points of Contact" and any other changes in the CSPP that occur after the award of the contract. Any changes to the CSPP must be reviewed and approved by HDOTA and the FAA Airport District Office (ADO).

E. A copy of the CSPP can be found in the attached Safety Risk Management Document. The CSPP is a part of the bid documents and must be priced accordingly by the Contractor in the contract bid.

F. Phasing Plans included in the contract drawings shall supersede phasing plans in the SRMD.

1.06 SAFETY RISK MANAGEMENT DOCUMENT

A. The Safety Risk Management Document (SRMD) is a safety document accepted by the HDOTA, FAA, ATC, Airlines, and other stakeholders. The SRMD is a result of a safety evaluation of the project as required by FAA Order 5200.11 *FAA Airports (ARP) Safety Management System*.

B. The Contractor must be aware of the hazards, risks, and mitigation measures identified in the SRMD to be associated with the construction of the project.

C. The SRMD is a part of the bid documents and the Contractor must be aware of the mitigation measures required to address the identified hazards and risks. The Contractor's cost for implementing the required mitigation measures must be priced accordingly in the contract bid.

1.07 ALLOWANCE

A. Allowance includes, but not limited to, works required for environmental measures, when required by the regulation(s); unforeseen conditions and other measures, such as temporary traffic controls, temporary safety measures, and security measures, when approved by the engineer.

B. Use the allowance only as directed by the Engineer for the airport's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

C. Contractor's overhead, profit, and related costs for products and equipment ordered by the Airport under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

D. Change Orders authorizing use of funds from the unforeseen conditions contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

E. At the project closeout, any unused amounts remaining in the Allowance will be credited back to the State.

1.08 HOURS OF WORK FOR CONSTRUCTION

A. Work hours for construction are subject to the following:

1. Work hours listed in the Construction Safety Phasing Plan must be adhered to throughout the duration of the project. However, starting and ending times as well as duration may be adjusted by the Airport Manager depending on the actual flight schedules and airport operational considerations.

2. Work hours must be verified with the Airport Manager to provide minimum interruption to facility operations while performing work. The Contractor will be required to shift to night work hours for any work that negatively impacts airport operations, especially passenger movement and or comfort.

3. Work hours must be coordinated with the Airport Manager in order to protect the general public and airport employees from excessive dust and noise levels unless protective measures are taken by the Contractor (e.g. noise and/or dust control) to reduce the impact to a level acceptable to the Airport Manager.

B. The Contractor must work continuously throughout the project duration. The Contractor must apply and receive approval from the Engineer in writing of all work occurring outside of normal work hours. The Contractor must coordinate their schedule with the Engineer if rescheduling of work or intermittent work is required, such work must be performed at no extra cost to the State. If the Contractor elects to work overtime, compensation for State employees and for State representatives, as authorized by the State, must be in accordance with Article VII, Section 7.6 of the General Provisions.

C. Runway 8-26 is the main arrival and departure runway at ITO. To minimize disruption to ITO's day to day operations, night time work hours have been set in the CSPP. The Contractor must be aware of these constrained work hours.

1.09 SITE VISIT

A. The Contractor is encouraged to visit and verify all conditions pertinent to the Contract he/she is bidding on. These conditions include, but are not limited to, the existing wind cone locations, site conditions, and site topography.

1.10 COORDINATION

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

B. Prior to, during, and after construction, the Contractor will be required to coordinate with various airport agencies, groups, and stakeholders. These agencies, groups, and stakeholders include, but are not limited to:

- FAA Honolulu District Office (ADO)
- Hilo International Airport Management (ITO)
- Hilo International Airport Operations Control (AOC)
- ITO Aircraft Rescue and Fire Fighting (ARFF)
- State of Hawaii Department of Transportation, Airports Division (HDOTA)
- Honolulu Control Facility (HCF)
- FAA Air Traffic Organization (ATO)
- FAA System Support Center (SSC)
- Airline Representatives

1.11 SAFETY

A. The Contractor must take all necessary precautions to protect all his and/or her workers 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.

B. Barricades and warning signs must be erected by the Contractor in the work area to properly protect all personnel in the area.

C. During the progress of the work, all debris, empty crates, waste, material drippings, etc., must be removed by the Contractor at the

end of each workday and properly disposed, and the work area must be left clean and orderly.

D. Outage: Written requests for power outage must 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. Outages must be in accordance with Article IV, Section 4.12 of the General Provisions and Special Provisions.

2. Outages that affect FAA owned navigational aids must be coordinated with the FAA and require a minimum of 45 days advanced notice via the FAA's Strategic Event Notification Form.

E. Safety Requirements

1. The Contractor must follow the construction safety and phasing plan provided by the Department of Transportation, Airports Division. The Contractor must also submit a safety plan detailing proposed measures to ensure compliance with the safety requirements.

2. Where conflicts between airport operations and construction activity are anticipated, the Contractor must coordinate with the State and obtain approval of proposed solutions.

3. Mobilization areas, access routes and haul routes must be coordinated with the State prior to construction.

4. The Contractor must address any other concerns during the preconstruction meeting or weekly construction meetings.

1.12 VEHICLE PARKING

A. Subject to availability of space and approval by the Airport Manager, parking may be made available for Contractor vehicle parking. The Contractor must submit the parking requests for themselves and any subcontractors to the Airport Manager through the State Project Manager (SPM) for review. Upon approval by the Airport Manager and subject to availability, a maximum of two (2) temporary parking passes per subcontractor and maximum of three (3) passes for the General Contractor will be issued at no charge. At the Airport Manager's discretion, the parking passes are good for either three (3) months or six (6) months and must be renewed before the passes expire.

B. All passes will be signed out and become the responsibility of the General Contractor. The General Contractor will distribute the parking passes among their subcontractors.

C. Additional parking passes beyond the temporary parking passes may be purchased. These passes are subject to approval by the Airport Manager and availability of parking spaces.

D. All costs associated with obtaining parking passes must be incidental to the Contract.

1.13 PROVISIONS FOR FIELD OFFICE/STORAGE SPACE

A. 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 must be subject to the requirements of Section 01561 - CONSTRUCTION SITE RUNOFF CONTROL PROGRAM.

B. 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 must then be on the Contractor to find space outside of airport property.

1.14 PROTECTION OF EXISTING STRUCTURES AND IMPROVEMENTS

A. The contractor must preserve and protect all structures, equipment, and vegetations on/or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this Contract. The Contractor must only remove trees when specifically authorized to do so, and must avoid damaging vegetation that will remain in place. If any limb or branches of trees are broken during Contract performance, or by the careless operation of equipment, or by workmen, the Contractor must trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Engineer.

B. The Contractor must protect from damage all existing improvements and utilities at/or near the work site.

C. The Contractor must protect from damage and not obstruct all airfield navigational aids and equipment on the airfield.

1.15 TEMPORARY CONSTRUCTION SIGNS

A. The Contractor must install temporary construction signs where the presence of planned construction areas will obstruct the existing signage or cause the closing of an existing restroom facility or method of egress or ingress and/or as directed by the State. Signage for the closure of restroom facilities must include the locations of the two nearest available restrooms. Such signs must be in accordance with the Department of Transportation – Airports Signage and Graphics Manual, highway standards for construction warning signs for background and text colors (white letters on fluorescent yellow background). Signs may be mounted on suitable approved material other than aluminum panels. The Contractor will be responsible to fabricate and install such signs. Costs related to this activity will be considered as incidental to and included in the bid price for the various items of work in this project.

1.16 OPERATION OF AIRPORT FACILITIES DURING CONSTRUCTION

A. The Contractor must coordinate all phases of work under this contract with the Engineer to permit the continuing operation of existing Airport facilities and to minimize disruption to pedestrian and vehicular traffic.

B. The Contractor must organize and plan the construction activities to assure the safety and reliability of and to minimize the interruption to the airport and its tenants.

C. Utility Maintenance: During the construction of this contract, existing utility services serving occupied or used facilities must not be disrupted except where authorized in writing by authorities having jurisdiction. Contractor must provide temporary services during interruptions to existing utilities, as acceptable to the Engineer. Any damages to the existing utility facilities by the Contractor will be repaired at the Contractors expense.

D. Outages for water, power, communications, air conditioning or any other utility, if necessary, must be kept to a minimum and scheduled for off-peak hours. Outages and outage requests must be in accordance with Article IV, Section 4.12 of the General Provisions and Special Provisions. Outage requests must include a description of work and the duration of the outage. The Contractor must not proceed with such outages until written approval is received from the State. The Contractor will not be allowed to claim

for delay if the outage request cannot be obtained in time to perform the scheduled work.

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

1.17 CONSTRUCTION STAKES, LINES AND GRADES

A. The Contractor must perform all construction layout and reference staking necessary for the proper control and satisfactory completion of all structures, grading, paving, drainage, sewer, water, and all other appurtenances required for the completion of the work.

B. All construction staking must be performed by qualified personnel under the direct supervision of a person with an engineering background who is experienced in the direction of such work and is acceptable to the Engineer.

C. The Department will not be responsible for delays in setting stakes and marks.

D. All control points and stakes or marks which the Engineer may set must be preserved by the Contractor. If such control points, stakes or marks are destroyed or disturbed by the Contractor, the cost of replacing such stakes or marks will be charged against the Contractor and deducted from payments due the Contractor.

E. The Department may check the Contractor's control of the work at any times as the work progresses. The Contractor will be informed of the results of these checks, but the Department by doing so will in no way relieve the Contractor of his responsibility for the accuracy of the layout work. The Contractor must at his expense correct or replace any deficient or inaccurate layout and construction work. If, as a result of these deficiencies or inaccuracies, the Department is required to make further studies, redesign, or both, all expenses incurred by the Department due to such deficiencies or inaccuracies, will be deducted from any payments due the Contractor.

F. The Contractor must be responsible for the placement and preservation of adequate ties to all control points whether established by the Contractor or by the Engineer.

G. The Contractor must furnish all necessary personnel, engineering equipment and supplies, materials, and transportation incidental to the accurate and satisfactory completion of this work.

H. All original, additional or replacement stakes, marks, references and batter-boards which may be required for the construction operations, must be furnished, set and properly referenced by the Contractor. The Contractor must be solely and completely responsible for the accuracy of the line and grade of all features of the work. Any errors or apparent discrepancies found in previous surveys, the plans and specifications must be called to the Engineer's attention by the Contractor for correction or interpretation prior to proceeding with the work.

I. Before construction is started on any structure which is referenced to an existing structure or topographical feature, the Contractor must check the pertinent locations and grades of the existing structures or topographical features to determine whether the locations and grades shown on the plans are correct.

J. All construction staking must be performed by qualified personnel under the direct supervision of a person with an engineering background who is experienced in the direction of such work and is acceptable to the Engineer.

K. Unless otherwise provided, all requirements imposed by this section and performed by the Contractor must be considered incidental to the various contract items and not separate or additional payment will be made thereof.

L. Before construction is started on any structure which is referenced to an existing structure or topographical feature, the Contractor must check the pertinent locations and grades of the existing structures or topographical features to determine whether the locations and grades shown on the plans are correct.

M. All stakes and markers used for control staking must be of the same quality as used by the Department for this purpose. For slope limits, pavement edges, gutter lines, et cetera, where so-called "working" stakes are commonly used, stakes of different quality may be acceptable.

1.18 OPERATIONS AND STORAGE AREAS

A. Storage & staging areas may be available on a limited basis. Due to the number of projects in progress or projected to be in progress, the State does not guarantee the availability of such areas on airport property. The Contractor may request storage & staging area(s) within the AOA fence line once the Notice to Proceed date is set.

B. The Contractor must confine all operations (including storage of material) on the Airport premises to areas authorized or approved by the Engineer. The Contractor must hold and save the Airports Division free and harmless from liability of any nature occasioned by the Contractor's performance.

C. The Contractor must use only established roadways. When materials are transported in prosecuting the work, vehicles must not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local laws or regulations. When it is necessary to cross curbs or sidewalks, the Contractor must protect them from damage. The Contractor must repair or pay for the repair of any damaged curbs, sidewalks, and roadways.

1.19 DISPOSAL OF EXCESS SOIL MATERIALS

A. Excess soil generated by the project must not be disposed of on site, but shall be disposed of in accordance with the project specific C-EHMP and specification section 01562 – Management of Contaminated Medias.

B. Off-Site Disposal of Excess Soil Material: Any excess soil material and rubbish disposed of outside the Airport property must be the responsibility of the Contractor. The Contractor must make all arrangements and bear all costs involved therewith.

1.20 CONTRACTOR-FURNISHED PRODUCTS

A. Contractor must furnish all products.

B. Components required to be supplied in quantity within a specification section must all be the same and must be interchangeable.

C. Unless otherwise noted in the Contract Documents, provide materials and equipment that:

1. Has been produced by reputable manufacturers having adequate experience in the manufacture of these items

2. Has been designed for the service intended

3. Has not been previously incorporated into another project or facility

4. Has not changed ownership since their initial production or fabrication and shipment from the manufacturer's factory or facility

5. Has not been subject to degradation or deterioration since manufacture

1.21 CLEANING UP

A. The Contractor must at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor must remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not property of the Airports Division. Upon completing the work, the Contractor must leave the work area in a clean, neat and orderly condition satisfactory to the Engineer.

1.22 VERIFICATION OF DIMENSIONS

A. The Contractor must be responsible for the coordination and proper relation of his work to the work of all trades. The Contractor must visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Owner's Representative of any discrepancy between the field measurements and the plan dimensions before performing any work.

1.23 STANDARDS & CODES

A. Wherever references are made in the contract to the respective standards, specifications and advisory circulars in accordance with which work is to be performed or tested, it is to be understood that the edition or revision of the standards, specifications and advisory circulars in effect on the date of the bidder's proposal must apply unless otherwise expressly set forth in the contract. Unless otherwise specified, reference to such standards is solely for technical information.

B. In case of conflict among any such referenced standards and codes or between any such standard(s) or code(s) and the requirements of the Contract, the stricter requirement must govern.

1.24 SPECIAL PROJECT REQUIREMENTS

A. Upon receipt of the Contract, the Contractor must process and return the Contract to the State' Contract Office within five (5) calendar days.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section for unforeseen conditions approved by the State and Engineer shall be paid for under the Unforeseen Conditions allowance item in the Proposal Schedule. The allowance item is an estimate and payment shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be full compensation for all materials, labor, tools, equipment, and all other incidentals necessary to complete the work.

B. All other work specified in this Section will not be measured nor paid for separately, but must be considered incidental to and included in the bid prices for the various items of work in this project.

Payment will be made under:

Item No.	**Item**	**Unit**
01000.1	Unforeseen Conditions	Allowance (ALLOW)

PART 5 – ATTACHMENTS

5.01 Safety Risk Management Document (SRMD)

Hilo International Airport (ITO)
Drainage and Wind Cone Improvements
Safety Risk Assessment Panel Meeting
Safety Risk Management Document

State of Hawaii
Department of Transportation
Airports Division

SRMD Version 1.1
July 7, 2021

Sponsor: Greg Garcia, HDOT-A

Prepared by: BASES

Version No.: 1.1

Change Control and Version Tracking

SRMD Action/Change	Date	Version
Pre-SRA Panel Meeting with FAA LOB's	October 1, 2019	--
Pre-SRA Panel Meeting with all stakeholders	November 22, 2019	--
Pre-SRA Panel Meeting with all stakeholders	December 9, 2020	--
HDOT-A SRA Panel Meeting	March 31, 2021	--
Draft SRMD distributed to Panel Members for comment	May 3, 2021	1.0
Panel Member comments on Draft SRMD due	June 3, 2021	1.1
Final SRMD routed for signatures	July 7, 2021	1.1
Final SRMD with signatures distributed (estimated date)	July 16, 2021	1.1

Signature Page

Title: Drainage and Wind Cone Improvements at Hilo International Airport, Safety Risk Assessment Panel Meeting, Safety Risk Management Document

Initiator: Greg Garcia

Initiator's Organization: HDOT-A

Initiator's Phone Number: (808) 838-8829

Submission Date: July 7, 2020

SRMD Version: 1.1

Risk Acceptance Signature:

_____ _____

Steven J. Santiago – Assistant Manager, Hawaii District Airports Date

_____ _____

Ross Higashi – HDOT-A Deputy Director Date

Proposal Rejection:

_____N/A_____ _____

Signature, Name and Organization Date

*NOTE: Although not required by FAA Order 5200.11 and this panel was not triggered by the FAA, the SAS-1 Signature Page is provided in Appendix F for reference only.

Table of Contents

List of Figures

List of Tables

Appendices

Appendix A – Preliminary Hazard List (PHL)

Appendix B – Preliminary Hazard Analysis (PHA)

Appendix C – Panel Packet

Appendix D – Dissenting Opinions

Appendix E – Sign-In Sheets

Appendix F – SAS-1 Form

Appendix G – Ground Rules

Appendix H – Definitions

Appendix I – Roles and Responsibilities

Appendix J – Reference Documents

Appendix K – Construction Safety and Phasing Plan (CSPP)

Executive Summary

The State of Hawaii, Department of Transportation, Airports Division (HDOT-A), proposes to to address Part 139 airfield ponding issues at the Hilo International Airport by improving the drainage, installing trench drains and dry wells. The project will also relocate the wind cones at the end of Runways 8, 21, and 26 and place them outside the Runway Object Free Area (ROFA).

The HDOT-A implemented the Safety Risk Assessment (SRA) process into the Construction Safety Phasing Plan (CSPP) review because the proposed changes to the airfield had presumed significant impacts to the airfield operational status and the National Airspace System (NAS). All HDOT-A led SRA preliminary and panel meetings were conducted and facilitated in accordance with the FAA Airport (ARP) Safety Management System Order 5200.11, FAA ARP Safety Management Systems (SMS) Desk Reference, Version 1.0, FAA AC 150/5200-37A Safety Management Systems for Airport Operators, and FAA Order 8040.4B Safety Risk Management Policy.

This Safety Risk Management Document (SRMD) documents the Safety Risk Management Panel (SRMP) evaluation of the proposed Construction Safety Phasing Plan (CSPP) to improve the drainage with the installation of trench drains, dry wells, and the removal of deteriorated infield pavement. The project will also relocate the Runway 8, 21 and 26 wind cones outside of the Runway Object Free Area (ROFA).

HDOT-A conducted multiple Preliminary SRA meetings with Airport stakeholder groups. The purpose of having multiple Preliminary SRA meetings was to ensure the panelists have background and knowledge of the Federal Aviation Administration (FAA) Airports SMS process and understand the proposed change to airfield system. These meetings were conducted on the following dates with these stakeholder groups:

1. October 1, 2019, Preliminary SRA invitations were sent out to all FAA lines of business (LOB's). HDOT-A EA, HDOT-A ITO, WRSA, FAA HI/OAK District, FAA ITO & KOA SSC, FAA ATO, FAA HCF ATO, AECOM, FAA ITO ATCT, FAA HCF, and FAA HNL ADO were able to participate via physical attendance or Teams Video conference call.
2. November 22, 2019, Preliminary SRA invitations were sent out to all stakeholders affected by the proposed change. HDOT-A EA, HDOT-A ITO, FAA TIO ATCT, FAA RSO, HDOT-A Planning, FAA ITO & KOA SSC, FAA ATO, FAA HCF ATO, FAA HCF, WRSA, FAA HNL ADO, AvAirPros, and Hawaiian Airlines were able to participate via physical attendance or Teams Video conference call.
3. December 9, 2020, Preliminary SRA invitations were sent out to all stakeholders affected by the proposed change. HDOT-A EA, HDOT-A ITO, FAA TIO ATCT, FAA RSO, HDOT-A Planning, FAA ITO & KOA SSC, FAA ATO, FAA HCF ATO, FAA HCF, WRSA, FAA HNL ADO, AvAirPros, and Hawaiian Airlines were able to participate via Teams Video conference call.

SRMP Findings

The hazards were identified, analyzed, and assessed in an organized group discussion, based on the thorough review of the Project Proposal Summary (PPS) and CSPP. There were nine (9) hazards generated through the brainstorming session, documented in the Preliminary Hazard List (PHL). The Safety Risk Management Panel (SRMP) evaluated the nine (9) hazards in the PHL,

determining four (4) credible hazards for further evaluation in the Preliminary Hazards Analysis (PHA) worksheet.

The SRMP evaluated the worst credible Effect for each hazard identified and for the first hazard it was determined to have differing circumstances resulting in multiple worst credible effects that needed further assessment. This hazard was divided by generating an alpha-numeric identifier listing each Effect analyzed separately as shown in Table 1 below.

The SRMP identified all hazards, including the worst credible effect to have low initial risk, associated with different phases of the project. These potential hazards will be monitored by HDOT-A and the Construction Manager, addressed as needed during weekly construction project meetings. See Table 1 below for summary.

Table 1: Hazard Risk Assessment Results

(1) Hazard ID	(2) Hazard Description	(7) Effects	(12) Initial Risk	(15) Predicted Residual Risk
XYZ-1	Condition, real or potential; can cause injury, illness, etc. Pre-requisite for accident or incident	Potential outcome or harm of the hazard if it occurs in the defined system state	Conditions, characterized by qualities, in which a system can exist; worst credible	Risk status predicted to occur when recommended controls or requirements are verified
ITO-DRAINAGE&WC-1A	Pilot LOSA	Surface Incident	4D – Low	N/A
ITO-DRAINAGE&WC-1B	Pilot LOSA	Aircraft Damage	4E – Low	N/A
ITO-DRAINAGE&WC-2	Contractor/Vehicle Driver LOSA	Runway Incursion	4D – Low	N/A
ITO-DRAINAGE&WC-3	Controller LOSA	Runway Incursion	4D – Low	N/A
ITO-DRAINAGE&WC-4	Foreign Object Debris	Aircraft Damage	4D - Low	N/A

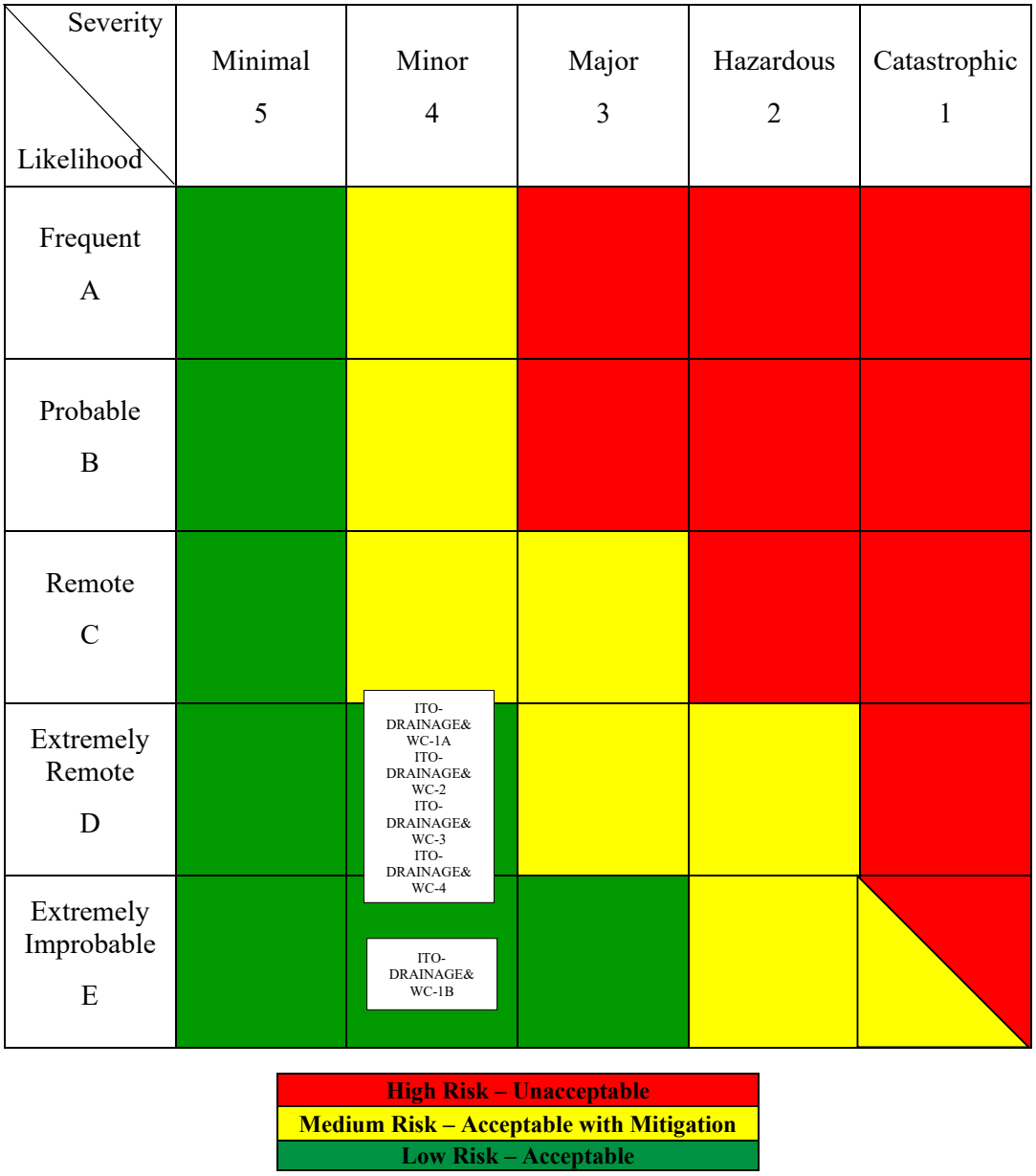


Figure 1: Risk Matrix

The SRMP applied the SRM process determining that the ITO Drainage and Wind Cone Improvements CSPP can be introduced into the NAS with an acceptable level of risk (See Figure 1 Above). Appendix F provides the SAS-1 Form 5200-8 Signature page, signifying SRMP members concurrence of this Safety Risk Assessment for the Drainage and Wind Cone Improvements at Hilo International Airport project.

Introduction and Background

Hilo International Airport (ITO) is a small hub airport located on the Island of Hawaii. ITO is owned and operated by the State of Hawaii, Department of Transportation, Airport Division. It is located on the east side of the island providing service to commercial domestic and interisland air carriers, , commuter/air taxi, air cargo, helicopter (tour operators), military, and general aviation.

During a past Part 139 inspection ITO was written up for ponding issues near the Army National Guard Aviation Ramp and the GA Ramp. To address these write ups this project will be installing dry wells at multiple locations to drain the excess water off the apron. A large portion of broken asphalt near the Civil Air Patrol building and Taxiway L will be removed, regraded, and regressed to help with drainage. The demolition of the broken asphalt will remove an existing faded compass calibration pad. The project will install a new compass calibration pad near the same area.

Also, the Part 139 inspection wrote up a discrepancy for having its wind cones located inside the ROFA. This project will relocate the Runway 8, 21, and 26 wind cones and place them outside the ROFA. The segmented circle around the Runway 8 wind cone will be removed and relocated around the new Runway 21 wind cone location.

The HDOT-A utilized their SRA facilitator services consultant to conduct all SRA preliminary and panel meetings in accordance with the FAA Airports (ARP) Safety Management System (SMS) Order 5200.11, FAA Order 8040.4B Safety Risk Management Policy, and FAA ARP SMS Desk Reference, Version 1.0. A series of preliminary SRA meetings were conducted using a systematic approach to prepare for the final SRA panel meeting. The meetings were scheduled with stakeholder groups as they reviewed the CSPP Phasing and Barricade plan provided by the designer. The following outlines the meeting dates and stakeholder groups that were invited. However, it is not an indicator of the actual attendance, please refer to Appendix E Sign-In Sheets.

Preliminary SRA Meeting Date	Stakeholder Group	Purpose
October 1, 2019	HDOT-A EA, HDOT-A ITO, WRSA, FAA HI/OAK District, FAA ITO & KOA SSC, FAA ATO, FAA HCF ATO, AECOM, FAA ITO ATCT, FAA HCF, and FAA HNL ADO	To review the phasing for the field investigations with all FAA LOB's and develop to an acceptable level by all parties.
November 22, 2019	HDOT-A EA, HDOT-A ITO, FAA TIO ATCT, FAA RSO, HDOT-A Planning, FAA ITO & KOA SSC, FAA ATO, FAA HCF ATO, FAA HCF, WRSA, FAA HNL ADO, AvAir Pro, and Hawaiian Airlines	To review the phasing for the field investigations with all stakeholders and develop to an acceptable level by all parties.
December 9, 2020	HDOT-A EA, HDOT-A ITO, FAA TIO ATCT, FAA RSO, HDOT-A Planning, FAA ITO & KOA SSC, FAA ATO, FAA HCF ATO, FAA HCF, WRSA, FAA HNL ADO, AvAir Pro, and Hawaiian Airlines	To review the phasing for the field investigations with all stakeholders and develop to an acceptable level by all parties.

As the preliminary meetings were conducted, an SRA briefing on the FAA ARP SMS process, roles and responsibilities, and ground rules were presented and posted in the room. The ground rules allowed participants the venue to ask questions and have their concerns addressed prior to conducting the final SRA Panel Meeting. Throughout these meetings, the participants were reminded on the ground rules, specifically, "the absence of an answer is understood as agreement." This fostered open discussion and participants' concerns were addressed during the meeting or placed on the issues board for future discussion.

The following provides a brief overview of the preliminary SRA meetings discussion and concerns by the stakeholder group in narrative format.

The first Preliminary SRA was conducted on October 1, 2019, with all FAA Lines of Business (LOB's) to review the phases of the field investigation CSPP. The following is a recap of the new revisions for the affected phases that resulted from the discussion.

It was decided that the project would be broken up into five (5) phases with no anticipated night work. The following is a recap of the five proposed phases that resulted from the discussion.

a. Phase 1 will see the demolition of the broken AC pavement between Runway 3-21 and the perimeter road. The area will be grassed and regraded. There is no exact location of the drywells at the current time. The work will be outside of the Runway Safety Area (RSA), up to the Taxiway L shoulder. The work also goes to the Taxiway L shoulder, so the only access will be from the new hangars. Taxiway and Taxi-lane Object Free Area (TOFA) lines will need to be added to the drawings. The vehicle road access will need to remain open to transit across the ramp. Demolition may incur Foreign Object Debris (FOD) due to helicopter rotor wash from Hawaii Air National Guard (HIANG). Ingress/egress routes may need to be identified. Work can be done at night, but there is a question of what the worksite will be during non-work hours. The compass rose will be relocated to accommodate the pilots' requests. It is currently located on the West side of Taxiway L on the broken asphalt. This phase will be broken up into two different subphases. Phase 1 will be for the demolition of the pavement area between Runway 3-21 and the service road and the other phase will be for work between the perimeter road and the hangars Work areas with 3" pavement lips will need to be maintained. Inquiry as to the number of aircraft that operate on Runway 3-21 from 6:00pm-6:00am. ATC reported hardly anyone does pattern work since the flight school has closed. There is about 1 medivac aircraft per week. The only other concern would be if the wind changes, cargo aircraft may use Runway 3-21 but prefer utilizing Runway 8-26 which is closer to the new cargo ramp.
b. Phase 2 This phase work will be near Taxiway I and the perimeter road behind Runway 3. This will install 1-2 drywells along the edge of the road. Understanding the perimeter road will need to remain open, however, to install the drywell large equipment may be used and possibly closing one lane of the road. Runway 3-21 may have to be closed during this work depending on the height of the equipment that will need to be verified. Will need to prepare a draft airspace study form 7460 for the proposed equipment height since it could take up to 1-2 months to process. Night work may be an issue with homes located in the area same issue for phase 1. The perimeter road may require its own phase if there is a requirement to have to close the runway. There will be several patches on Taxiway I to address the ponding issues. Taxiway I will need to be closed, and barriers

positioned. Verification for Gate 21 availability when the project starts. Concurrence with the contractor staging to be located inside the AOA.

c. Phase 3 This phase is to address the ponding near the northwest ramp. RF stated the drawing is still preliminary as there is no exact locations of where the trench drains or drywells will be located. Limits of work will not be barricaded during the entire phase, only while work is being performed. The contractor will utilize access gate 21 if it still available and stage inside the AOA. Taxiway J will be used to access the ramp. The west ramp demolition project is currently ongoing, creating lease lots may come into this area of a larger block. This may become a smaller work space. Designer to reach out to west ramp designer to see if their demolition project will be addressing the ponding issue in that area. Verification needed to avoid the two projects creating more ponding issues. Concern regarding heavy rain occurrences during the construction when it floods. Will the work be suspended until it drains, or should the contractor have the means to take care of it. There is a drywell currently out there, however, it does take time to drain. Designer verified there would be no impacts regarding Taxiway C during this phase. The perimeter road will remain open for ARFF vehicles. During some of the phases, request to have AECOM come on as Program Managers.
d. Phase 4 will need to be coordinated as it will be done concurrently with the West Ramp Demolition Project. This may call for night work. The map will need to be updated to show the additional tie down and the fence line. The work area needs to be sub phased to show more of the taxi area. The area near Taxiway C may be a busy intersection. Aircraft at the old T-hangars use the taxiway to enter Runway 3 for a back taxi. There currently is a lot of ponding by the hold short line, which the contractor will work up to that area. Due to the height limitation of the equipment installing the drywell, that may require a runway closure with work to be performed at night. Will break out phases to separate the north and south areas. Drawings needed to show the updated fence line. The existing funds for the reimbursable agreement should be adequate for this project for the shutdown and re-energizing of the NAVAID's. The current expiration on the agreement is May 2020, no additional funding needed. The Lease lots currently being established will need to be considered prior to the final location of the drywells so as to not to cause any impacts with the usability of those lease lots as a result of this project. The relocation of the AOA fence line and the demolition of the buildings will need to be included in the ALP update.
e. Phase 5 will be the simple relocation of the Runway 21 wind cone. The contractor will access the Air Operations Area (AOA) through Gate 28. The haul route will also need to be changed to be closer to the ROFA and not in between parked aircraft. The staging area will also need to be changed. The existing base of the wind cone will be demolished as well. The new location of the wind cone will not be on the ALP. The project is not on Airport Capital Improvement Plan (ACIP) at the moment, but it should be on ACIP if federal funding will be used. The access gates will not need to be manned if people are not going in/out continuously. There are security measures in the contract if the gates require for it to be open for longer periods.

The second Preliminary SRA was conducted on November 22, 2019, with all stakeholders to review the phases of the field investigation CSPP. The following is a recap of the new revisions for the affected phases that resulted from the discussion.

It was decided that all work will be done during the day, and that the project will be divided into six (6) phases. The following is a recap of the six proposed phases that resulted from the discussion.

a. Phase 1 will consist of the demolition of the pavement in form of the HIANG, which is in between the access road and Runway 3-21. This phase will include repairs to several areas of the pavement near the access road and the hangars to include installing drywells and trench drains. The only way that fixed wing aircraft can exit out of Hangar 414 is through Taxiway L, so they will be relocated to the transit parking area on the opposite side of the airfield. Helicopter operations can still traverse through from the new hangars. The duration of the work is approximately 20 calendar days, with work being 0600-1600. A suggestion was made that the helicopter operators are notified via tenant notice and NOTAM for a no-fly over the ramp where the work is being performed. The access road is to remain open for the duration of this phase.
b. Phase 2 will see work being conducted inside the ROFA and next to Runway 3-21. This phase will require a runway closure due to the equipment height in close proximity to Runway 3-21. The work will consist of the demolition of pavement, regressing, and regrading. The duration of work will be 20 calendar days, with work hours being 0600-1600. Low-profile barriers will be installed along the taxiway connecting intersections to Runway 3-21. Taxiway I will remain open for the duration of this phase. A tenant notice and NOTAM will be issued similar to that in Phase 1. The contractor will be conducting Foreign Object Debris (FOD) check and cleanup as a part of this plan. It was suggested that the contractor utilize access gate 22 instead of access gate 21.
c. Phase 3 will be to address the ponding on Taxi-lane I, which will require a closure. The duration of this phase will be 7 calendar days, with work being 0600-1600. The work on the pavement may extend past the movement boundary line as the ponding obscures the line itself. Because of this, it was suggested that Taxiway C be closed just before the intersection of Taxiway K to perform this work. Although not shown, there is a possibility of regrading the grass portion in this area to address the ponding as the soil for grass is higher than the pavement prompting the ponding. If this occurs, the Southern portion of Taxiway J may need to be closed and additional time would need to be added to this phase.
d. Phase 4 consist of addressing the ponding on the Northwest ramp near Taxiway C. The work will be performed inside the Taxiway Safety Area (TSA), so it may require the closure of Taxiway C. This phase may lead into the West Ramp Demolition Project, so there will be coordination that will need to be made. A Work-in Progress (WIP) may be able to be performed as it is phased together since it is in close proximity form the edge of the taxiway. TSA lines need to be added as it will be 107’ from the taxiway centerline. This phase will be broken up into two different phases with a WIP for both. There could possibly be a WIP and a group restriction on Taxiway C for the smaller portion. The TSA for Taxiway C from the ALP may be smaller since only smaller aircraft use that area.
e. Phase 5 will consist of drainage improvement work near the General Aviation (GA) ramp and Taxiway C. This work will require the closure of a portion of Taxiway C from Taxiway K to Taxiway A. Both ITO HDOT-A and ATCT are okay with the low-profile barrier placement as depicted on the phasing sheet. The contractor will enter the work area through access gate 28. The duration of work for this phase will be 35 calendar days, with work being 2100-0600. There is a concern that air ambulance flights go right into the area of work. There are two air ambulances that are based in ITO and parked on the ramp close to the GA. It will take 20-30 minutes for the local American Medical Response (AMR), and

one hour if the flight is arriving form HNL. To accommodate the work, the air ambulance aircraft can be relocated closer to the end of Runway 3 on the ramp and the barriers can be relocated on Taxiway C as not to disturb the work area. In the event of disruption to workers is the air taxi comes in, the workers will need to load it up and give the required distances to get the aircraft in/out.

f. Phase 6 will be the relocation of the wind cone at the end of Runway 21 that is currently located in the ROFA to approximately 100'-200' outside the ROFA. The duration of work for this phase will be 28 calendar days, with work the hours being 0600-1600.

The third Preliminary SRA was conducted on December 9, 2020, with all stakeholders to review the phases of the field investigation CSPP. The following is a recap of the new revisions for the affected phases that resulted from the discussion.

a. Phase 1 will be in front of the Army National Guard Ramp. This phase will be for the broken AC in front of the taxi-lane near the access road and TWY "L". The broken AC will be removed, and the area will be regraded, with new grass planted. 8 drywells will also be installed in the highlighted section shown in the phasing plan, with the drainage pipes having a 5' diameter. The contractor will come out with a tall drill to bore into the Earth in order to create the drywells. There will also be other tall construction equipment on site. This phase includes the closure of TWY "L" for the 90-day duration of this phase. The working hours will be 0600-0600 as the RWY will not be closed. Along with TWY "L" being closed, the Army National Guard Ramp will also be closed. The contractor will need to coordinate with the airport and all stakeholders where they will be working each day and where the trucks will be going in and out that day. It is currently unsure how many drywells will be in the area, but it was made clear that it would not affect the phasing. The location of the drywell will depend on the topography of the low spots. It is estimated that there will be three drywells in the sliver, with five in the bigger trapezoidal area. The contractor will have one drill rig, so only one installation can be done at a time. Coordination will need to be done with Air Traffic to let them know where the drill rig will be placed. This should be precoordinated with ATCT and the Army National Guard.
b. Phase 2 will be similar to Phase 1 in that it will demolish the broken asphalt near TWY "L", as well as regrade and re-grass. Because the work will be inside the ROFA, close to the RWY, the RWY is looking at being closed since tall equipment will be nearby. This phase will last for an estimated 30 working days, 3 of these requiring closure. NOTAMs will be issued for the RWY 3-21 and TWY "L" closures. The contractor will issue NOTAMs for tall equipment is applicable. A note sheet will be added for the requirement of daily grading to meet the standards and install transitions for the reopening of RWY 3-21. The barricade will move to the left side of TWY "I", and the barricade at the RWY 3 hold line will be removed.
c. Phase 3 will be for regrading and will consist of the installation of one drywell in the middle of the area. This phase is anticipated to take 14 working days, with the hours of 0600-1600. This will include working up to the edge of TWY "C", with the barricades extending into the North ramp, giving the contractor an area to stage equipment. Note 5 details that the contractor will have to coordinate with ITO and ATCT during work hours. A Northerly direction will normally be given when restricting a full-length parallel TWY. The use of Gate 21 will be called out and should be used for any phase using Gate 22. Note 5 coordinate with ITO for aircraft group restrictions. NOTAM to state limited to

70’ side. Add NOTAM for “feet east of Twy K” for Twy C restriction start. Relocate MA line to the TSA line

d. Phase 4 will consist of the installation of a compass calibration pad near the GA ramp. This phase has an estimated 14 working day duration, with the hours of 0060-1600. The contractor will be called out to barricade the perimeter of the working area. The only NOTAM needed will be for the GA ramp, which will be a WIP. Some aircraft will need to be relocated, with medical aircraft needing special attention. The compass rose is needed by the Army National Guard. Blackhawk cannot be in that area with a fixed wing aircraft there. The new compass rose will call for the notification to stakeholders on where it will be and when its effective to be done. The diagrams and 5010 may need to be updated if there are notes regarding the old compass not useable.
e. Phase 5 will have its title changed to “Phase 5” and will be for the relocation of the RWY 8 and 21 wind cones to address the Part 139 writeups. This phase has an anticipated 28 working days, will be a WIP, and will have the hours of 0060-1600. NOTAMs will be in place for the tall equipment. The circuits will need to be turned off if they are connected to wind cones. The RWY 8 wind cone will be demolished and relocated perpendicular from the RWY 8 centerline. The segmented circle will be relocated to the RWY 21 wind cone. The stakeholders will be notified on the new wind cone location.
f. Phase 6 will be for the relocation of the RWY 26 wind cone. This phase will have an anticipated duration of 28 days and will include the nighttime working hours of 2100-0600. There will be NOTAMs regarding the RWY 8-26 and TWY “A” East of TWY “F” being closed, TWYs “B”, “D”, and “E” North of TWY “A “closed, and for calling out NAVAIDs OTS. Coordination will need to be done with the cargo flights taking place at night. The wind cone close to the glideslope will affect the glideslope capabilities due to the contractor’s equipment. The wind cone will need to be hooked up to the RWY lighting, and the RWY edge lights will be turned off during this time. Notice to public for night ops by district. Add to assumptions.

At the conclusion of the multiple preliminary SRA meetings with all the FAA offices, airlines, military, general aviation, and other stakeholders; the designer was able to refine the Phasing and Barricade Plan, and the CSPP narrative for the SRA Panel review. The SRA Panel meeting was conducted on March 31, 2021.

Section 1 – Current System / Baseline

Hilo International Airport is located on the East side of the Island of Hawaii. It is a Part 139 certified public use commercial service airport with two runways and multiple parallel and interconnecting taxiways (See Figure 2). Runway 3-21 at 5,600' x 150' with published declared distances (See Table 3). Runway 8-26 at 9,800' x 150' and is the primary commercial service runway. Both runways and their approaches to each end have a Very High Frequency (VHF) Omnidirectional Range/Distance Measuring Equipment (VOR/DME) or Tactical Aircraft Control and Navigation (TACAN) approach procedure, and Precision Approach Path Indicator (PAPI) or Visual Approach Slope Indicator (VASI)'s. Runway 21 has added Area Navigation (RNAV) approach. Runway 26 has an additional ILS or Localizer Approach and RNAV approach.

The Airport Traffic Control Tower is open 0600 to 2200 daily. Runway 3-21 is closed to turbine aircraft 1800-0600. ITO serves a small category of helicopter tour operators, however, there is no Final Approach and Takeoff (FATO) helipad marking available.

Table 2: Runway Data Summary

Item	Runway 03/21		Runway 08/26	
	03	**21**	**08**	**26**
Width	150'		150'	
Length	5,600'		9,800'	
Marking Type	Non-Precision		Precision	
Part 77 Approach	Visual	Non-Precision	Visual	Precision
Navigational Aids	None	RNAV	None	ILS/DME/ VOR/RNAV
Visual Aids	4-box VASI	None	4-Light PAPI	4-Light PAPI
Lighting Type	None	None	ODALS	MALSR

Table 3: Declared Distances

Item	Runway 3	Runway 21
Existing TORA	5,600'	5,251'
Existing TODA	5,600'	5,251'
Existing ASDA	5,600'	5,510'
Existing LDA	5,251'	5,510'

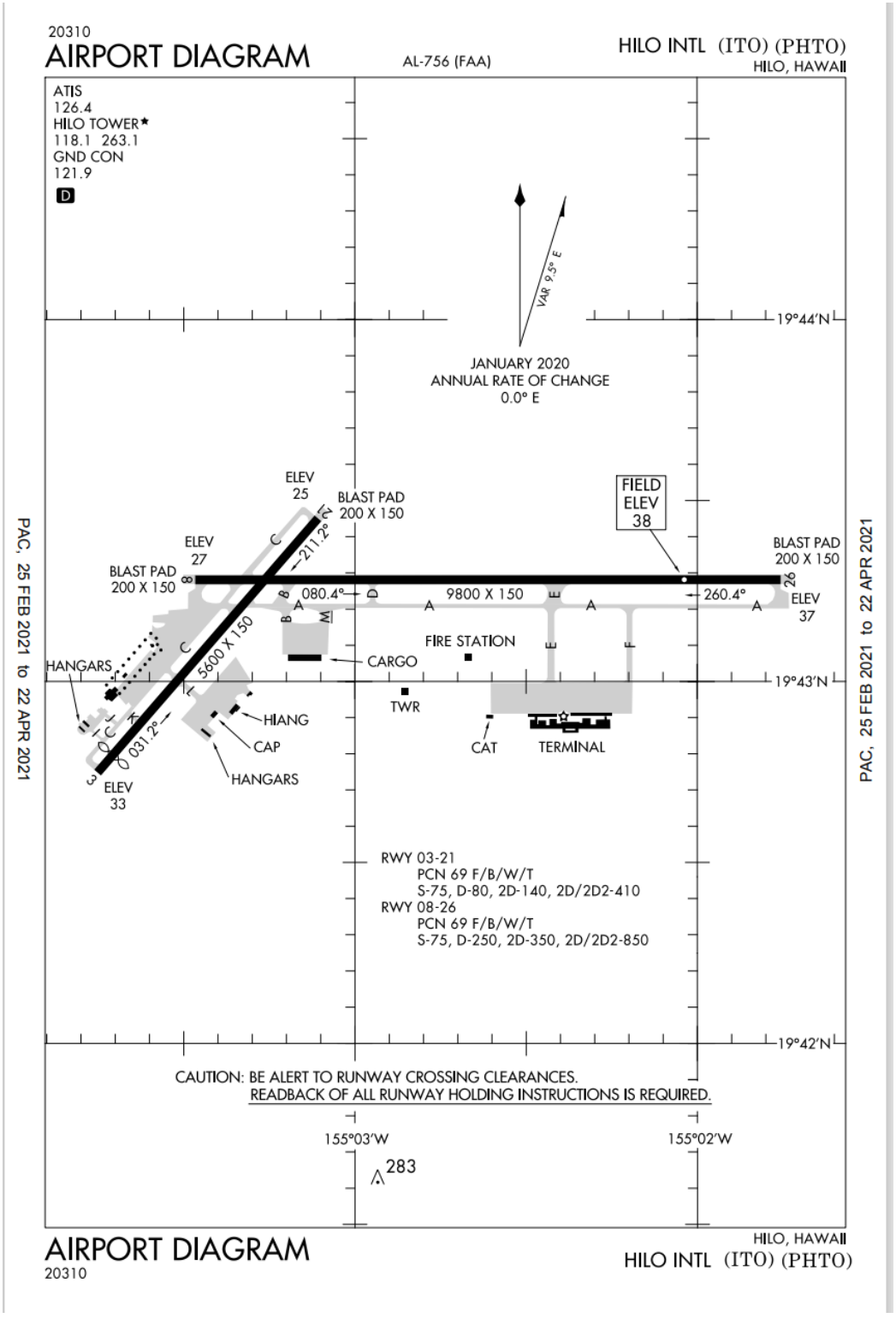


Figure 2: ITO Airport Diagram (via FAA)

Section 2 – Proposed Change

Phase 1:

- Description:
  - Demolition of broken AC pavement in front of the Army National Guard Aviation Ramp, Installation of dry wells to address ponding issues, and grass and grade demolished AC pavement located outside the ROFA.
- Duration/Working Hours:
  - 90 calendar days, 0600 to 1600 hours.
- Required NOTAMs:
  - TWY "L" East of RWY 3-21 Closed.
  - Army National Guard Aviation Ramp partially closed.
  - Helicopter operations, caution WIP.
  - NOTAMs for tall equipment (when applicable).
- Notes:
  - The contractor shall not damage, obstruct, or alter existing NAVAIDs.
  - The contractor shall maintain an open channel of communication with the ATCT and yield to any aircraft when directed by the ATCT.
  - When the contractor is directed to pullback by the ATCT, the contractor shall barricade off the work area and remove all large equipment from the work area.
  - The contractor shall ensure the access road remains open throughout the entirety of construction.
  - The contractor shall coordinate with ITO to relocate Hangar 414 parked aircraft.
  - Helicopter operations usually use the TWYs in the work area. The contractor shall coordinate with ITO and ATCT to notify helicopter operations of work times and reroute helicopter flight paths when necessary. Army National Guard helicopters could possibly be diverted to depart to the Northeast.
  - The contractor shall ensure all applicable FAA Form 7460-1 for temporary construction vehicles are submitted and approved prior to the start of work.
  - Added to Assumptions: Contractor will work on one half of the work area at a time in coordination with ATC and ITO for the sliver of work area fronting Army National Guard, Phase 1.
  - Adjust staging area to allow access to Hangar 414.

Phase 2:

- Description:
  - Demolition of broken AC pavement in front of the Army National Guard Aviation Ramp, installation of dry wells to address ponding issues, and grass and grade demolished AC pavement, located inside the ROFA.
  - Installation of dry wells along the access road behind RWY 3-21.
- Duration/Working Hours:
  - 30 calendar days, 0600 to 1600 hours.
- Required NOTAMs:
  - RWY 3-21 closed.

- TWY “L” closed.
- TWY “C” closed South of TWY “I”.
- Army National Guard Aviation Ramp WIP.
- RWY 3-21 VASI OTS (0600-1600 HST).
- NOTAMs for tall equipment (when applicable).

- Notes:
  - The contractor shall not damage, obstruct, or alter existing NAVAIDs.
  - The contractor shall maintain an open channel of communication with the ATCT and yield to any aircraft when directed by the ATCT.
  - A Lighted “X” shall be placed at each RWY end and low-profile barricades shall be placed at each TWY connection before closing the RWY.
  - The contractor shall ensure the access road remains open throughout the entirety of construction.
  - The contractor shall coordinate with ITO to relocate Hangar 414 parked aircraft.
  - Helicopter operations usually use the TWYs in the work area. The contractor shall coordinate with ITO to notify helicopter operations of work times and reroute helicopter flight paths when necessary. Army National Guard helicopters could possibly depart to the Northeast.
  - The contractor shall ensure all applicable FAA Form 7460-1 for temporary construction vehicles are submitted and approved prior to the start of work.
  - At the end of each working period, the contractor must ensure the edge o RWY does not have more than a 3” drop form top of RWY to grade.
  - Adjust staging area to allow access to Hangar 414.

Phase 3:

- Description:
  - Regrade and regress shoulder area to address ponding issues.
  - Install dry well.
- Duration/Working Hours:
  - 14 calendar days, 0600 to 1600 hours.
- Required NOTAMs:
  - TWY “C” WIP.
  - TWY “C” aircraft wingspan limited to 70’ between TWY “J” and 200’ Northeast of TWY “K”.
  - TWY “J” WIP.
  - TWY “J” aircraft wingspan limited to 70’.
  - Northwest ramp partial closure.
  - NOTAMs for tall equipment (when applicable).
- Notes:
  - The contractor shall not damage, obstruct, or alter existing NAVAIDs.
  - The contractor shall maintain an open channel of communication with the ATCT and yield to any aircraft when directed by the ATCT.
  - The contractor shall setup barricades around the affected areas of work throughout the phase.
  - The contractor shall ensure the access road remains open throughout the entirety of construction.

- The contractor shall coordinate with ITO and ATC to implement required aircraft group restrictions for TWY "C" during work hours.
- The contractor shall ensure all applicable FAA Form 7460-1 for temporary construction vehicles are submitted and approved prior to the start of work.
- NOTAMs are required for twys C and J; restricted to aircraft with wingspan no greater than 70' (NOTAM #2 and #4) since work so close to twys.

Phase 4:

- Description:
  - Installation of compass calibration pad.
- Duration/Working Hours:
  - 14 calendar days, 0600 to 1600 hours.
- Required NOTAMs:
  - Army National Guard Aviation Ramp WIP.
- Notes:
  - The contractor shall not damage, obstruct, or alter existing NAVAIDs.
  - The contractor shall maintain an open channel of communication with the ATCT and yield to any aircraft when directed by the ATCT.
  - The contractor must coordinate with ITO to relocate any aircraft that usually park in and around the work area.
  - The contractor shall ensure the access road remains open throughout the entirety of construction.
  - Added to assumptions: once this work is done, notification to ITO stakeholders will be made that compass rose is now available.

Phase 5:

- Description:
  - Demolition and relocation of the RWY 8 supplemental wind cone and demolition of segmented circle.
  - Demolition and relocation of the RWY 21 supplemental wind cone and installation of new segmented circle.
- Duration/Working Hours:
  - 28 calendar days, 0600 to 1600 hours.
- Required NOTAMs:
  - RWY 3-21 WIP.
  - TWY 8-26 WIP.
  - TWY "C" WIP.
  - NOTAMs for tall equipment (when applicable).
- Notes:
  - The contractor shall not damage, obstruct, or alter existing NAVAIDs.
  - The contractor shall maintain an open channel of communication with the ATCT and yield to any aircraft when directed by the ATCT.
  - There shall be an operational wind cone available at the RWY 8 and TWY 21 ends at all times.
  - The contractor shall coordinate with ITO, HCF, and SOC to verify existing underground utilities and required outages.

- The contractor shall ensure all applicable FAA Form 7460-1 for temporary construction vehicles are submitted and approved prior to the start of work.
- Rwy 8 WC is being relocated closer to fence line so there's no room for segmented circle inside fence line; relocation of segmented circle will be in shaded work area (no right hand turn indicators, circle will be moved to around rwy 21 wc).
- Just a note about the 7460-2 for the segmented circle. The OE/AAA website does not allow a 0' above grade, so it must be input as 1' above grade, which is the lowest height it will accept. even though the circle is flush with the grade (recently experienced that when filing 7460s for survey monuments).

Phase 6:

- Description:
  - Demolition and relocation of the RWY 26 supplemental wind cone.
- Duration/Working Hours:
  - 28 calendar days, 2100 to 0600 hours.
- Required NOTAMs:
  - RWY 8-26 closed.
  - TWY "A" closed East of TWY "F".
  - TWY "B "closed.
  - TWY "D" closed.
  - TWY "E" closed North of TWY "A".
  - RWY 8-26 Glide Slope OTS (2100-0600 HST).
  - RWY 8-26 VASI OTS (2100-0600 HST).
  - RWY 8-26 LOC OTS (2100-0600 HST).
  - RWY 8-26 DME OTS (2100-0600 HST).
  - NOTAMs for tall equipment when applicable.
- Notes:
  - The contractor shall not damage, obstruct, or alter existing NAVAIDs.
  - The contractor shall maintain an open channel of communication with the ATCT and yield to any aircraft when directed by the ATCT.
  - There shall be an operational wind cone available at the RWY 26 end at all times.
  - The contractor shall coordinate with ITO, HCF, and SOC to verify existing underground utilities and required outages.
  - Prior to the closure of RWY 8-26 the contractor shall coordinate with ITO to ensure all updated postings for RWY 3-21 are issued.
  - The contractor shall ensure all applicable FAA Form 7460-1 for temporary construction vehicles are submitted and approved prior to the start of work.
  - Cargo will be landing on Rwy 3-21, public notices need to be put out since flying above some residential housing. ITO must get public affairs involved to put out notices in the newspaper.
  - Added to assumptions: when jet aircraft have to use 3-21 beyond restriction hours, public notification must be done.

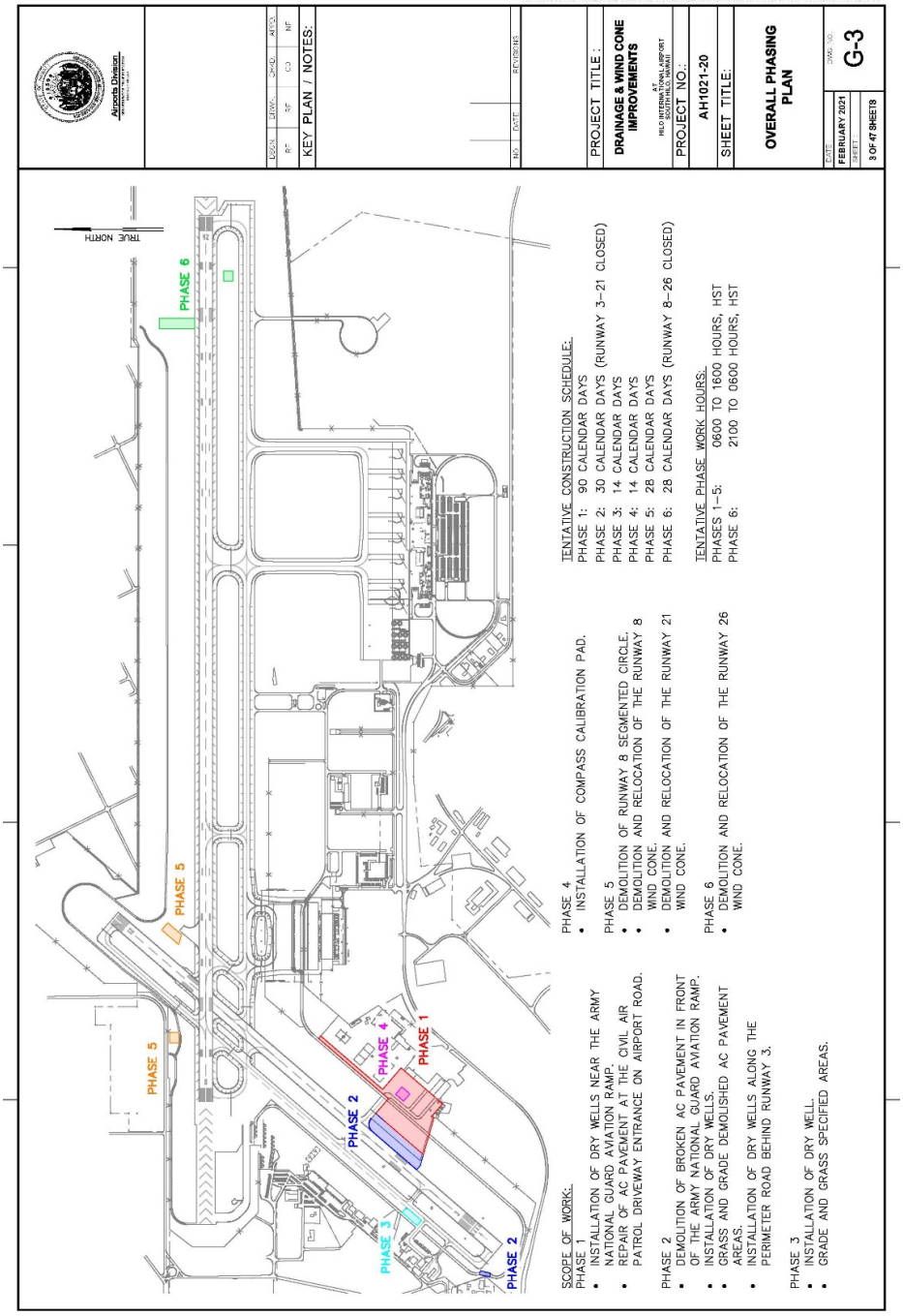


Figure 3: Overall Phasing Plan

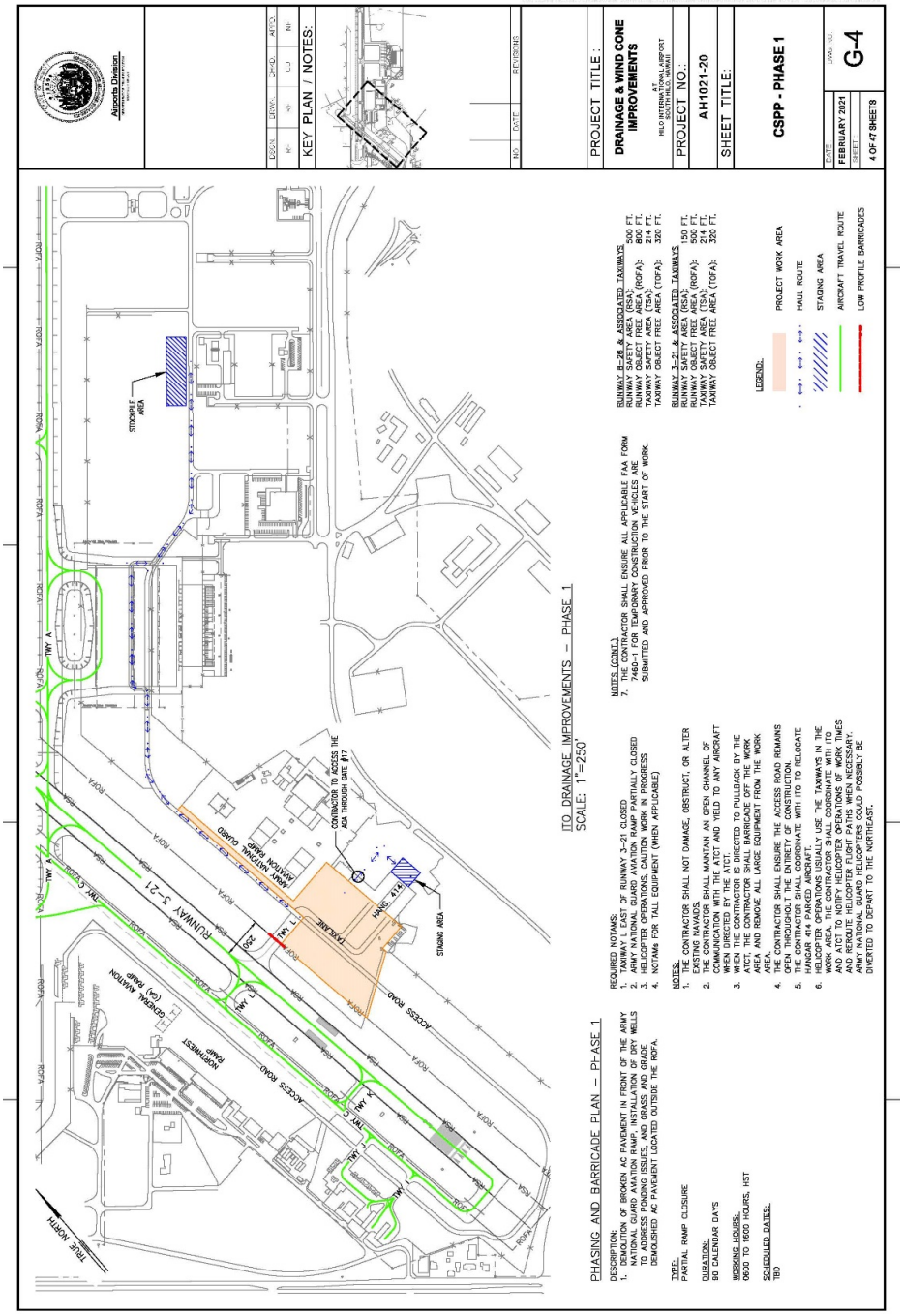


Figure 4: Phase 1

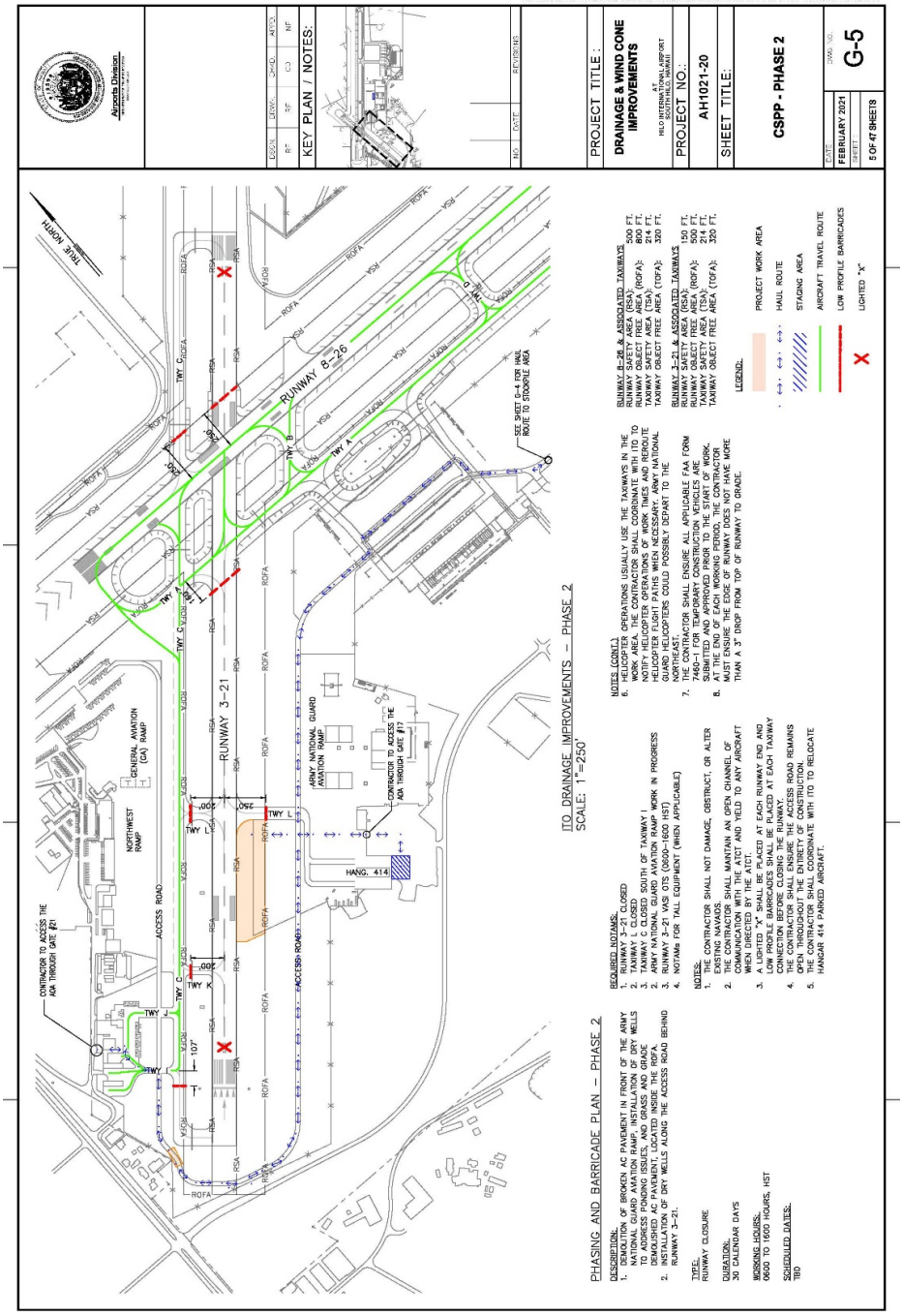


Figure 5: Phase 2

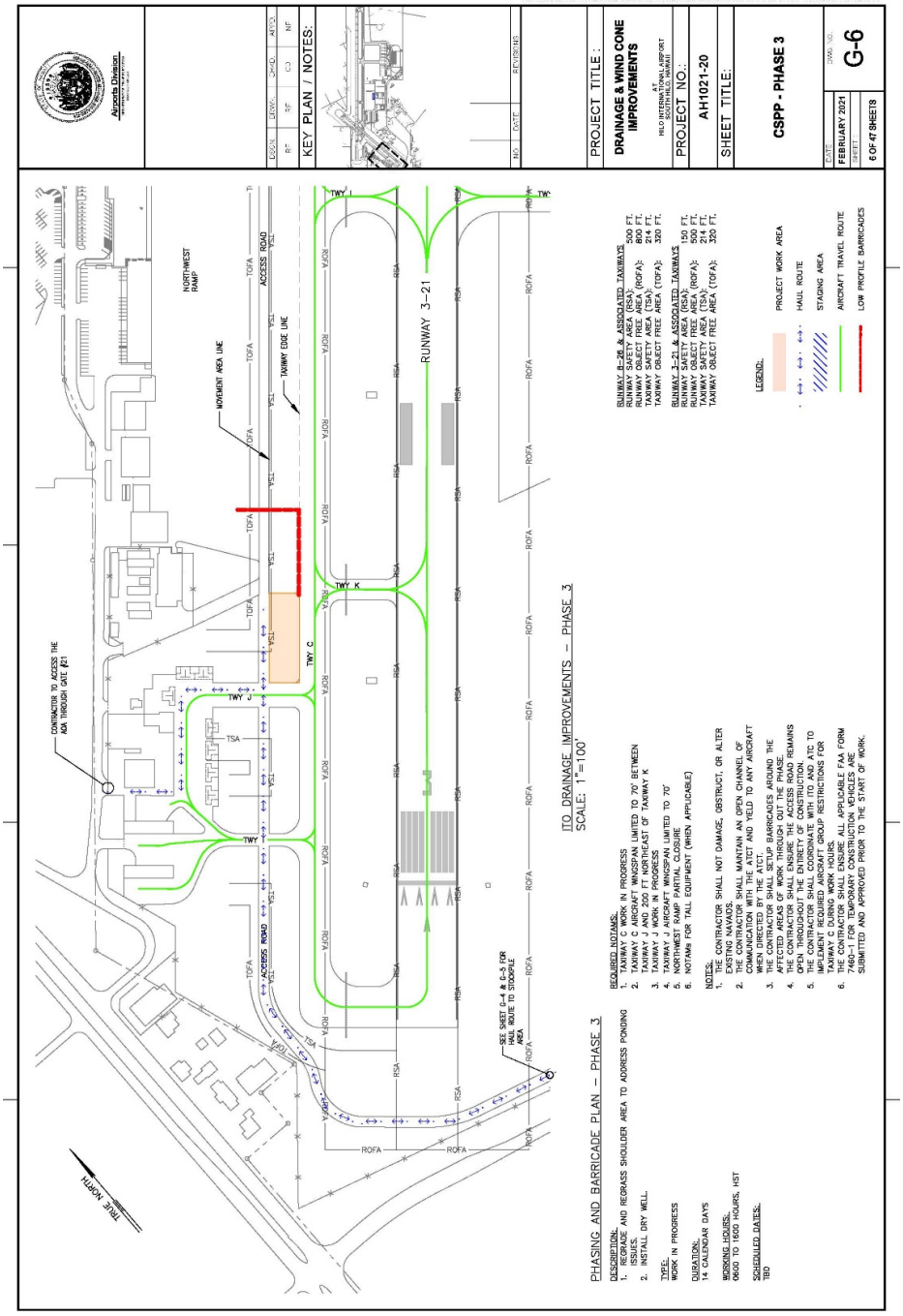


Figure 6: Phase 3

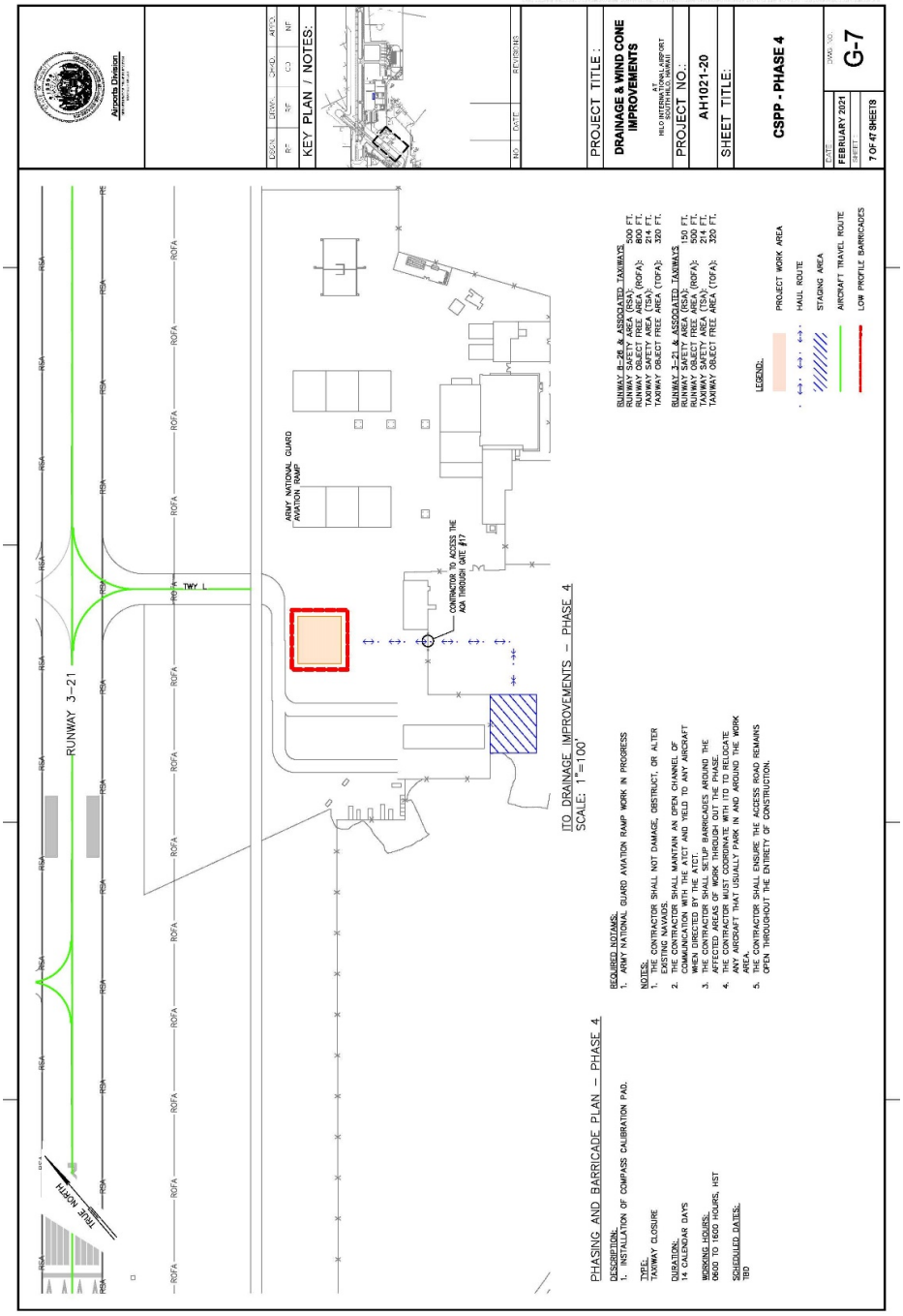


Figure 7: Phase 4

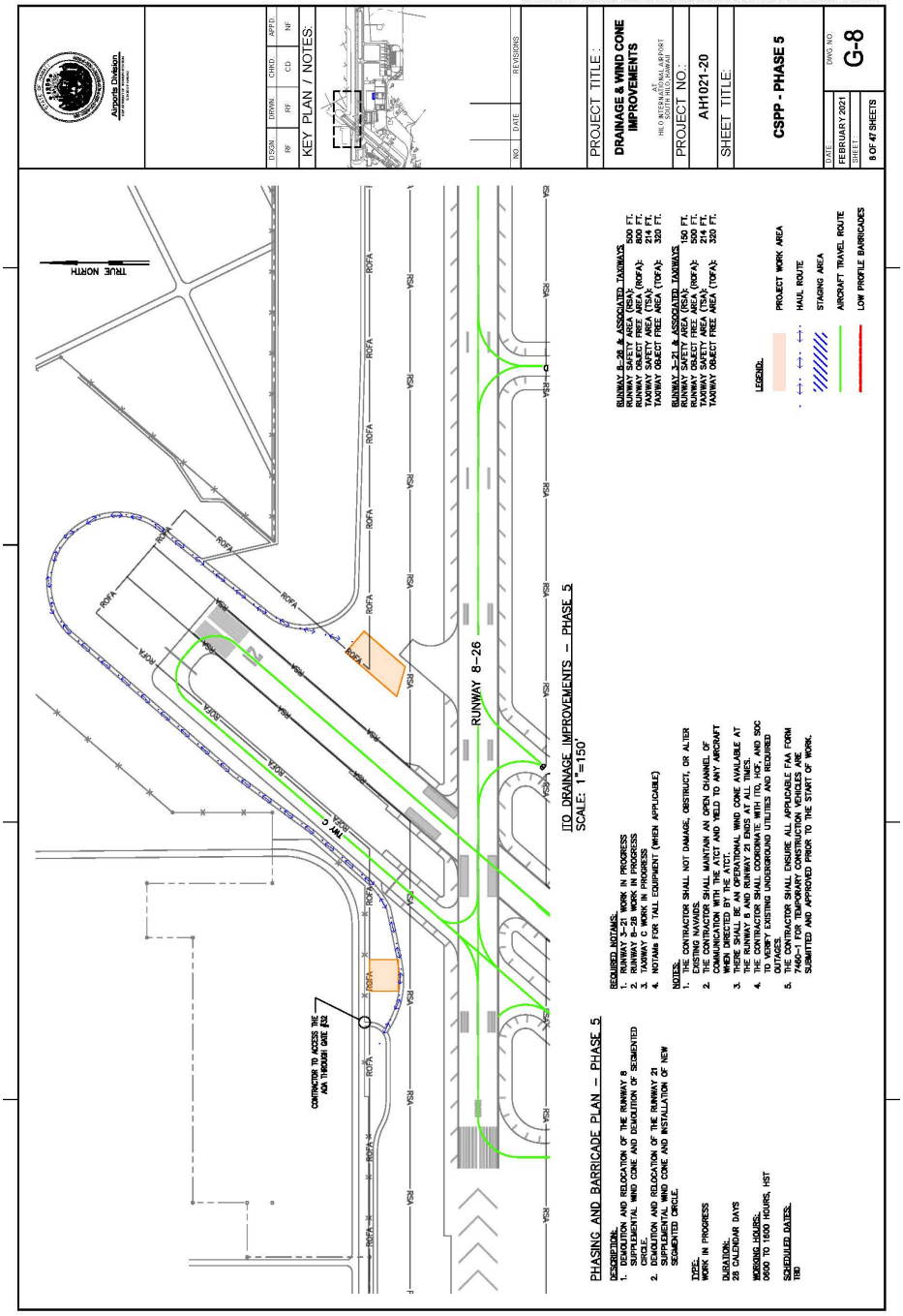


Figure 8: Phase 5

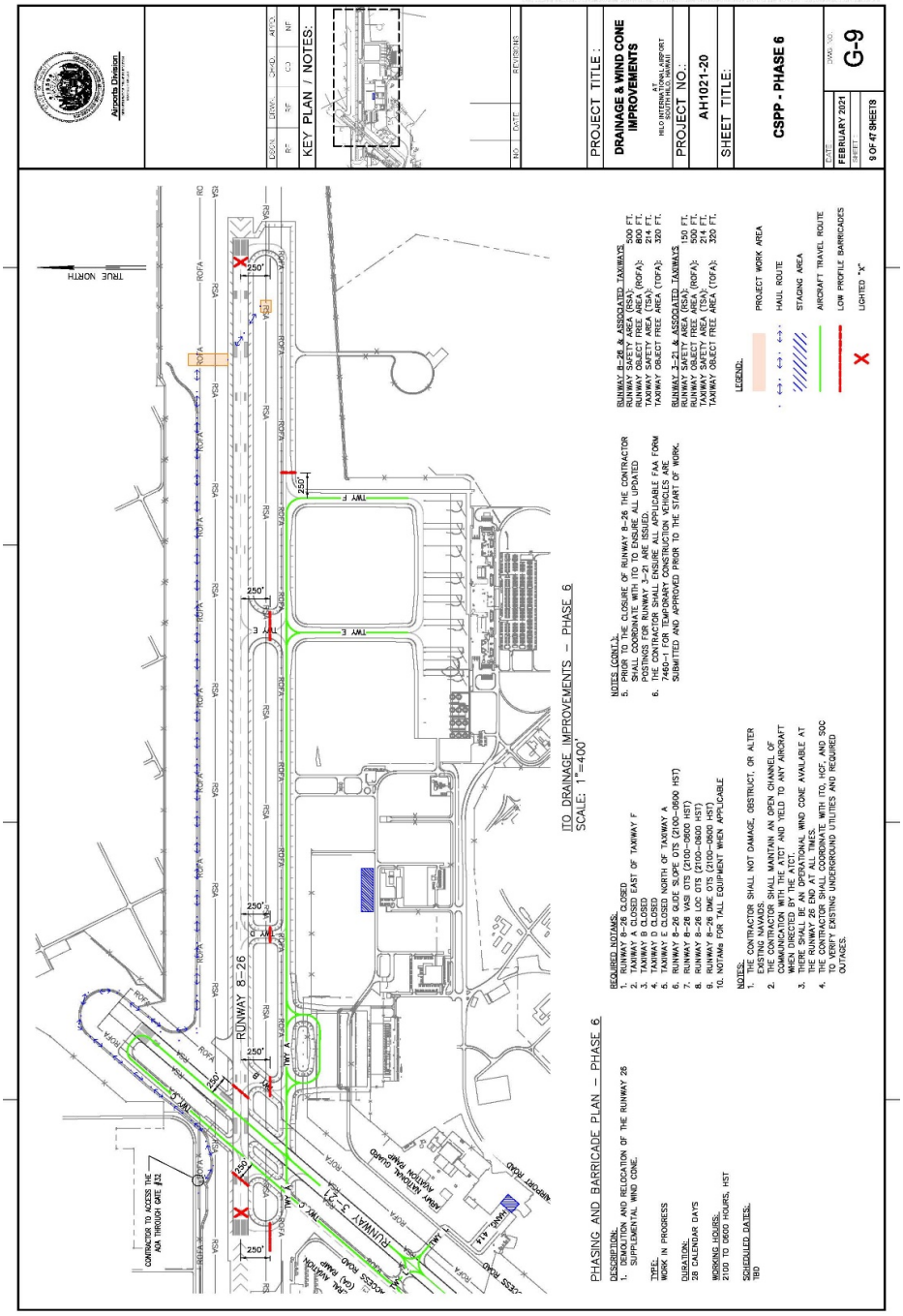


Figure 9: Phase 6

Section 3 – Safety Risk Management Planning and Impacted Organizations

The Safety Risk Management Panel met at the Hilo International Airport on March 31, 2021, to assess the proposed change to the NAS and associated hazards. The facilitator worked with the HNL ADO Program Manager to identify SRMP members, Subject Matter Experts (SMEs), and obtain concurrence prior to sending out calendar invitations. All FAA Lines of Business and HNL stakeholders were included in the invitation. See Table 3 below for the list of panel meeting participants for the is panel meeting. The sign-in sheets can be found in Appendix E.

Table 4: SRM Panel Members, Subject Matter Experts, Meeting Attendees

Panel Member	Organization, Position/Title	E-mail
Steven Santiago	HDOT-A ITO, AADM	steven.j.santiago@hawaii.gov
Elizabeth Moore	FAA ITO ATCT	elizabeth.a.moore@faa.gov
Kandyce Watanabe	FAA HNL ADO, Program Mgr.	kandyce.watanabe@faa.gov
David Sakasegawa	FAA HCF, Manager	david.sakasegawa@faa.gov
Neil Okuna	FAA HCF ATO, Support Specialist	neil.n.okuna@faa.gov
Fernando Morales	FAA RSO	fernando.morales@faa.gov
Perfecto Delmendo	AvAirPros	p.delmendo@avairpros.com

SME	Organization, Position/Title	E-mail
Calvin Shimizu	HDOT-A ITO, Maint. Sup.	calvin.t.shimizu@hawaii.gov
Martinez Jacobs	HDOT-A	martinez.jacobs@hawaii.gov
Tanya Sakamoto	HDOT-A, SMS Manager	tanya.sakamoto@hawaii.gov
Ray Severn	HDOT-A AIR-EP, Planner	raymond.s.severn@hawaii.gov
Manny Legaspi	HDOT-A AIR-EA, Proj. Mgr.	emmanuel.b.legaspi@hawaii.gov
Sean Dunckel	AECOM, Program Mgmt.	sean.dunckel@aecom.com
Dawn Mineker	AECOM, Program Mgmt.	dawn.mineker@aecom.com
Reyn Furushima	WRSA, Engineer	reyn@wrsasolutions.com
Renee Ellorda	FAA ITO & KOA SSC Manager	renee.ellorda@faa.gov
Dave Clark	FAA WSC FP	david.m.clark@faa.gov
Dottie Poole	FAA HCF ATO	dottie.poole@faa.gov
Kellie Lui	FAA HCF NATCA	hcffacrep@gmail.com
Carl Klinkhammer	FAA WSC NPI, Planner	carl.klinkhammer@faa.gov
Brian Kaut	FAA WSC NPI, Planner	brian.kaut@faa.gov

Facilitation Team	Organization, Position/Title	E-mail
Dawn Ward	Base Management, Facilitator	dawn@basesgrp.com
Steve Wong	Base Management, Co-Facilitator	steve@basesgrp.com
Dalyn DeMattos	Base Management, Technical Writer	dalyn@basesgrp.com
Sue Yamauchi	Base Management, Technical Writer	sue@basesgrp.com

Section 4 – Assumptions

1. All existing controls are in place (i.e., airfield training, access, tenant coordination, notification etc.).

2. Continuous incursion monitoring and outreach efforts will continue by ITO Airport and local FAA offices.

3. No anticipated significant increase in commercial service, cargo, general aviation, and military operations for ITO. Current aircraft operational state is based on pre-pandemic operational numbers.

4. No planned equipment upgrades in NAVAIDs or communication by the FAA.

5. Controllers and vehicle operators will be briefed on runway changes and procedures.

6. Contractor will have Radio personnel to control and monitor the radio (sole responsibility) will be onsite during construction.

7. Work will not be allowed on the airfield unless an approved CSPP by FAA and HDOT-A is on file.

8. Ongoing construction meetings will address operations during upcoming phases to ensure attendee awareness of impending construction work and associated operational impacts, including runway and taxiway section closures.

9. Low profile barricade phasing and schedules will be provided to affected parties including the airlines, ATCT, contractor, CM, and District via periodic construction meetings, informational meetings, and email.

10. Construction vehicle routes, flaggers and barricades will be reviewed as indicated in the CSPP prior to the start of each construction phase.

11. Construction areas will be clearly marked with lighted low-profile barricades that will be weighted down.

12. Controllers, and vehicle operators will be briefed on runway and taxiway changes, closures, and procedures.

13. FOD checks will be completed by construction and airport personnel when movement areas are used.

14. NOTAMs will be issued for each phase as indicated on the phasing sheets.

15. Airfield signage and marking will be relocated to meet standards (if applicable).

16. Minimize changes to CSPP/schedule.

17. Coordination with ongoing projects.

18. All applicable 7460-1 airspace determinations (temp and permanent) will be completed prior to commencement of airfield work.

19. All applicable 7460-2 airspace determinations (permanent for Windsocks) will be completed post construction.

20. Contractor will work on one half of the work area at a time in coordination with ATC and ITO for the sliver of work area fronting Army National Guard, Phase 1. 3 dry well installations expected.

21. Contractor will adhere to Part 139 Construction Requirements (i.e., no 3" or greater lips, ruts, humps, bumps, etc.) and will be graded prior to reopening Runway 3-21.

22. For Compass Rose, ITO airport notification will be provided, and ALP (and all associated publications) will be updated when put into service.

23. Public Notice issues related to work during Phase 6. (28-working days, 2100 to 0600 hours HST) to allow jets to operate at night on Rwy 3.

24. During Phase 6, ITO airport will change condition for Runway 3 operations and coordination with cargo flights.

25. Complete an Airport Sponsor Strategic Event Submission (SEC) Form (FAA Form 6200-26) at least 45 days before construction.

Section 5 – Phase 1: System Description

The current system state is described in Section 1 Current System / Baseline. The CSPP system conditions are described in Section 2, Proposed Change. This project is anticipated to begin construction January 2022 and be completed by September 2022.

Shown below are the current and near future projects and events anticipated to occur at ITO that were considered for potential cumulative impacts to the airfield operations.

1. The old Cargo Building Demolition Project does not have an end date at this current time, but an estimate puts it to be completed by April-May 2021.
2. The RWY and TWY Lighting Replacement Project is currently in the design process. The construction bid is anticipated to advertise February 2022, with construction starting July 2022.
3. Exercise RIMPAC will take place in 2022 with no anticipated impacts to this project.

The SRMP determined that these projects are not expected to have any significant impacts with the ITO Drainage and Wind Cone Improvements project.

Section 6 – Phase 2: Identified Hazards

Identification of hazards in this step considers all reasonable possible sources of hazards. According to FAA Order 5200.11, a hazard is any existing or potential condition that may lead to injury, illness, or death to people; damage to or loss of a system, equipment, or property; or damage to the environment. A hazard is a condition that is a prerequisite of an accident or incident.

During this hazard identification stage, the facilitator opened up by providing the panel members with some ground rules listed in Appendix G and reminded the group that the "absence of an answer is understood as agreement." The SRM Panel Meeting is the venue to vet out all safety concerns related to this project.

The design consultant completed their presentation of the CSPP exhibits and the facilitator provided the Panel Members a briefing on the brainstorming process. The development of the Preliminary Hazard List (PHL) allowed all panel members to list their presumed safety concerns based upon their background and subject matter expertise.

The panel identified a total of five (5) preliminary hazards as a result of the brainstorming process (Appendix A). The five (5) hazards are shown in Table 4 below and also in the PHA in Appendix B.

Table 5: List of Hazards and the System State That It Exists In

(1) Hazard ID	(2) Hazard Description	(4) System State	(7) Effects
XYZ-1	Condition, real or potential; can cause injury, illness, etc. Pre-requisite for accident or incident	Conditions, characterized by quantities or qualities, in which a system can exist; worst credible	Potential outcome or harm of the hazard if it occurs in the defined system state
ITO-DRAINAGE&WC-1A	Pilot LOSA	All Phases	Surface Incident
ITO-DRAINAGE&WC-1B	Pilot LOSA	Phase 3	Aircraft Damage
ITO-DRAINAGE&WC-2	Contractor/Vehicle Driver LOSA	All Phases	Runway Incursion
ITO-DRAINAGE&WC-3	Controller LOSA	All Phases	Runway Incursion
ITO-DRAINAGE&WC-4	Foreign Object Debris	Phases 1, 3, and 6	Aircraft Damage

The SRMP evaluated the worst credible Effect for each hazard identified and for the first hazard it was determined to have differing circumstances resulting in multiple worst credible effects that needed further assessment. This hazard was divided by generating an alpha-numeric identifier listing each Effect analyzed separately as shown in Table 4 above.

This panel used the Preliminary Hazard Analysis (PHA) tool/technique provided in the ARP Desk Reference for the airspace determinations for Construction Safety and Phasing Plans. The PHA provided the panel members an initial overview of the hazards present in the overall flow of the operation in this proposed change.

Description of Hazards

This step focuses on hazard identification, including further analysis of the hazards to assist Panel Members on analyzing the safety risks. The Facilitator cultivated discussions to ensure the panel considered all credible sources of system failure, including equipment, human factors, operational procedures, maintenance procedures, and external services.

The Facilitator initiated the functional brainstorming technique as a tool to systematically identify hazards as the panel developed the Preliminary Hazard List (PHL). During the brainstorming session, the group developed a list of potential hazards associated with the project that provided the basis for the Preliminary Hazard Analysis (PHA).

During the hazard identification stage, the panel identified potential safety issues, their possible causes and corresponding effects, as the Technical Writer documented these discussions on the PHA. Following each portion, the Facilitator obtained concurrence from the Panel Members to ensure all documentation was correct.

The sections below provide an overview of each identified hazard, cause, and effect, for all stages of construction.

ITO-DRAINAGE&WC-1A: Pilot Loss of Situational Awareness (LOSA)

(System State: All Phases of Construction)

The SRMP determined that Pilot LOSA is a hazard which could be caused by shutting down of TWYs and rerouting pilots to the RWY, weather, lack of timely information, not checking NOTAMs, phasing changes, vehicle haul routes, knowing aircraft has the right of way, designated haul route, continuation/expectation bias, and shutdown and restore of NAVAIDs to impacted RWYs. This hazard exists in all stages of construction as the SRMP considered all existing controls that relate to the prevention or reduction of this hazard occurrence or to mitigate its effects.

Mitigations that exist to prevent or reduce this hazard occurrence or mitigate its effects were listed under existing controls in the PHA as follows: AC 150/5070-7 Airport System Planning Process, AC 150/5200-18 Airport Safety Self Inspection, AC 150/5200-28 NOTAMs for Airport Operators, AC 150/5200-31 Airport Emergency Plan, AC 150/5210-24 Airport Foreign Object Debris Management, AC 150/5210-5 Painting, Marking, Lighting of Vehicles Used on Airport, AC 150/5300-13 Airport Design, AC 150/5340-1 Standards for Airport Markings, AC 150/5340-18 Standards for Airport Sign Systems, AC 150/5340-30 Design and Installation Details for Airport Visual Aids, AC 150/5345-44 Specifications for TWY and TWY Signs, AC 150/5345-46 Specifications for RWY and TWY Lighting Fixtures, AC 150/5345-53 Airport Lighting

Equipment Certification Program, AC 150/5345-55 Specification for L-893, Lighted Visual Aid to indicate Temporary RWY Closure, AC 150/5345-56 Specification for L-890, Airport Lighting Control and Monitoring System (ALCMS), AC 150/5370-2 Operational Safety on Airports During Construction, FAR Part 139 Regulations/Airport, JO 7110.65 Air Traffic Control, SOP Standard Operating Procedure, LOA Letter of Agreement, ARTS/STARS Automated Radar System, ARSR, ASR-9, ASR-11 Surveillance Radar, ATIS Automated Terminal Information System, AMASS Airport Movement Area Safety System, Pilot Training, Airfield Driver Training, Pilot Intervention, Controller Intervention, ATC Scanning, Airfield Operations Monitoring, Operational Supervision, NOTAM Notice to Airmen, Charts Aeronautical, Jeppesen charts, AFD Airport/Facility Directory, AIM Aeronautical Information Manual, CRM Crew Resource Management, and CSPP Construction Safety and Phasing Plan.

The SRMP identified three (3) possible effects and decided that there was no single definitive worst credible potential outcome or harm of the hazard if it occurs in the defined system state and decided to assess one of the other effects, the first was a surface incident. This hazard was analyzed by the SRMP and the results are documented in Section 7.

ITO-DRAINAGE&WC-1B: Pilot Loss of Situational Awareness (LOSA)

(System State: Phase 3)

The SRMP determined that Pilot LOSA is a hazard which could be caused by shutting down of TWYs and rerouting pilots to the RWY, weather, lack of timely information, not checking NOTAMs, phasing changes, vehicle haul routes, knowing aircraft has the right of way, designated haul route, continuation/expectation bias, and shutdown and restore of NAVAIDs to impacted RWYs. This hazard exists in all stages of construction as the SRMP considered all existing controls that relate to the prevention or reduction of this hazard occurrence or to mitigate its effects.

Mitigations that exist to prevent or reduce this hazard occurrence or mitigate its effects were listed under existing controls in the PHA as follows: AC 150/5070-7 Airport System Planning Process, AC 150/5200-18 Airport Safety Self Inspection, AC 150/5200-28 NOTAMs for Airport Operators, AC 150/5200-31 Airport Emergency Plan, AC 150/5210-24 Airport Foreign Object Debris Management, AC 150/5210-5 Painting, Marking, Lighting of Vehicles Used on Airport, AC 150/5300-13 Airport Design, AC 150/5340-1 Standards for Airport Markings, AC 150/5340-18 Standards for Airport Sign Systems, AC 150/5340-30 Design and Installation Details for Airport Visual Aids, AC 150/5345-44 Specifications for TWY and TWY Signs, AC 150/5345-46 Specifications for RWY and TWY Lighting Fixtures, AC 150/5345-53 Airport Lighting Equipment Certification Program, AC 150/5345-55 Specification for L-893, Lighted Visual Aid to indicate Temporary RWY Closure, AC 150/5345-56 Specification for L-890, Airport Lighting Control and Monitoring System (ALCMS), AC 150/5370-2 Operational Safety on Airports During Construction, FAR Part 139 Regulations/Airport, JO 7110.65 Air Traffic Control, SOP Standard Operating Procedure, LOA Letter of Agreement, ARTS/STARS Automated Radar System, ARSR, ASR-9, ASR-11 Surveillance Radar, ATIS Automated Terminal Information System, AMASS Airport Movement Area Safety System, Pilot Training, Airfield Driver Training, Pilot

Intervention, Controller Intervention, ATC Scanning, Airfield Operations Monitoring, Operational Supervision, NOTAM Notice to Airmen, Charts Aeronautical, Jeppesen charts, AFD Airport/Facility Directory, AIM Aeronautical Information Manual, CRM Crew Resource Management, and CSPP Construction Safety and Phasing Plan.

The SRMP identified three (3) possible effects and decided that there was no single definitive worst credible potential outcome or harm of the hazard if it occurs in the defined system state and decided to assess a second effect, which was aircraft damage. This hazard was analyzed by the SRMP and the results are documented in Section 7.

ITO-DRAINAGE&WC-2: Contractor/Vehicle Driver LOSA

(System State: All Phases of Construction)

The SRMP determined that Contractor/Vehicle Driver LOSA is a hazard which could be caused by lack of driver training/experience, change in phases, going into an area they are not supposed to, driver missing or ignoring briefing, vehicle haul routes, knowing aircraft has the right of way, designated haul route, and lack of safety control from users.. This hazard exists in all stages of construction as the SRMP considered all existing controls that relate to the prevention or reduction of this hazard occurrence or to mitigate its effects.

Mitigations that exist to prevent or reduce this hazard occurrence or mitigate its effects were listed under existing controls in the PHA as follows: AC 150/5200-28 NOTAMs for Airport Operators, AC 150/5210-20 Ground Vehicle Operations on Airport, AC 150/5300-13 Airport Design, AC 150/5340-1 Standards for Airport Markings, AC 150/5340-18 Standards for Airport Sign Systems, AC 150/5345-44 Specifications for TWY and TWY Signs, AC 150/5345-46 Specifications for RWY and TWY Lighting Fixtures, AC 150/5370-2 Operational Safety on Airports During Construction, FAR Part 139 Regulations/Airport, JO 7110.65 Air Traffic Control, JO 7210.3 Facility Operations and Administration, SOP Standard Operating Procedure, LOA Letter of Agreement, Controller Training, Airfield Driver Training, Access Control Training, Controller Intervention, ATC Scanning, Airfield Operations Monitoring, Operational Supervision, Radio Frequency Monitoring, AFD Airport/Facility Directory, CRM Crew Resource Management, Daily Briefings/Notes, and CSPP Construction Safety and Phasing Plan.

The SRMP identified three (3) possible effects and decided that the worst credible potential outcome or harm of the hazard if it occurs in the defined system state was a runway incursion. This hazard was analyzed by the SRMP and the results are documented in Section 7.

ITO-DRAINAGE&WC-3: Controller LOSA

(System State: All Phases of Construction)

The SRMP determined that Controller LOSA is a hazard which could be caused by taxi aircraft onto closed areas, NOTAMs not up to date, phase changes, controller did not get proper briefing either on the project or during position relief briefing, and failure to use existing RWY memory

aids. This hazard exists in all stages of construction as the SRMP considered all existing controls that relate to the prevention or reduction of this hazard occurrence or to mitigate its effects.

Mitigations that exist to prevent or reduce this hazard occurrence or mitigate its effects were listed under existing controls in the PHA as follows: AC 150/5200-18 Airport Safety Self Inspection, AC 150/5200-28 NOTAMs for Airport Operators, AC 150/5340-1 Standards for Airport Markings, AC 150/5340-18 Standards for Airport Sign Systems, AC 150/5370-2 Operational Safety on Airports During Construction, ACAC Checklist Airport Construction Advisory Council, JO 7110.65 Air Traffic Control, JO 7210.3 Facility Operations and Administration, SOP Standard Operating Procedure, Controller Training, Controller Intervention, ATC Scanning, Airfield Operations Monitoring, Operational Supervision, Radio Frequency Monitoring, NOTAM Notice to Airmen, Charts Aeronautical, Jeppesen charts, AFD Airport/Facility Directory, AIM Aeronautical Information Manual, CRM Crew Resource Management, and CSPP Construction Safety and Phasing Plan.

The SRMP identified four (4) possible effects and decided that the worst credible potential outcome or harm of the hazard if it occurs in the defined system state was a runway incursion. This hazard was analyzed by the SRMP and the results are documented in Section 7.

ITO-DRAINAGE&WC-4: Foreign Object Debris

(System State: Phases 1, 3, and 6)

The SRMP determined that LOSA for Pilots is a hazard which could be caused by weather, vehicle haul routes, and careless drivers. This hazard exists in all stages of construction as the SRMP considered all existing controls that relate to the prevention or reduction of this hazard occurrence or to mitigate its effects.

Mitigations that exist to prevent or reduce this hazard occurrence or mitigate its effects were listed under existing controls in the PHA as follows: AC 150/5200-18 Airport Safety Self Inspection, AC 150/5200-28 NOTAMs for Airport Operators, AC 150/5210-20 Ground Vehicle Operations on Airports, AC 150/5210-24 Airport Foreign Object Debris Management, AC 150/5340-1 Standards for Airport Markings, AC 150/5340-18 Standards for Airport Sign Systems, AC 150/5345-44 Specifications for TWY and TWY Signs, AC 150/5345-46 Specifications for RWY and TWY Lighting Fixtures, AC 150/5370-2 Operational Safety on Airports During Construction, FAR Part 139 Regulations/Airport, JO 7110.65 Air Traffic Control, SOP Standard Operating Procedure, LOA Letter of Agreement, Pilot Training, Controller Training, Airfield Driver Training, Access Control Training, Pilot Intervention, Controller Intervention, Airfield Operations Monitoring, Operational Supervision, CRM Crew Resource Management, Daily Briefings/Notes, and CSPP Construction Safety and Phasing Plan.

The SRMP identified three (3) possible effects and decided that the worst credible potential outcome or harm of the hazard if it occurs in the defined system state was aircraft damage. This hazard was analyzed by the SRMP and the results are documented in Section 7.

Section 7 – Phases 3 & 4: Hazard Analysis and Risks Assessed

To ensure a thorough examination of hazards, the SRMP's methodology for risk analysis was based on the Five-Step process detailed in FAA Order 5200.11:

1. Describe the System
2. Identify Hazards
3. Analyze Risk
4. Assess Level of Risk
5. Mitigation Actions

Risk Analysis

The objective of this step is to determine the initial safety risk associated with the effects of each identified hazard. The safety risk associated with a hazard is the combination of the predicted severity and likelihood of the potential effect of a hazard in the worst credible system state. This is also accomplished in consideration of existing controls which help to mitigate risks down to an acceptable level.

The Effect is defined as the potential outcome or harm of the hazard if it occurs in the defined system state. The SRMP categorized a list of Effects due to each hazard during the PHL process (Appendix A).

The Preliminary Hazard Assessment (PHA) worksheet was developed to record the hazards, causes, system states, existing controls, possible effects, severity and likelihood rationale, initial risk, mitigation, and predicted residual risk. The completed PHA is found in Appendix B.

Risk Assessment

The objective of this step is to determine the safety risk level acceptability. Risk Assessment is the process of combining the impacts of risk elements discovered in risk analysis and comparing them against some acceptability criteria. Risk assessment can include consolidating risks into risk sets that can be jointly mitigated, combined, and then used in decision making. Order 5200.11 defines risk as the composite of predicted severity and likelihood of the potential effect of a hazard in the worst credible system state.

Each hazard was evaluated by two factors; first the severity was determined using Table 5, followed by a determination of likelihood using Table 6. The SRM Panel identified the severity and likelihood of each hazard, as described above. These documents were also provided as a compete SRMP Panel packet, see Appendix C. The severity and likelihood ratings from each panel member can be found in Appendix D.

Severity is the potential consequence or impact of a hazard in terms of degree of loss or harm. It is a prediction of how bad the outcome of a hazard can be. There may be many outcomes associated with a given hazard, and the severity should be determined for each outcome.

Likelihood is the estimated probability or frequency, in quantitative or qualitative terms, of the outcome(s) associated with a hazard. It is an expression of how often an outcome of a hazard is predicted to occur in the future.

The SRMP plotted the severity and likelihood for each hazard's worst credible outcome on the predictive risk matrix (Figure 10). The SRMP then observed where the hazards lie based on the three categories of risk (low, medium, high). This indicates the "initial" risk level for each hazard. If the initial risk for any analyzed hazards fall in the high risk (red) region, FAA Order 5200.11 requires mitigation. It also requires further Safety Assessment Acceptance and signature requirements by the Safety Review Board and ARP-1. The Risk Matrix provides a visual depiction of the safety risk and enables prioritization in the control of the hazards. The Risk Matrix shown in Figure 10 is referenced from FAA Order 8040.4B Safety Risk Management Policy.

Severity / Likelihood	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
Frequent A					
Probable B					
Remote C					
Extremely Remote D		ITO-DRAINAGE& WC-1A ITO-DRAINAGE& WC-2 ITO-DRAINAGE& WC-3 ITO-DRAINAGE& WC-4			
Extremely Improbable E		ITO-DRAINAGE& WC-1B			

Figure 10: Risk Matrix

High Risk – Unacceptable
Medium Risk – Acceptable with Mitigation
Low Risk – Acceptable

ITO-DRAINAGE&WC-1A Pilot Loss of Situational Awareness (LOSA)

The SRMP analyzed and assessed this hazard by discussing the identified Causes that contribute to potential outcomes if this hazard occurs in the defined system state. The SRMP continued their assessment based on the worst credible effect, which was identified as a surface incident. The SRMP determined that in this case it is possible that minimal damage to aircraft and/or minor injury to passengers/workers, minimal unplanned disruption to airport operations, or minor incident involving the use of airport emergency procedures could take place. The SRMP concluded on a risk rating on severity of 4-Minor and the likelihood as D-Extremely Remote as it is expected to occur once every 10-100 years or 25 million departures, whichever occurs sooner. The SRMP evaluation resulted with an initial risk rating of 4-Minor in severity and D-Extremely Remote for its likelihood. This hazard resultant matrix determination is a 4D – Low (Green).

ITO-DRAINAGE&WC-1B Pilot Loss of Situational Awareness (LOSA)

The SRMP analyzed and assessed this hazard by discussing the identified Causes that contribute to potential outcomes if this hazard occurs in the defined system state. The SRMP continued their assessment based on the worst credible effect, which was identified as aircraft damage. The SRMP determined that in this case it is possible that minimal damage to aircraft and/or minor injury to passengers/workers, minimal unplanned disruption to airport operations, or minor incident involving the use of airport emergency procedures could take place. The SRMP concluded on a risk rating on severity of 4-Minor and the likelihood as E-Extremely Improbable as it is expected to occur less than every 100 years. The SRMP evaluation resulted with an initial risk rating of 4-Minor in severity and E-Extremely Improbable for its likelihood. This hazard resultant matrix determination is a 4E – Low (Green).

ITO-DRAINAGE&WC-2 Contractor/Vehicle Driver LOSA

The SRMP analyzed and assessed this hazard by discussing the identified Causes that contribute to potential outcomes if this hazard occurs in the defined system state. The SRMP continued their assessment based on the worst credible effect, which was identified as a runway incursion. The SRMP determined that in this case it is possible that minimal damage to aircraft and/or minor injury to passengers/workers, minimal unplanned disruption to airport operations, or minor incident involving the use of airport emergency procedures could take place. The SRMP concluded on a risk rating on severity of 4-Minor and the likelihood as D-Extremely Remote as it is expected to occur once every 10-100 years or 25 million departures, whichever occurs sooner. The SRMP evaluation resulted with an initial risk rating of 4-Minor in severity and D-Extremely Remote for its likelihood. This hazard resultant matrix determination is a 4D – Low (Green).

ITO-DRAINAGE&WC-3 Controller LOSA

The SRMP analyzed and assessed this hazard by discussing the identified Causes that contribute to potential outcomes if this hazard occurs in the defined system state. The SRMP continued their assessment based on the worst credible effect, which was identified as a runway incursion. The SRMP determined that in this case it is possible that minimal damage to aircraft and/or minor

injury to passengers/workers, minimal unplanned disruption to airport operations, or minor incident involving the use of airport emergency procedures could take place. The SRMP concluded on a risk rating on severity of 4-Minor and the likelihood as D-Extremely Remote as it is expected to occur once every 10-100 years or 25 million departures, whichever occurs sooner. The SRMP evaluation resulted with an initial risk rating of 4-Minor in severity and D-Extremely Remote for its likelihood. This hazard resultant matrix determination is a 4D – Low (Green).

ITO-DRAINAGE&WC-4 Foreign Object Debris

The SRMP analyzed and assessed this hazard by discussing the identified Causes that contribute to potential outcomes if this hazard occurs in the defined system state. The SRMP continued their assessment based on the worst credible effect, which was identified as aircraft damage. The SRMP determined that in this case it is possible that minimal damage to aircraft and/or minor injury to passengers/workers, minimal unplanned disruption to airport operations, or minor incident involving the use of airport emergency procedures could take place. The SRMP concluded on a risk rating on severity of 4-Minor and the likelihood as D-Extremely Remote as it is expected to occur once every 10-100 years or 25 million departures, whichever occurs sooner. The SRMP evaluation resulted with an initial risk rating of 4-Minor in severity and D-Extremely Remote for its likelihood. This hazard resultant matrix determination is a 4D – Low (Green).

Table 6: Severity Definitions

Effect On:	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
ATC Services	-Conditions Resulting in a minimal reduction in ATC services, or -A loss of separation resulting in a Category D Runway Incursion (RI), or -An Operational Deviation (OD), or -A Proximity Event (PE)	-Conditions resulting on a slight reduction in ATC services, or -A loss of separation resulting on a Category C RI, or Operational Error (OE)	-Conditions resulting in a p artial loss of ATC services, or -A loss of separation resulting in Category B RI or OE	-Conditions resulting in a total loss of ATC services (ATC Zero), or -A loss of separation resulting in a Category A RI or OE	Conditions resulting in a collision between aircraft, obstacles or terrain
Flight Crew	-Flight crew receives TCAS Traffic Advisory informing of nearby traffic or, -Pilot Deviation (PD) where loss of airborne separation falls within the same parameters of a Category D OE or PE, or -Minimal effect on operation of aircraft	-Potential for PD due to TCAS Preventive Resolution Advisory (PRA) advising crew not t o deviate from present vertical profile, or -PD where loss of airborne separation falls within the same parameters of a Category C OE , or -A reduction of functional capability of aircraft but does not impact overall safety (e.g. normal procedures per AFM)	-PD due to response to TCAS Corrective Resolution Advisory (CRA) issued advising crew to take vertical action to avoid developing conflict with traffic, or -PD where loss of airborne separation falls within the same parameters of a Category B OE, or -Reduction in safety margin or functional capability of the aircraft requiring crew to follow abnormal procedures per AFM	-Near mid-air collision (NMAC) results due to proximity of less than 500 feet from another aircraft or a report filed by pilot or flight crew member that a collision hazard existed between two or more aircraft; or -Reduction of safety margin and functional capability of the aircraft requiring crew to follow emergency procedures as per AFM.	-Conditions resulting in a mid-air collision (MAC) or impact with obstacle or terrain resulting in hull loss, multiple fatalities, or fatal injury
Flying Public	Minimal injury or discomfort to passenger(s)	-Physical discomfort to passenger(s) (e.g. extreme braking action; clear air turbulence causing unexpected movement of aircraft causing injuries to one or two passengers out of their seats) -Minor injury to greater than zero to less or equal to 10% of passengers	-Physical distress on passengers (e.g. abrupt evasive action; severe turbulence causing unexpected aircraft movements), or -Minor injury to greater than 10% of passengers	Serious injury to passenger(s)	Fatalities or fatal injury to passenger(s)
Airport	No damage to aircraft but minimal injury or discomfort of little consequence to passenger(s) or workers	-Minimal damage to aircraft, or -Minor injury to passengers, or -Minimal unplanned airport operations limitations (i.e. taxiway closure), or -Minor incident involving the use of airport emergency procedures	-Major damager to aircraft and/or minor injury to passenger(s)/worker(s), or -Major unplanned disruption to airport operations, or -Serious incident, or -Deduction on the airport's ability to deal with adverse conditions	-Severe damage to aircraft and/or serious injury to passenger(s)/worker(s); or -Complete unplanned airport closure, or -Major unplanned operations limitations (i.e., runway closure), or -Major airport damage to equipment and facilities	-Complete loss of aircraft and/or facilities or fatal injury in passenger(s)/worker(s); or -Complete unplanned airport closure and destruction of critical facilities; or -Airport facilities and equipment destroyed

Table 7: Likelihood Definitions

	NAS System & ATC Operational	NAS Systems		ATC Operational		Flight Procedures	Airports
		Individual Item/System	ATC Service/NAS Level System	Per Facility	NAS-Wide		Airport Specific
Frequent A	Probability of occurrence per operation/operational hour is equal to or greater than $1x10^{-3}$	Expected to occur about once every 3 months for an item	Continuously experienced in the system	Expected to occur more than once per week	Expected to occur more than every 1-2 days	Probability of occurrence per operation/operational hour is equal to or greater than $1x10^{-5}$	Expected to occur more than once per week or every 2500 departures, whichever occurs sooner
Probable B	Probability of occurrence per operation/operational hour is equal to or greater than $1x10^{-5}$	Expected to occur about once per year for an item	Expected to occur frequently in the system	Expected to occur about once every month	Expected to occur about several times per month		Expected to occur about once every month or 250,000 departures, whichever occurs sooner
Remote C	Probability of occurrence per operation/operational hour is less than or equal to $1x10^{-5}$ but equal to or greater than $1x10^{-7}$	Expected to occur several times during the life cycle of an item	Expected to occur numerous times in a system's life cycle	Expected to occur about once every year	Expected to occur about once every 3 years	Probability of occurrence per operation/operational hour is less than or equal to $1x10^{-5}$, but equal to or greater than $1x10^{-7}$	Expected to occur about once every year or 2.5 million departures, whichever occurs sooner
Extremely Remote D	Probability of occurrence per operation/operational hour is less than or equal to $1x10^{-7}$ but equal to or greater than $1x10^{-9}$	Unlikely to occur, but possible in an item's life cycle	Expected to occur several times in a system's life cycle	Expected to occur once every 10-100 years	Expected to occur about once every 3 years	Probability of occurrence per operation/operational hour is less than or equal to $1x10^{-7}$ but equal to or greater than $1x10^{-9}$	Expected to occur once every 10-100 years or 25 million departures, whichever occurs sooner
Extremely Improbable E	Probability of occurrence per operation/operational hour is less than $1x10^{-9}$	So unlikely that it can be assumed that it will not occur in an item's life cycle	Unlikely to occur, but it is possible in system life cycle	Expected to occur less than every 100 years	Expected to occur less than every 30 years	Probability of occurrence per operation/operational hour is less than $1x10^{-9}$	Expected to occur less than every 100 years

During the SRMP PHA, there were instances that SRMP members were outside of the majority vote for either severity and /or likelihood while assessing for initial risks, which were recorded and shown in the Tables below. Those SRMP members with the indicated yellow highlights under each Hazard ID, were afforded an opportunity to provide their dissenting opinions in writing as required by the FAA Office of Airports Safety Management System (SMS) Implementation Guidance and Desk Reference, Section 5.3.e2, SRMD documentation. The Panel Members indicated they would not be submitting dissenting opinions.

Table 8: Initial Risk Dissenting Opinion Summary (Part 1 of 2)

	ITO-DRAINAGE&WC-1A		ITO-DRAINAGE&WC-1B		ITO-DRAINAGE&WC-2	
	Pilot LOSA		Pilot LOSA		Contractor/Vehicle Driver LOSA	
Panel Member	Severity	Likelihood	Severity	Likelihood	Severity	Likelihood
Steve Santiago	2	C	4	E	4	D
Elizabeth Moore	4	D	4	E	4	D
Kandyce Watanabe	-	-	-	-	4	D
Dave Sakasegawa	4	D	4	E	5	D
Neil Okuna	4	D	5	E	4	D
Fernando Morales	4	D	4	D	4	D
Perfecto Delmendo	4	C	4	C	4	D
Majority Rating						
	4D – Low		**4E – Low**		**4D – Low**	

Table 9: Initial Risk Dissenting Opinion Summary (Part 2 of 2)

	ITO-DRAINAGE&WC-3		ITO-DRAINAGE&WC-4	
	Controller LOSA		FOD	
Panel Member	Severity	Likelihood	Severity	Likelihood
Steve Santiago	4	D	4	D
Elizabeth Moore	4	D	4	D
Kandyce Watanabe	4	D	4	D
Dave Sakasegawa	4	D	4	D
Neil Okuna	4	D	4	D
Fernando Morales	4	D	4	D
Perfecto Delmendo	4	D	4	D
Majority Rating				
	4D – Low		**4D – Low**	

Section 8 – Phase 5: Treatment of Risk / Mitigation of Hazards

The SRMP agreed that the following Hazards and associated Effects which were rated with Low Initial Risks 4D/4E, had existing controls in place to effectively manage these risks and no mitigation measures were needed.

- ITO-DAINAGE&WC-1A Pilot LOSA, Surface Incident
- ITO-DRAINAGE&WC-1B Pilot LOSA, Aircraft Damage
- ITO-DRAINAGE&WC-2 Contractor/Vehicle Driver LOSA, Runway Incursion
- ITO-DRAINAGE&WC-3 Controller LOSA, Runway Incursion
- ITO-DRAINAGE&WC-4 FOD, Aircraft Damage

Section 9 – Tracking and Monitoring Hazards

Referencing the ARP SMS Desk Reference, low risk hazards (green) do not need to be actively managed but must be recorded in the SRMD. Medium risk is acceptable within the ARP SMS. A medium risk is the minimum acceptable safety objective. With medium risk, the proposal may be carried out as long as the risk is tracked and managed.

These hazards will be monitored by HDOT-A as they move through the design and construction SRA phases and addressed as needed.

The SRMP incorporated safety performance targets for triggering a reconvened panel. The panel will reconvene to look at additional mitigation if there is one incident falling within the category of 4-Minor for the duration of the Drainage and Wind Cone Improvements project. The definitions are described below:

- ATC Services
  - Conditions resulting in a slight reduction in ATC services
  - A loss of separation resulting in a Category C, RI, or Operational Error (OE)

- Flight Crew
  - Potential for PD due to TCAS Preventive Resolution Advisory (PRA) advising crew not to deviate from present vertical profile
  - PD where loss of airborne separation falls within the same parameters of a Category C, OE
  - A reduction of functional capability of aircraft but does not impact overall safety (e.g. normal procedures per ARM)

- Flying Public
  - Physical discomfort to passenger(s) (e.g. extreme braking action; clear air turbulence causing unexpected movement of aircraft causing injuries to one or two passengers out of their seats)
  - Minor injury to greater than zero to less than or equal to 10% of passengers

- Airport
  - Minimal damage to aircraft
  - Minor injury to passengers
  - Minimal unplanned airport operations limitations (i.e. taxiway closure)
  - Minor incident involving the use of airport emergency procedures

This would effectively cover all incidents associated with all stakeholder groups.

Preliminary Hazard List

Categorization:

[H] = **Hazard**– any real or potential condition that can result in injury, illness, or death to people; damage to or loss of a system, equipment or property; or damage to the environment.

[C] = **Cause**– events occurring independently or in combination that result in a hazard or failure.

[E] = **Effect**– real or potential outcome or harm that could be created if the hazard occurs in the defined system state

December 9, 2020 (all phases)

1. (HH) Pilot LOSA [H]
2. (KS) Contractor LOSA [H]
3. (CK) Controller LOSA [H]
4. (ML) Shut down and restore of NAVAIDs to impacted runways [C]
5. (EM) Proper coordination of Phase 6. If weather starts occurring during night construction and if the project gets cancelled at night. NOTAM revisions needed. [C]
6. (FM/RR) Driver/Vehicle LOSA [H] (combine with #2)
7. (PD) Continuation/Expectation Bias [C]
8. (SS) Vehicle haul routes, knowing aircraft has the right of way. Designated haul route [C]
9. (SS) FOD [H]

March 31, 2021

10. No additional Hazards

Preliminary Hazard Analysis (PHA) Worksheet

(1) Hazard ID	(2) Hazard Description	(3) Cause(s)	(4) System State(s)	(5) Existing Controls	(6) Justification / Supporting Data	(7) Effects	(8) Severity	(9) Severity Rationale	(10) Likelihood	(11) Likelihood Rationale	(12) Initial Risk	(13) Mitigation	(14) Mitigation Responsibility	(15) Predicted Residual Risk
XYZ-1	Condition, real or potential; can cause injury, illness, etc. Prerequisite for accident or incident	Events that result in a hazard or failure	Conditions, characterized by quantities or qualities, in which a system can exist	Mitigations that exist to prevent or reduce hazard occurrence or mitigate its effect	Explanation and additional detailing of Existing Controls (Need to cite specific paragraph and/or section number of FAA Orders, Program Guidance Letters, Advisory Circulars, Federal Aviation Regulations used)	Potential outcome or harm of the hazard if it occurs in the defined system state; worst credible	Resultant matrix determination	Particular effect of the identified hazard producing the worst credible outcome (likelihood is not considered)	Resultant matrix determination	Expression of how often a particular effect is expected to occur given existing controls and requirements (severity must be considered first)	Risk matrix ranking based on severity and likelihood of a hazard when it is first identified and assessed	Stated proposed mitigation for this hazard	Who has the responsibility to implement the mitigation	Risk status predicted to occur when recommended controls or requirements are verified
ITO-DRAINAGE&WC-1A	Pilot Loss of Situational Awareness (LOSA)	-shutting down of taxiways and rerouting pilots to the runway -weather -lack of timely information -not checking NOTAMs -phase changes -Vehicle haul routes, knowing aircraft has the right of way. Designated haul route -continuation/expectation bias -shutdown and restore of NAVAIDs to impacted runways	All phases of construction	AC 150/5070-7: Airport System Planning Process AC 150/5200-18: Airport Safety Self Inspection AC 150/5200-28: NOTAMs for Airport Operators AC 150/5200-31: Airport Emergency Plan AC 150/5210-24: Airport Foreign Object Debris Management AC 150/5210-5: Painting, Marking, Lighting of Vehicles Used on Airport AC 150/5300-13: Airport Design AC 150/5340-1: Standards for Airport Markings AC 150/5340-18: Standards for Airport Sign Systems AC 150/5340-30: Design and Installation Details for Airport Visual Aids AC 150/5345-44: Specifications for Runway and Taxiway Signs AC 150/5345-46: Specifications for Runway and Taxiway Lighting Fixtures AC 150/5345-53: Airport Lighting Equipment Certification Program AC 150/5345-55: Specification for L-893, Lighted Visual Aid to indicate Temporary Runway Closure AC 150/5345-56: Specification for L-890, Airport Lighting Control and Monitoring System (ALCMS) AC 150/5370-2: Operational Safety on Airports During Construction FAR Part 139 Regulations JO 7110.65: Air Traffic Control SOP: Standard Operating Procedure LOA: Letter of Agreement MEARTS/STARS: Micro Enroute Automated Radar System ARSR, ASR-9, ASR-11: Surveillance Radar ATIS: Automated Terminal Information System AMASS: Airport Movement Area Safety System Pilot Training Airfield Driver Training Pilot Intervention Controller Intervention ATC Scanning Airfield Operations Monitoring Operational Supervision NOTAM: Notice to Airmen Charts: Aeronautical, Jeppesen charts AFD: Airport/Facility Directory AIM: Aeronautical Information Manual CRM: Crew Resource Management CSPP: Construction Safety and Phasing Plan	AC 150/5200-28D: Sections 1.6.1; 8; 10; 13a; 18 AC 150/5210-5: Sections 4c and 5a AC 150/5300-13A: Sections 304 and 401 AC 150/5340-1L: Chapters 2, 3, and 4 AC 150/5340-18F: Chapters 1 and 2 AC150/5345-46E: Section 1.2.1 AC 150/5370-2G: Sections 1.2; 1.2.1; 1.2.2; 1.2.3; 1.2.4; 2.13; 2.4.1.9.b; 2.4.1.14; 2.18.3.2; 2.20 FAR Part 139: Sections 327, para a-b; 329, para a-e; 339; 341, para a-b JO 7210.3AA 4-3-1; 10-3-13; 10-4-4	-runway incursion -runway excursion -surface incident (pilot deviations, etc.) -ramp incident	4-minor	subject matter expertise	D-extremely remote	subject matter expertise	4D-Low	N/A		

Preliminary Hazard Analysis (PHA) Worksheet

(1) Hazard ID	(2) Hazard Description	(3) Cause(s)	(4) System State(s)	(5) Existing Controls	(6) Justification / Supporting Data	(7) Effects	(8) Severity	(9) Severity Rationale	(10) Likelihood	(11) Likelihood Rationale	(12) Initial Risk	(13) Mitigation	(14) Mitigation Responsibility	(15) Predicted Residual Risk
XYZ-1	Condition, real or potential; can cause injury, illness, etc. Prerequisite for accident or incident	Events that result in a hazard or failure	Conditions, characterized by quantities or qualities, in which a system can exist	Mitigations that exist to prevent or reduce hazard occurrence or mitigate its effect	Explanation and additional detailing of Existing Controls (Need to cite specific paragraph and/or section number of FAA Orders, Program Guidance Letters, Advisory Circulars, Federal Aviation Regulations used)	Potential outcome or harm of the hazard if it occurs in the defined system state; worst credible	Resultant matrix determination	Particular effect of the identified hazard producing the worst credible outcome (likelihood is not considered)	Resultant matrix determination	Expression of how often a particular effect is expected to occur given existing controls and requirements (severity must be considered first)	Risk matrix ranking based on severity and likelihood of a hazard when it is first identified and assessed	Stated proposed mitigation for this hazard	Who has the responsibility to implement the mitigation	Risk status predicted to occur when recommended controls or requirements are verified
ITO-DRAINAGE&WC-1B	Pilot Loss of Situational Awareness (LOSA)	-shutting down of taxiways and rerouting pilots to the runway -weather -lack of timely information -not checking NOTAMs -phase changes -Vehicle haul routes, knowing aircraft has the right of way. Designated haul route -continuation/expectation bias -shutdown and restore of NAVAIDs to impacted runways	Phase during which taxiway is limited to 70-ft wingspans (phase 3)	AC 150/5070-7: Airport System Planning Process AC 150/5200-18: Airport Safety Self Inspection AC 150/5200-28: NOTAMs for Airport Operators AC 150/5200-31: Airport Emergency Plan AC 150/5210-24: Airport Foreign Object Debris Management AC 150/5210-5: Painting, Marking, Lighting of Vehicles Used on Airport AC 150/5300-13: Airport Design AC 150/5340-1: Standards for Airport Markings AC 150/5340-18: Standards for Airport Sign Systems AC 150/5340-30: Design and Installation Details for Airport Visual Aids AC 150/5345-44: Specifications for Runway and Taxiway Signs AC 150/5345-46: Specifications for Runway and Taxiway Lighting Fixtures AC 150/5345-53: Airport Lighting Equipment Certification Program AC 150/5345-55: Specification for L-893, Lighted Visual Aid to indicate Temporary Runway Closure AC 150/5345-56: Specification for L-890, Airport Lighting Control and Monitoring System (ALCMS) AC 150/5370-2: Operational Safety on Airports During Construction FAR Part 139 Regulations JO 7110.65: Air Traffic Control SOP: Standard Operating Procedure LOA: Letter of Agreement MEARTS/STARS: Micro Enroute Automated Radar System ARSR, ASR-9, ASR-11: Surveillance Radar ATIS: Automated Terminal Information System AMASS: Airport Movement Area Safety System Pilot Training Airfield Driver Training Pilot Intervention Controller Intervention ATC Scanning Airfield Operations Monitoring Operational Supervision NOTAM: Notice to Airmen Charts: Aeronautical, Jeppesen charts AFD: Airport/Facility Directory AIM: Aeronautical Information Manual CRM: Crew Resource Management CSPP: Construction Safety and Phasing Plan	AC 150/5200-28D: Sections 1.6.1; 8; 10; 13a; 18 AC 150/5210-5: Sections 4c and 5a AC 150/5300-13A: Sections 304 and 401 AC 150/5340-1L: Chapters 2, 3, and 4 AC 150/5340-18F: Chapters 1 and 2 AC150/5345-46E: Section 1.2.1 AC 150/5370-2G: Sections 1.2; 1.2.1; 1.2.2; 1.2.3; 1.2.4; 2.13; 2.4.1.9.b; 2.4.1.14; 2.18.3.2; 2.20 FAR Part 139: Sections 327, para a-b; 329, para a-e; 339; 341, para a-b JO 7210.3AA 4-3-1; 10-3-13; 10-4-4	-aircraft damage -personnel injury -equipment damage	4-minor	subject matter expertise	E-extremely improbable	subject matter expertise	4E-Low	N/A		

Preliminary Hazard Analysis (PHA) Worksheet

(1) Hazard ID	(2) Hazard Description	(3) Cause(s)	(4) System State(s)	(5) Existing Controls	(6) Justification / Supporting Data	(7) Effects	(8) Severity	(9) Severity Rationale	(10) Likelihood	(11) Likelihood Rationale	(12) Initial Risk	(13) Mitigation	(14) Mitigation Responsibility	(15) Predicted Residual Risk
XYZ-1	Condition, real or potential; can cause injury, illness, etc. Prerequisite for accident or incident	Events that result in a hazard or failure	Conditions, characterized by quantities or qualities, in which a system can exist	Mitigations that exist to prevent or reduce hazard occurrence or mitigate its effect	Explanation and additional detailing of Existing Controls (Need to cite specific paragraph and/or section number of FAA Orders, Program Guidance Letters, Advisory Circulars, Federal Aviation Regulations used)	Potential outcome or harm of the hazard if it occurs in the defined system state; worst credible	Resultant matrix determination	Particular effect of the identified hazard producing the worst credible outcome (likelihood is not considered)	Resultant matrix determination	Expression of how often a particular effect is expected to occur given existing controls and requirements (severity must be considered first)	Risk matrix ranking based on severity and likelihood of a hazard when it is first identified and assessed	Stated proposed mitigation for this hazard	Who has the responsibility to implement the mitigation	Risk status predicted to occur when recommended controls or requirements are verified
ITO-DRAINAGE&WC-2	Contractor/Vehicle Driver Loss of Situational Awareness (LOSA)	-lack of driver training/experience -change in phases -goes into area they're not supposed to -driver missing or ignoring briefing -Vehicle haul routes, knowing aircraft has the right of way. Designated haul route -lack of safety control from users (ie. wing walkers)	All phases of construction	AC 150/5200-28: NOTAMs for Airport Operators AC 150/5210-20: Ground Vehicle Operations on Airports AC 150/5300-13: Airport Design AC 150/5340-1: Standards for Airport Markings AC 150/5340-18: Standards for Airport Sign Systems AC 150/5345-44: Specifications for Runway and Taxiway Signs AC 150/5345-46: Specifications for Runway and Taxiway Lighting Fixtures AC 150/5370-2: Operational Safety on Airports During Construction FAR Part 139 Regulations JO 7110.65: Air Traffic Control JO 7210.3: Facility Operations and Administration SOP: Standard Operating Procedure LOA: Letter of Agreement Controller Training, Airfield Driver Training, Access Control Training Controller Intervention, ATC Scanning Airfield Operations Monitoring Operational Supervision Radio Frequency Monitoring AFD: Airport/Facility Directory CRM: Crew Resource Management Daily Briefings/Notes CSPP: Construction Safety and Phasing Plan	AC 150/5200-28D: Sections 1.6.1; 8; 10; 13a; 18 AC 150/5210-20A: Sections 1.1; 1.3; 2.1; 2.2; 3.1.3; 3.4; 3.1.4.2; 3.4 AC 150/5340-1L: Chapters 2, 3, and 4 AC 150/5340-18F: Chapters 1 and 2 AC 150/5370-2G: Sections 1.4.2.10; 1.4.3.6; 2.13; 2.4.1.9.b; 2.4.1.14; 2.9.2; 2.9.2.7; 2.9.2.8; 2.9.2.9; 2.18.3.2; 2.20 1.2; 1.2.1; 1.2.2; 1.2.3; 1.2.4; 2.13; 2.4.1.9.b; 2.4.1.14; 2.18.3.2; 2.20 FAR Part 139: Sections 327, para a-b; 329, para a-e; 339; 341, para a-b JO 7210.3AA 4-3-1	-equipment damage -runway incursion -surface incident	4-minor	subject matter expertise	D-extremely remote	subject matter expertise	4D-Low	N/A		
ITO-DRAINAGE&WC-3	Controller Loss of Situational Awareness (LOSA)	-taxi aircraft onto a closed areas -NOTAMs not up to date -phase changes -controller did not get proper briefing either on the project or during position relief briefing -failure to use existing runway memory aids	All phases of construction	AC 150/5200-18: Airport Safety Self Inspection AC 150/5200-28: NOTAMs for Airport Operators AC 150/5340-1: Standards for Airport Markings AC 150/5340-18: Standards for Airport Sign Systems AC 150/5370-2: Operational Safety on Airports During Construction ACAC Checklist: Airport Construction Advisory Council JO 7110.65: Air Traffic Control JO 7210.3: Facility Operations and Administration SOP: Standard Operating Procedure ATIS: Automated Terminal Information System Controller Training Controller Intervention ATC Scanning Airfield Operations Monitoring Operational Supervision Radio Frequency Monitoring NOTAM: Notice to Airmen Charts: Aeronautical, Jeppesen charts AFD: Airport/Facility Directory AIM: Aeronautical Information Manual CRM: Crew Resource Management CSPP: Construction Safety and Phasing Plan	AC 150/5200-28D: Sections 1.6.1; 8; 10; 13a; 18 AC 150/5210-5: Sections 4c and 5a AC 150/5340-1L: Chapters 2, 3, and 4 AC 150/5340-18F: Chapters 1 and 2 AC150/5345-46E: Section 1.2.1 AC 150/5370-2G: Sections 1.2; 1.2.1; 1.2.2; 1.2.3; 1.2.4; 2.9.2.9; 2.13; 2.4.1.9.b; 2.4.1.14; 2.18.3.2; 2.20 FAR Part 139: Sections 327, para a-b; 329, para a-e; 339; 341, para a-b JO 7210.3AA 4-3-1; 10-3-13; 10-4-4;	-equipment damage -runway incursion -aircraft damage -surface incident	4-minor	subject matter expertise	D-extremely remote	subject matter expertise	4D-Low	N/A		

Preliminary Hazard Analysis (PHA) Worksheet

(1) Hazard ID	(2) Hazard Description	(3) Cause(s)	(4) System State(s)	(5) Existing Controls	(6) Justification / Supporting Data	(7) Effects	(8) Severity	(9) Severity Rationale	(10) Likelihood	(11) Likelihood Rationale	(12) Initial Risk	(13) Mitigation	(14) Mitigation Responsibility	(15) Predicted Residual Risk
XYZ-1	Condition, real or potential; can cause injury, illness, etc. Prerequisite for accident or incident	Events that result in a hazard or failure	Conditions, characterized by quantities or qualities, in which a system can exist	Mitigations that exist to prevent or reduce hazard occurrence or mitigate its effect	Explanation and additional detailing of Existing Controls (Need to cite specific paragraph and/or section number of FAA Orders, Program Guidance Letters, Advisory Circulars, Federal Aviation Regulations used)	Potential outcome or harm of the hazard if it occurs in the defined system state; worst credible	Resultant matrix determination	Particular effect of the identified hazard producing the worst credible outcome (likelihood is not considered)	Resultant matrix determination	Expression of how often a particular effect is expected to occur given existing controls and requirements (severity must be considered first)	Risk matrix ranking based on severity and likelihood of a hazard when it is first identified and assessed	Stated proposed mitigation for this hazard	Who has the responsibility to implement the mitigation	Risk status predicted to occur when recommended controls or requirements are verified
ITO-DRAINAGE&WC-4	FOD	-weather (causing mud) -vehicle haul routes -careless drivers	All phases impacting movement areas (Phases 1, 3, & 6)	AC 150/5200-18: Airport Safety Self Inspection AC 150/5200-28: NOTAMs for Airport Operators AC 150/5210-20: Ground Vehicle Operations on Airports AC 150/5210-24: Airport Foreign Object Debris Management AC 150/5340-1: Standards for Airport Markings AC 150/5340-18: Standards for Airport Sign Systems AC 150/5345-44: Specifications for Runway and Taxiway Signs AC 150/5345-46: Specifications for Runway and Taxiway Lighting Fixtures AC 150/5370-2: Operational Safety on Airports During Construction FAR Part 139 Regulations JO 7110.65: Air Traffic Control SOP: Standard Operating Procedure LOA: Letter of Agreement Pilot Training Controller Training Airfield Driver Training Access Control Training Pilot Intervention Controller Intervention Airfield Operations Monitoring Operational Supervision CRM: Crew Resource Management Daily Briefings/Notes	AC 150/5200-18C: Sections 9, Para a-d; 10j, items 1-10; 13e, items 1-6 AC 150/5210-24: Sections 4.1b; 4.3.a.1; 4.3.a.5; 6.2 AC 150/5370-2G: Section 1.2 FAR Part 139: Sections 327, para a-b; 329, para a-e; 339; 341, para a-b	-aircraft damage -equipment damage -surface incident	4-minor	subject matter expertise	D-extremely remote	subject matter expertise	4D-Low	N/A		

Safety Risk Assessment (SRA) Panel

Handouts

Existing Controls List

#	CONTROL	TITLE/DESCRIPTION
Advisory Circulars		
1	AC 150/5070 – 7	Airport System Planning Process
2	AC 150/5200 –18	Airport Safety Self Inspection
3	AC 150/5200 – 28	NOTAMs for Airport Operators
4	AC 150/5200 – 31	Airport Emergency Plan
5	AC 150/5210 – 20	Ground Vehicle Operations on Airports
6	AC 150/5210 – 24	Airport Foreign Object Debris Management
7	AC 150/5210 – 5	Painting, Marking, Lighting of Vehicles Used on Airport
8	AC 150/5300 – 13	Airport Design
9	AC 150/5340 – 1	Standards for Airport Markings
10	AC 150/5340 – 18	Standards for Airport Sign Systems
11	AC 150/5340 – 30	Design and Installation Details for Airport Visual Aids
12	AC 150/5345 – 44	Specifications for Runway and Taxiway Signs
13	AC 150/5345 – 46	Specifications for Runway and Taxiway Lighting Fixtures
14	AC 150/5345 – 53	Airport Lighting Equipment Certification Program
15	AC 150/5345 – 55	Specification for L-893, Lighted Visual Aid to indicate Temporary Runway Closure
16	AC 150/5345 – 56	Specification for L-890, Airport Lighting Control and Monitoring System (ALCMS)
17	AC 150/5370 – 2	Operational Safety on Airports During Construction
18	FAR Part 139	Regulations/Airport
Directives - ATC		
19	ACAC Checklist	Airport Construction Advisory Council
20	JO 7110.65	Air Traffic Control
21	JO 7400.2	Handling Airspace Matters Procedures
22	JO 7210.3	Facility Operations and Administration
23	JO 6000.15	NAS Maintenance
24	SOP	Standard Operating Procedure
25	LOA	Letter of Agreement
Systems		
26	ARTS/STARS	Automated Radar System
27	ARSR, ASR-9, ASR-11	Surveillance Radar
28	ASDE, ASDE-X	Airport Surface Detection Equipment
29	ATIS	Automated Terminal Information System
30	TCAS	Traffic Alert & Collision Avoidance System
31	CA/MSAW	Conflict Alert/Minimum Safe Altitude Warning
32	AMASS	Airport Movement Area Safety System
33	ASOS	Automated Surface Observing System

Existing Controls List

#	CONTROL	TITLE/DESCRIPTION
Training		
34	Pilot Training	--
35	Controller Training	--
36	Airfield Driver Training	--
37	Access Control Training	--
Intervention		
38	Pilot Intervention	--
39	Controller Intervention	--
40	ATC Scanning	--
41	Airfield Operations Monitoring	--
42	Operational Supervision	--
43	Radio Frequency Monitoring	--
Publications		
44	NOTAM	Notice to Airmen
45	Charts	Aeronautical, Jeppesen charts
46	AFD	Airport/Facility Directory
47	AIM	Aeronautical Information Manual
Other		
48	CRM	Crew Resource Management
49	Daily Briefings/Notes	--
50	TMI	Traffic Management Initiative
51	CSPP	Construction Safety and Phasing Plan
52		
53		
54		
55		

Preliminary Hazard List with Risk Level

Source: FAA Office of Airports Safety Management Systems (SMS) Desk Reference

Hazard	Initial Risk
Foreign Object Damage / Debris (FOD)	3D
Loss of Situational Awareness by the Pilot: Change in Airport Geometry	2D
Loss of Situational Awareness by the Pilot: Continuation Bias / Complacency	2D
Loss of Situational Awareness by the Pilot: Construction Light Pollution	2E
Loss of Situational Awareness by the Pilot: Visual Cue Saturation	2D
Loss of Situational Awareness by the Pilot: Complex Taxiing Instructions	2D
Loss of Situational Awareness by the Pilot: Insufficient/Ineffective/Inaccurate Notification to Users/Stakeholders	2D
Loss of Situational Awareness by the Pilot: Interference or Loss of NAS Systems	3D
Loss of Situational Awareness by the Controllers: Complexity	3D
Loss of Situational Awareness by the Controllers: Interference or Loss of NAS Systems	4C
Loss of Situational Awareness by the Controllers: Line of Sight	5D
Loss of Situational Awareness by Vehicle Operators/Personnel: Visual Cue Saturation	3D
Increase/Changes in Wildlife Activity	4D
Penetration of Protected Surfaces (Airport Design, TERPS, and others)	5C

Hazard Severity Classification

Effect On:	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
ATC Services	-Conditions Resulting in a minimal reduction in ATC services, or -A loss of separation resulting in a Category D Runway Incursion (RI), or -An Operational Deviation (OD), or -A Proximity Event (PE)	-Conditions resulting in a slight reduction in ATC services, or -A loss of separation resulting in a Category C, RI, or Operational Error (OE)	-Conditions resulting in a partial loss of ATC services, or -A loss of separation resulting in Category B, RI or OE	-Conditions resulting in a total loss of ATC services (ATC Zero), or -A loss of separation resulting in a Category A, RI or OE	Conditions resulting in a collision between aircraft, obstacles or terrain
Flight Crew	-Flight crew receives TCAS Traffic Advisory informing of nearby traffic or, -Pilot Deviation (PD) where loss of airborne separation falls within the same parameters of a Category D, OE or PE, or -Minimal effect on operation of aircraft	-Potential for PD due to TCAS Preventive Resolution Advisory (PRA) advising crew not to deviate from present vertical profile, or -PD where loss of airborne separation falls within the same parameters of a Category C, OE or -A reduction of functional capability of aircraft but does not impact overall safety (e.g. normal procedures per ARM)	-PD due to response to TCAS Corrective Resolution Advisory (CRA) issued advising crew to take vertical action to avoid developing conflict with traffic, or -PD where loss of airborne separation falls within the same parameters of a Category B, OE, or -Reduction in safety margin or functional capability of the aircraft requiring crew to follow abnormal procedures per AFM	-Near mid-air collision (NMAC) results due to proximity of less than 500 feet from another aircraft or a report filed by pilot or flight crew member that a collision hazard existed between two or more aircraft; or -Reduction of safety margin and functional capability of the aircraft requiring crew to follow emergency procedures as per AFM.	-Conditions resulting in a mid-air collision (MAC) or impact with obstacle or terrain resulting in hull loss, multiple fatalities, or fatal injury
Flying Public	Minimal injury or discomfort to passenger(s)	-Physical discomfort to passenger(s) (e.g. extreme braking action; clear air turbulence causing unexpected movement of aircraft causing injuries to one or two passengers out of their seats) -Minor injury to greater than zero to less or equal to 10% of passengers	-Physical distress on passengers (e.g. abrupt evasive action; severe turbulence causing unexpected aircraft movements), or -Minor injury to greater than 10% of passengers	Serious injury to passenger(s)	Fatalities or fatal injury to passenger(s)
Airport	No damage to aircraft but minimal injury or discomfort of little consequence to passenger(s) or workers	-Minimal damage to aircraft, or -Minor injury to passengers, or -Minimal unplanned airport operations limitations (i.e. taxiway closure), or -Minor incident involving the use of airport emergency procedures	-Major damage to aircraft and/or minor injury to passenger(s)/worker(s), or -Major unplanned disruption to airport operations, or -Serious incident, or -Deduction on the airport's ability to deal with adverse conditions	-Severe damage to aircraft and/or serious injury to passenger(s)/worker(s); or -Complete unplanned airport closure, or -Major unplanned operations limitations (i.e. runway closure), or -Major airport damage to equipment and facilities	-Complete loss of aircraft and/or facilities or fatal injury in passenger(s)/worker(s); or -Complete unplanned airport closure and destruction of critical facilities; or -Airport facilities and equipment destroyed.

Likelihood Definitions

	NAS System & ATC Operational	NAS Systems		ATC Operational		Flight Procedures	Airports
		Individual Item/System	ATC Service/NAS Level System	Per Facility	NAS-Wide		Airport Specific
Frequent A	Probability of occurrence per operation/operational hour is equal to or greater than $1x10^{-3}$	Expected to occur about once every 3 months for an item	Continuously experienced in the system	Expected to occur more than once per week	Expected to occur more than every 1-2 days	Probability of occurrence per operation/operational hour is equal to or greater than $1x10^{-5}$	Expected to occur more than once per week or every 2500 departures, whichever occurs sooner
Probable B	Probability of occurrence per operation/operational hour is equal to or greater than $1x10^{-5}$	Expected to occur about once per year for an item	Expected to occur frequently in the system	Expected to occur about once every month	Expected to occur about several times per month		Expected to occur about once every month or 250.000 departures, whichever occurs sooner
Remote C	Probability of occurrence per operation/operational hour is less than or equal to $1x10^{-5}$ but equal to or greater than $1x10^{-7}$	Expected to occur several times during the life cycle of an item	Expected to occur numerous times in a system's life cycle	Expected to occur about once every year	Expected to occur about once every 3 years	Probability of occurrence per operation/operational hour is less than or equal to $1x10^{-5}$, but equal to or greater than $1x10^{-7}$	Expected to occur about once every year or 2.5 million departures, whichever occurs sooner
Extremely Remote D	Probability of occurrence per operation/operational hour is less than or equal to $1x10^{-7}$ but equal to or greater than $1x10^{-9}$	Unlikely to occur, but possible in an item's life cycle	Expected to occur several times in a system's life cycle	Expected to occur once every 10-100 years	Expected to occur about once every 3 years	Probability of occurrence per operation/operational hour is less than or equal to $1x10^{-7}$ but equal to or greater than $1x10^{-9}$	Expected to occur once every 10-100 years or 25 million departures, whichever occurs sooner
Extremely Improbable E	Probability of occurrence per operation/operational hour is less than $1x10^{-9}$	So unlikely that it can be assumed that it will not occur in an item's life cycle	Unlikely to occur, but it is possible in system life cycle	Expected to occur less than every 100 years	Expected to occur less than every 30 years	Probability of occurrence per operation/operational hour is less than $1x10^{-9}$	Expected to occur less than every 100 years

Severity and Likelihood Ratings

Hazard ID	ITO-DRAINAGE&WC-1A		ITO-DRAINAGE&WC-1B		ITO-DRAINAGE&WC-2	
Hazard Description - SYSTEM STATE - Worst Credible Effect	**Pilot LOSA - ALL PHASES - Surface Incident**		**Pilot LOSA - PHASE 3 - Aircraft Damage**		**Contractor/Vehicle Driver LOSA - ALL PHASES - Runway Incursion**	
Panel Member	Severity	Likelihood	Severity	Likelihood	Severity	Likelihood
Steve Santiago	2	C	4	E	4	D
Elizabeth Moore	4	D	4	E	4	D
Kandyce Watanabe	-	-	-	-	4	D
Dave Sakasegawa	4	D	4	E	5	D
Neil Okuna	4	D	5	E	4	D
Fernando Morales	4	D	4	D	4	D
Perfecto Delmendo	4	C	4	C	4	D
Majority Rating	**4**	**D**	**4**	**E**	**4**	**D**
	LOW		**LOW**		**LOW**	

Hazard ID	ITO-DRAINAGE&WC-3		ITO-DRAINAGE&WC-4	
Hazard Description - SYSTEM STATE - Worst Credible Effect	**Controller LOSA - ALL PHASES - Runway Incursion**		**FOD - PHASES 1, 3, & 6 - Aircraft Damage**	
Panel Member	Severity	Likelihood	Severity	Likelihood
Steve Santiago	4	D	4	D
Elizabeth Moore	4	D	4	D
Kandyce Watanabe	4	D	4	D
Dave Sakasegawa	4	D	4	D
Neil Okuna	4	D	4	D
Fernando Morales	4	D	4	D
Perfecto Delmendo	4	D	4	D
Majority Rating	**4**	**D**	**4**	**D**
	LOW		**LOW**	

Attendance

Meeting Date: Wednesday, March 31, 2021 Meeting Time: 9:00am – 4:00 pm HST

Location: Microsoft Teams (Virtual/On-line) ☒ = Present

	Name	Panel Member / SME	Company / Agency	Responses as of 3/30
☒	Santiago, Steven	Panel Member	HDOT-A ITO	Accepted
☐	Smith, Tiffinie	SME	HDOT-A ITO	None
☐	Doll, Joylyne	SME	HDOT-A ITO	None
☒	Shimizu, Calvin	SME	HDOT-A ITO	Tentative
☐	Molina, Mike	SME	HDOT-A ITO	None
☐	Nakayama, Jason	SME	HDOT-A ITO	None
☒	Jacobs, Martinez	SME	HDOT-A	Accepted
☒	Sakamoto, Tanya	SME	HDOT-A SMS Div Manager	Accepted
☐	Fujita, Daryl	Panel Member	HDOT-A GA Officer	Accepted
☐	Tuiolosega, Herman	SME	HDOT-A AIR-EP	None
☐	Kawaoka, Lynette	SME	HDOT-A AIR-EP	None
☒	Severn, Ray	SME	HDOT-A AIR-EP	None
☐	Hays, Hannah	SME	HDOT-A AIR-EP	None
☐	Garcia, Greg	SME	HDOT-A AIR-EA	None
☐	Chiu, Eddie	SME	HDOT-A AIR-EA	None
☒	Legaspi, Manny	SME	HDOT-A AIR-EA	Accepted
☒	Dunckel, Sean	SME	AECOM	None
☒	Mineker, Dawn	SME	AECOM	Accepted
☐	Campbell, Alan	SME	AECOM	Accepted
☒	Furushima, Reyn	SME (Designer)	WRSA	Accepted
☒	Moore, Elizabeth	Panel Member	FAA ITO ATCT	None
☒	Ellorda, Renee	SME	FAA ITO&KOA SSC	Accepted
☐	Barclay, Charles	Panel Member	FAA ITO SSC	Accepted
☒	Watanabe, Kandyce	Panel Member	FAA HNL ADO	Accepted
☐	Brown, William "Will"	Panel Member	FAA HNL ADO	Accepted
☒	Sakasegawa, David	Panel Member	FAA HCF Manager	Accepted
☐	Hamamoto, Liane	SME	FAA HCF ATO	None
☒	Okuna, Neil	Panel Member	FAA HCF ATO	Accepted
☒	Poole, Dottie	SME	FAA HCF ATO	None
☐	Shinkawa, Chad	Panel Member	FAA HCF NATCA	None
☐	Kamakahi, Jacob	SME	FAA HCF NATCA	Declined
☒	Lui, Kellie	SME	FAA HCF NATCA	
☒	Klinkhammer, Carl	SME	FAA WSC NPI	Accepted
☒	Kaut, Brian	SME	FAA WSC NPI	Accepted
☒	Clark, Dave	SME	FAA WSC FP	

	Name	Panel Member / SME	Company / Agency	Responses as of 3/30
☐	Allen, Scott	Panel Member	FAA FSDO	Accepted
☐	Heenan, Michael	SME	FAA FSDO	None
☐	Chitwood, Tiffany	SME	FAA CMO	None
☐	Guillory, Richard "Rich"	Panel Member	FAA CMO	None
☐	Santoro, Joe	SME	FAA RSO	None
☒	Morales, Fernando	Panel Member	FAA RSO	Accepted
☒	Delmendo, Perfecto	Panel Member	AvAir Pros HALO	Accepted
☐	Ilagan, Ed	SME	AvAir Pros	None
☐	Silva, Richard	SME	Hawaiian Airlines	None
☐	Lauritsen, Charles "CD"	Panel Member	Hawaiian Airlines	Accepted
☐	Freitas, Tracy	SME	Hawaiian Airlines	None
☐	Gibson, Luana	SME	Hawaiian Airlines	None
☐	Wilson, Toni	SME	Southwest Airlines	Declined
☐	Agarwal, Ravin	SME	United Airlines	None
☐	Coon, Kevin	Panel Member	United Airlines	Tentative
☐	Litke, Paul	SME	United Airlines	None
☐	Tarpey, Jeff	SME	United Airlines	Tentative
☐	Suiaunoa, Nicole	Panel Member	United Ground Express	Accepted
☐	Colbert, Travis	SME	Aloha Air Cargo	None
☐	Meyer, Steve	Panel Member	Aloha Air Cargo	None
☐	Sakamoto, Rick	SME	Aloha Air Cargo	None
☐	Smith, Marcel	SME	Aloha Air Cargo	None
☐	Meinster, Pete	SME	Empire Airlines	None
☐	Perich, Dan	SME	Empire Airlines	None
☐	Mantz, Darlene Pua	Panel Member	TransAir	None
☐	Saga, Pouli	SME	TransAir	None
☐	Melohn, Bill	Panel Member	AOPA/GACH	None
☐	Myers, Preston	SME	Safari Helicopters	None
☐	Mitchell, Stephanie	SME	Safari Helicopters	None
☐	Murphy, J.C.	SME	Safari Helicopters	None
☐	Hamp, Eric	SME	Blue Hawaiian Helicopters	None
☐	Dorn, Calvin	SME	Paradise Helicopters	None
☐	Malakie, Dan	SME	Paradise Helicopters	None
☐	Navor, Carlos	SME	Paradise Helicopters	None
☐	Stachowicz, Pete	SME	Paradise Helicopters	None
☐	etrumble@hawaii.rr.com	SME	GA	None
☐	hlhaymore@yahoo.com	SME	GA	None
☐	n34212@gmail.com	SME	GA	None

	Name	Panel Member / SME	Company / Agency	Responses as of 3/30
☐	prambaut@earthlink.net	SME	GA	None
☐	avnav@hotmail.com	SME	GA	None
☐	m.singer@heartwoodpacific.com	SME	GA	None
☐	volcopters@aol.com	SME	GA	None
☐	gburk@hotmail.com	SME	GA	None
☐	carolmurray99@gmail.com	SME	GA	None
☐	mark.plgr@gmail.com	SME	GA	None
☐	hawaiijim@yahoo.com	SME	GA	None
☐	themissingcard@netscape.net	SME	GA	None
☐	danl@hawaii.edu	SME	GA	None
☐	tmoth25@yahoo.com	SME	GA	None
☐	lanipetrie@aol.com	SME	GA	None
☐	drf28@cornell.edu	SME	GA	None
☒	Ward, Dawn	Co-Facilitator	Base Management	None
☒	Wong, Steve	Co-Facilitator	Base Management	Accepted
☒	DeMattos, Dalyn	Tech Writer	Base Management	Accepted
☒	Yamauchi, Sue	Tech Writer	Base Management	None

Safety Assessment Screening for Projects (SAS-1) **Page 3**

SMS ID:

11. SRM Panel Members and Certification

We certify that we have reviewed the project documentation and have fully considered the potential hazards (and any proposed mitigation measures) before reaching this determination. Dissenting opinions concerning the determination are included in the report.

Name	Organization	Title	Date	Signature
Elizabeth Moore	FAA- ITO ATCT	ATM	1 APR 2021	Elizabeth Moore Digitally signed by Elizabeth Moore Date: 2021.04.01 08:12:46 -10'00'

12. Airport Certification and Acceptance

As a duly authorized representative of the sponsor of the airport identified above, I hereby certify that I have reviewed and understand the hazards and mitigation measures identified in the attached documentation. I further certify that I understand it is our legal duty, as sponsor, to ensure that any and all airport-related mitigation measures are fulfilled and documented in a timely manner. Any such commitments on our part represent an obligation under our Federal grant assurances, regardless of whether the FAA participates in the funding of any part of the Proposed Action. Nothing in the FAA's review may be deemed as relieving the sponsor of its legal obligations as owner and operator of the airport.

Name and Title	Date	Signature

13. FAA SRM Approval

Hazards were identified and analyzed using standard procedures and processes in accordance with FAA Order 5200.11. Mitigation measures, including draft NOTAM requirements, if necessary, are attached and are included with the formal FAA project approval action. These measures will help ensure safety levels are maintained at acceptable levels both during and after the proposed construction and non-construction airport changes.

Name and Title	Date	Signature

FAA Form 5200-8 (8-10)

Safety Assessment Screening for Projects (SAS-1) **Page 3**

SMS ID:

11. SRM Panel Members and Certification

We certify that we have reviewed the project documentation and have fully considered the potential hazards (and any proposed mitigation measures) before reaching this determination. Dissenting opinions concerning the determination are included in the report.

Name	Organization	Title	Date	Signature
Perfecto Delmendo	AvAirPros (HALO)	Senior Director	05/03/21	Perfecto Delmendo

12. Airport Certification and Acceptance

As a duly authorized representative of the sponsor of the airport identified above, I hereby certify that I have reviewed and understand the hazards and mitigation measures identified in the attached documentation. I further certify that I understand it is our legal duty, as sponsor, to ensure that any and all airport-related mitigation measures are fulfilled and documented in a timely manner. Any such commitments on our part represent an obligation under our Federal grant assurances, regardless of whether the FAA participates in the funding of any part of the Proposed Action. Nothing in the FAA's review may be deemed as relieving the sponsor of its legal obligations as owner and operator of the airport.

Name and Title	Date	Signature

13. FAA SRM Approval

Hazards were identified and analyzed using standard procedures and processes in accordance with FAA Order 5200.11. Mitigation measures, including draft NOTAM requirements, if necessary, are attached and are included with the formal FAA project approval action. These measures will help ensure safety levels are maintained at acceptable levels both during and after the proposed construction and non-construction airport changes.

Name and Title	Date	Signature

FAA Form 5200-8 (8-10)

Safety Assessment Screening for Projects (SAS-1) **Page 3**

SMS ID:

11. SRM Panel Members and Certification

We certify that we have reviewed the project documentation and have fully considered the potential hazards (and any proposed mitigation measures) before reaching this determination. Dissenting opinions concerning the determination are included in the report.

Name	Organization	Title	Date	Signature
Fernando Morales	FAA Runway Safety - RSPM		05/07/2021	Fernando Morales

12. Airport Certification and Acceptance

As a duly authorized representative of the sponsor of the airport identified above, I hereby certify that I have reviewed and understand the hazards and mitigation measures identified in the attached documentation. I further certify that I understand it is our legal duty, as sponsor, to ensure that any and all airport-related mitigation measures are fulfilled and documented in a timely manner. Any such commitments on our part represent an obligation under our Federal grant assurances, regardless of whether the FAA participates in the funding of any part of the Proposed Action. Nothing in the FAA's review may be deemed as relieving the sponsor of its legal obligations as owner and operator of the airport.

Name and Title	Date	Signature

13. FAA SRM Approval

Hazards were identified and analyzed using standard procedures and processes in accordance with FAA Order 5200.11. Mitigation measures, including draft NOTAM requirements, if necessary, are attached and are included with the formal FAA project approval action. These measures will help ensure safety levels are maintained at acceptable levels both during and after the proposed construction and non-construction airport changes.

Name and Title	Date	Signature

FAA Form 5200-8 (8-10)

Safety Assessment Screening for Projects (SAS-1) **Page 3**

SMS ID:

11. SRM Panel Members and Certification

We certify that we have reviewed the project documentation and have fully considered the potential hazards (and any proposed mitigation measures) before reaching this determination. Dissenting opinions concerning the determination are included in the report.

Name	Organization	Title	Date	Signature
Kandyce Watanabe	FAA ADO	Program Manager	6/17/21	Kandyce Watanabe

12. Airport Certification and Acceptance

As a duly authorized representative of the sponsor of the airport identified above, I hereby certify that I have reviewed and understand the hazards and mitigation measures identified in the attached documentation. I further certify that I understand it is our legal duty, as sponsor, to ensure that any and all airport-related mitigation measures are fulfilled and documented in a timely manner. Any such commitments on our part represent an obligation under our Federal grant assurances, regardless of whether the FAA participates in the funding of any part of the Proposed Action. Nothing in the FAA's review may be deemed as relieving the sponsor of its legal obligations as owner and operator of the airport.

Name and Title	Date	Signature

13. FAA SRM Approval

Hazards were identified and analyzed using standard procedures and processes in accordance with FAA Order 5200.11. Mitigation measures, including draft NOTAM requirements, if necessary, are attached and are included with the formal FAA project approval action. These measures will help ensure safety levels are maintained at acceptable levels both during and after the proposed construction and non-construction airport changes.

Name and Title	Date	Signature

FAA Form 5200-8 (8-10)

Ground Rules

- Open, honest communications
- No sidebar conversations
- All Panel Members input is important
- Please state your name each time before speaking
- Please mute your microphones when not speaking, remember to unmute before speaking
- Meeting will start and end on time – Breaks should occur periodically, depending on discussion
- Anyone can call an ELMO (Enough, Let's Move On)

****Absence of an answer is understood as agreement****

Definitions

Accident – an unplanned event or series of events that results in death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment.

Cause – events occurring independently or in combination that result in a hazard or failure

Credible – capable of being believed. Worthy of belief or confidence. Sound, rational, defendable, and data driven.

Effect – real or credible harmful outcome that could be created if the hazard occurs in the defined system state.

Hazard – any real or potential condition that can result in injury, illness, or death to people; damage to or loss of a system equipment, or property; or damage to the environment.

Likelihood – the estimated probability or frequency, in quantitative or qualitative terms, of an occurrence related to the hazard. *Likelihood is the estimated probability or frequency of a hazard's effect; often an expression of how often an effect is expected to occur.*

Residual Safety Risk – the remaining safety risk that exists after all control techniques have been implemented or exhausted, and all controls have been verified. *Only verified controls can be used for the assessment of residual safety risk.*

Risk Analysis – the process during which a hazard is characterized for its likelihood and the severity of its effect or harm. Risk analysis can be either quantitative or qualitative; however, the inability to quantify or the lack of historical data on a particular hazard does not preclude the need for analysis.

Risk Assessment- assessment of the system or component to compare the achieved risk level with the tolerable risk level.

Risk Matrix – tool that combines severity and likelihood to assess risks as unacceptable, acceptable with mitigation, and acceptable.

Safety Assessment – a systematic, comprehensive evaluation of an implemented system.

Safety Risk - the composite of the likelihood of the potential effect of a hazard and predicted severity of that effect.

Safety Risk Control (Risk Mitigation) – any action taken to eliminate hazards or to mitigate their effects by reducing the severity and/or likelihood of the risk associated with those hazards. Safety risk controls necessary to mitigate an unacceptable risk should be mandatory, measurable, and monitored for effectiveness.

Safety Risk Management (SRM) - a formal process within the SMS composed of describing the system, identifying the hazards, assessing the risk, analyzing the risk, and mitigating the risk.

Severity – the consequence or impact of a hazard in terms of degree or loss or harm. *Severity is the measure of how bad the results of an event are predicted to be; usually determined by the worst credible outcome.*

Roles and Responsibilities

Facilitator – Responsible to follow the SMS process. Engages the panel to develop a thorough SRM Safety Assessment ensuring all relevant perspectives are considered, soliciting expert advice and building group consensus whenever possible. Cultivates discussion among panel members about potential hazards, risks, and mitigations. Manages conflicts that arise during the panel meeting, including biased observers and dissenting opinions. Facilitator does not make the final decision concerning findings of the panel. If the panel does reach a sound consensus, the FAA Project Manager has the final say on the findings of the panel.

Technical Writer – Documents discussions, PHL, PHA and consensus.

Panel Member – Invited as an SME to participate in discussions, share technical expertise, identify/analyze risks and reach consensus on level of risk. Panel Members are SME's in their own specialized field. They are expected to have the authority to represent and make decisions for their respective organization. Panel Members are required to sign the resulting SRMD or provide dissenting opinion and rationale.

Subject Matter Expert (SME) – Invited for technical expertise and operational responsibilities. If the panel of SME's already consists of someone with your knowledge and background, you do not need to be a panel member. An example of an SME not on a panel is a planning or design consultant who supports the panel through research and preparation of documents.

List of Reference Documents

ACRP Report 1, Volume 1 – SMS for Airports Overview, 2007

ACRP Report 1, Volume 2 – SMS for Airports Guidebook, 2009

ACRP 58 – Safety Reporting Systems at Airports, 2014

ACRP 131 – Guidebook for SRM, 2015

FAA AC 150/5200-37A – Introduction to Safety Management Systems (SMS) for Airport Operators

FAA Order 5200.11 Change 3 – FAA Airports (ARP) Safety Management System (SMS), August 2014

FAA Order 8000.369B, Safety Management System

FAA Order 8040.4B, Safety Risk Management Policy

FAA Office of Airports (ARP) SMS Desk Reference, June 2012

Standard Operating Procedure for Safety Risk Management under the FAA Office of Airports Safety Management System

HILO INTERNATIONAL AIRPORT (ITO)

HAWAIʻI DEPARTMENT OF TRANSPORTATION AIRPORTS DIVISION (DOT-A)

DRAINAGE AND WIND CONE IMPROVEMENTS
State Project No.: AH1021-20

CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

June 4, 2021

Emmanuel Legaspi
State Project Manager

Prepared by:

Wesley R. Segawa & Associates

Points of Contact

Contractors On-Site and Responsible Personnel Contacts:

[Contractor Project Manager]	office	(808) xxx-xxxx
	cell	(808) xxx-xxxx
[Contractor On-Site Supervisor]	cell	(808) xxx-xxxx
[Contractor On-Site Alternate Supervisor]	cell	(808) xxx-xxxx
[Contractor On-Site Radio Person]	cell	(808) xxx-xxxx
[Subcontractor Project Manager]	office	(808) xxx-xxxx
[Subcontractor On-Site Supervisor] [Company]	cell	(808) xxx-xxxx
[Subcontractor On-Site Alternate] [Company]	cell	(808) xxx-xxxx
[List supervisor and alternate contacts for all subcontractors including company]		

Hilo International Airport (ITO) Contacts:

ITO Airport Manager (Steve Santiago)	office	(808) 961-9302
	cell	(808) 987-2811
ITO Assistant Airport Superintendent (Tiffinie Smith)	office	(808) 961-9303
	cell	(808) 209-9598
ITO Airport Maintenance Supervisor, ITO-MS/ITO Runway Inspector (Calvin Shimizu)		
	office	(808) 961-9377
	cell	(808) 430-1111
ITO Airport Electrician (Jason Nakayama)	office	(808) 961-9332
ITO Airport Security Office (24 hrs)	office	(808) 961-9338
ITO Airport Security Manager, M-F 0800-1600 hrs HST (TBD)		
	office	TBD
	cell	TBD
ITO Airport Pass and ID Office, M-F 0800-1600 hrs HST (Gilbert Flores)		
	office	(808) 961-9350
	office	(808) 961-9351
ITO Airport Rescue & Fire Fighting, ARFF (24 hrs)	office	(808) 961-9317
ITO Airport Rescue & Fire Fighting On-Duty Captain (24 hrs)		
	cell	(808) 430-6216
U.S. Department of Agriculture (USDA)	office	(808) 933-9040

HDOT-A

HDOT-A Project Supervisor (Greg Garcia)	(808) 838-8829
HDOT-A Project Manager (Emmanuel Legaspi)	(808) 838-8848

FAA and Hawaii Control Facility (HCF) Contacts:

FAA ITO Air Traffic Control Tower, ATCT (0600-2200 hrs HST)		(808) 961-3883
ITO Tower Frequency (CTAF).....		118.1
ITO Ground Frequency.....		121.9
Sector 5 FAA-HCF Approach Frequency (2000-0600 hrs HST)....		119.7
FAA Honolulu Control Facility – SOC (24 hrs)	office	(808) 840-6511
	other	(808) 597-0965
FAA Honolulu Control Facility – Air Traffic (24 hrs)	office	(808) 840-6201
	office	(808) 840-6846
FAA ITO ATCT Manager (Alex Mikhalek)	office	(805) 640-5364
	cell	TBD
FAA Project Manager (Kandyce Watanabe)	office	(808) 312-6031
FAA HCF Contact (Dottie Poole)	office	(808) 840-6146
FAA Technical Operations, FAA-ATO, NAVAIDs, 0600-1600 hrs HST		
(Renee Ellorda)	office	(808) 334-8902
	cell	(808) 365-4947

(Charles Barclay)	cell	(808) 895-0752

Construction Manager:

CM for this project	cell	(808) xxx-xxxx

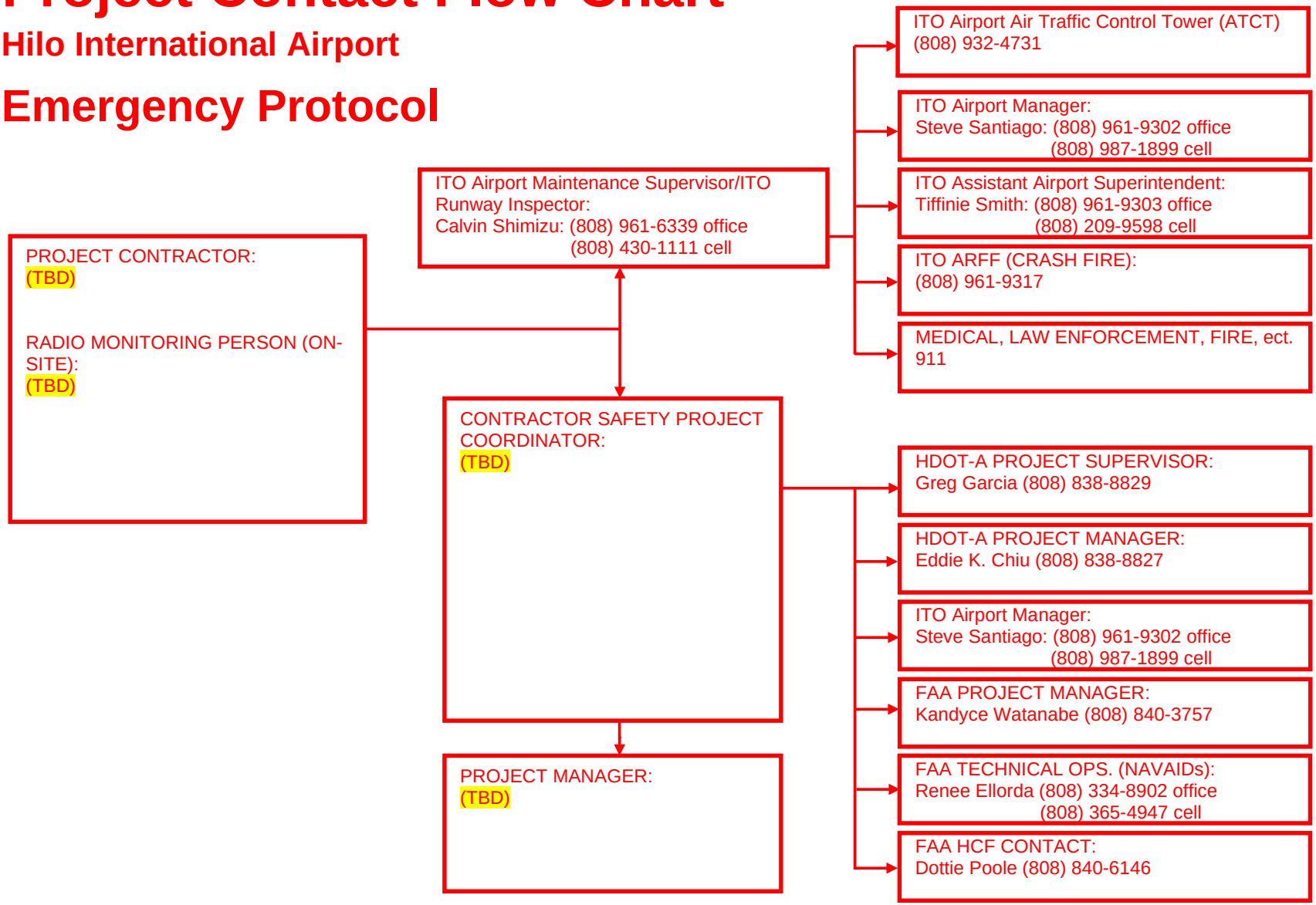
Other

Hawaii One Call Center	(866) 423-7287
Hawaii Poison Center	(800) 222-1222

Project Contact Flow Chart

Hilo International Airport

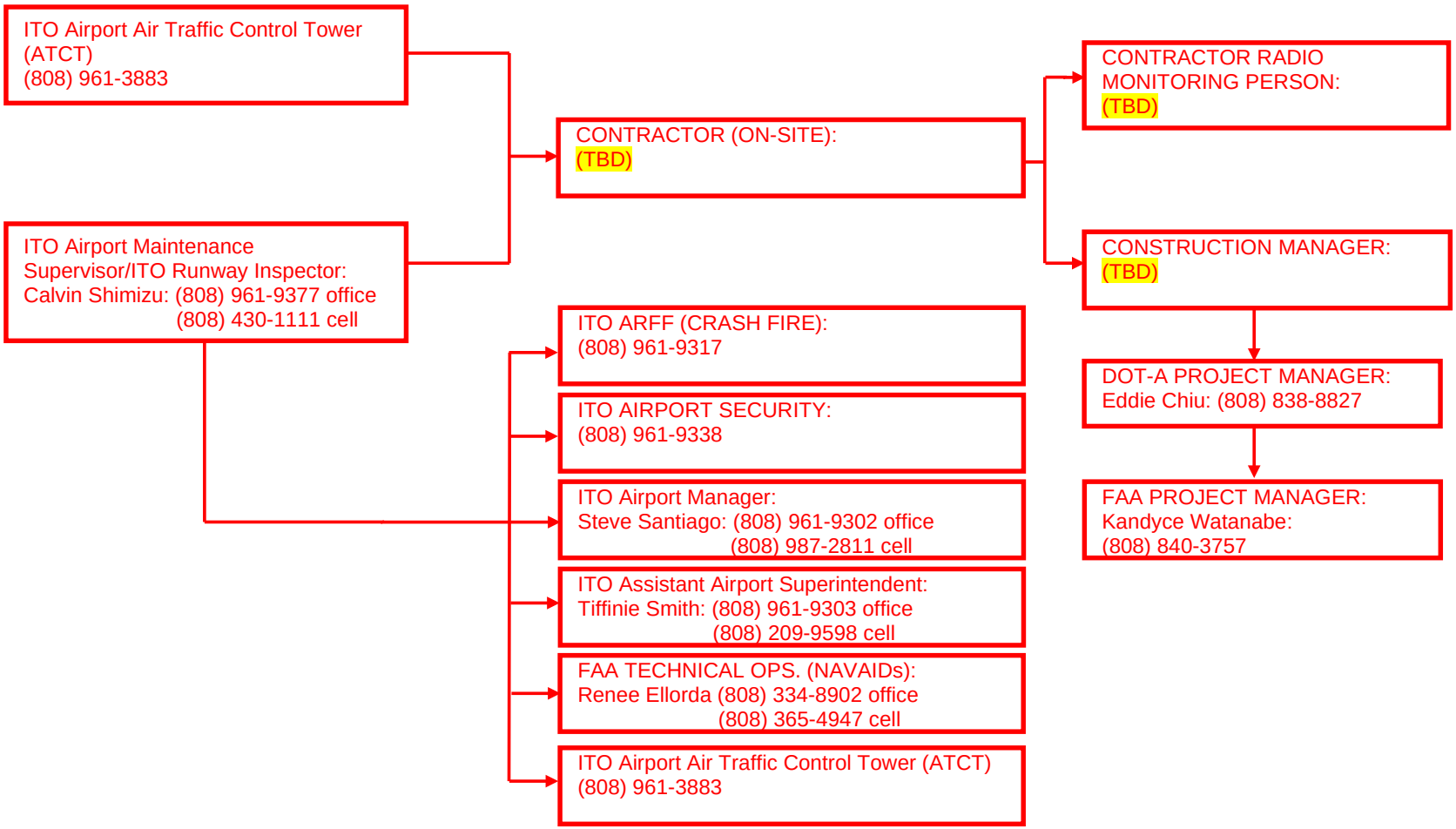
Emergency Protocol



Project Contact Flow Chart

Hilo International Airport

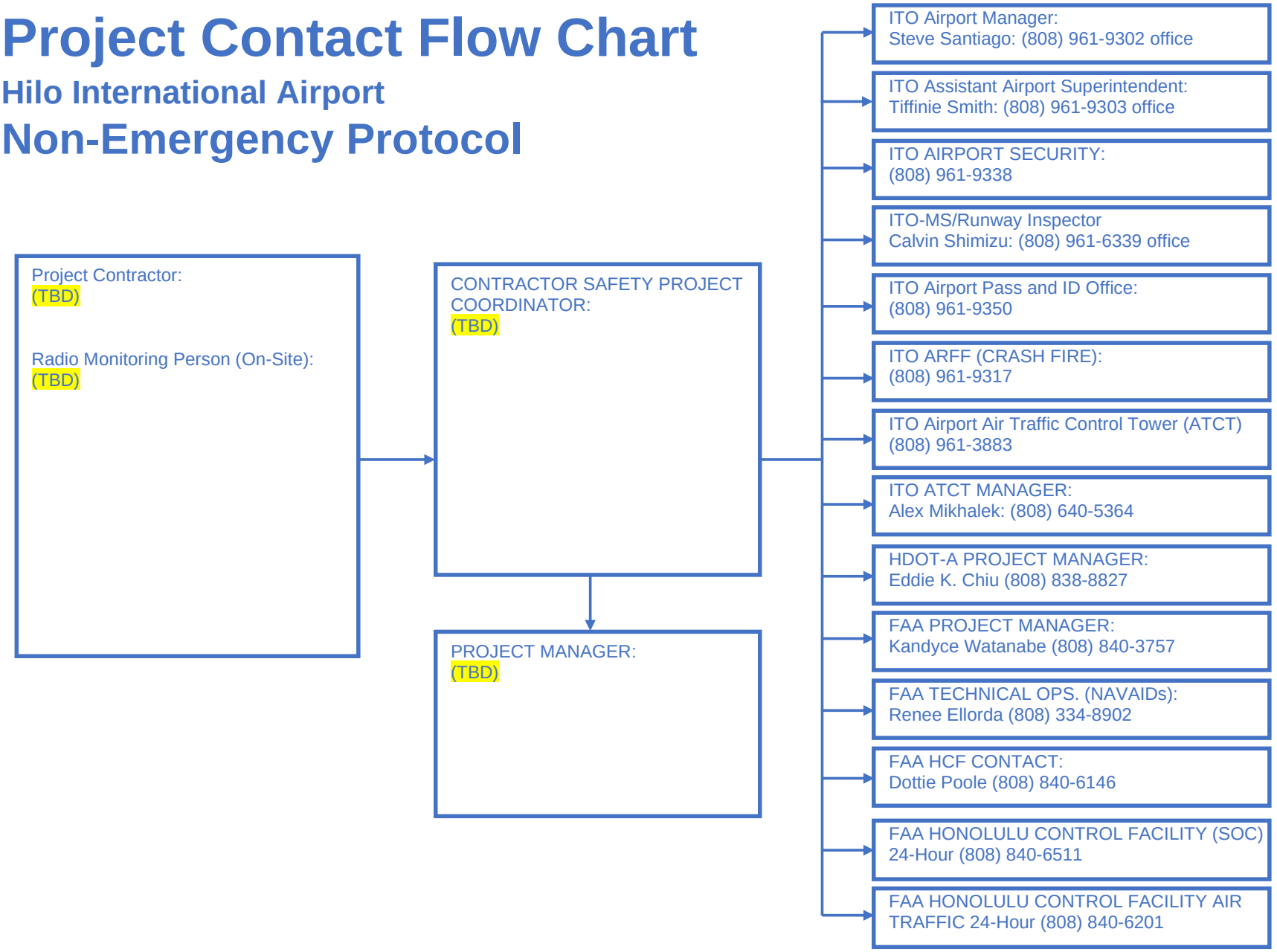
Aircraft Emergency Protocol



Project Contact Flow Chart

Hilo International Airport

Non-Emergency Protocol



SECTION 1 INTRODUCTION

Hilo International Airport has been issued a Part 139 write up indicating ponding issues at various locations around the airport. These ponds are a hazard on the airfield since they attract wildlife, which become a hazard to aircraft. Various locations around the General Aviation Ramp and Army National Guard Aviation Ramp have been identified as areas with ponding issues. The project will address this issue by applying appropriate drainage improvements. These improvements include the installation of dry wells, demolition of broken AC, regrading, installation of grass, and AC patch repairs. A new compass rose will also be installed due to the existing compass rose being located on AC set for demolition.

The Runway 8, 21, and 26 supplemental wind cones are located inside the Runway Object Free Area (ROFA), which has been a common Part 139 write up across the state. The ITO Drainage and Wind Cone Project will relocate the existing supplemental wind cone outside of the ROFA. The supplemental wind cones shall be lit which will require the extension of electrical conduit to the new wind cone location. During construction there shall always be an operational wind cone at each runway end.

The scope of the project encompasses various types of work and allowable work times. Individual phases have developed time schedules, barricade plans and established haul routes to promote the highest standard of safety with the least negative operational impact to ongoing and emergency airfield movements. These phases, work times, barricade plans, and other safety standards are compiled in this document.

Hilo International Airport is a complex operating facility that is governed by a very strict set of operating rules to ensure the safety of the traveling public, the operators of the various airlines, and those individuals who function as support personnel to the facility.

The following are general safety objectives that shall be achieved to maximize safety and to minimize time and economic loss to the aviation community, and others directly or indirectly affected by the project. The Contractor shall be responsible for controlling his/her operations with the requirements of this section as listed below:

- Maximize safety of aircraft operations
- Keep the airport operational for all users at all times
- Prevent any delays or conflicts to aircraft operations
- Prevent any delays or conflicts to other on-going construction operations
- Safely complete the site investigation

1.1 Safety Plan Compliance Document

The Contractor shall submit a Safety Plan Compliance Document (SPCD) to the airport operator prior to receiving a Notice to Proceed (NTP). It shall conform to requirements found in AC 150/5370-2G, Operational Safety on Airports During Construction (latest edition) and project specifications.

End of Section 1

SECTION 2 COORDINATION

2.1 Planning Meetings

The Contractor shall schedule a prework conference a minimum of 28 calendar days prior to the start of the construction. The preconstruction conference will discuss at a minimum: contract requirements, airport safety, contractor's proposed schedule of work, construction phasing and sequencing including associated dates and times of requested airfield closures, airport security, construction testing, and any other relevant project matters. Prior to the start of the project, the Contractor shall attend the weekly Project Coordination Meetings organized by ITO Airport Management. These meeting location and times are to be determined and include representatives from the following organizations:

- Construction Manager (CM)
- Department of Transportation, Airports Division (DOT-A)
- Hilo International Airport Management (ITO)
- ITO Airport Maintenance Supervisor (ITO-MS)
- ITO Aircraft Rescue and Fire Fighting (ARFF)
- Federal Aviation Administration (FAA) ITO Air Traffic Control Tower (ATCT)
- FAA Honolulu Control Facility (FAA HCF) (this includes ATCT, terminal airspace control, and enroute airspace control)
- Other airport stakeholders as appropriate

The topics of discussion shall include preferred access point(s); vehicle route(s); other on-going construction projects within the proposed project vicinity; additional notification/communication requirements prior to entering each area; work area barricade requirements, lighting, backup equipment and materials; emergency notification procedures and emergency contacts; and temporary stockpile locations; procedures that must be followed should the Contractor be unable to open a phase at the end of scheduled night time work hours; and other topics as appropriate.

2.2 Coordination and Progress Meetings

Attendance at weekly Project Coordination Meetings as described in Section 1.1 is mandatory during project construction. The Contractor must be prepared to discuss in detail their work, schedule, requested closures, and effect on operations for the upcoming three weeks. It may be necessary for the Contractor to modify their work and schedule to accommodate other projects or special operational needs at the airport. During runway or taxiway closures, Airport Management may require simultaneous work operations by multiple Contractors or Agencies to minimize the effect on airport operations.

Coordination of airfield activities is an important component of a safe operating environment. Progress meetings will be coordinated with the HDOT-A Project Manager to discuss the progress of the project as a whole. During the project the following coordination meetings will be held to discuss airfield activities:

- Pre-construction meeting
- Weekly Contractor progress meetings
- Pre-activity meeting and contingency planning meetings
- Daily coordination will take place between all involved parties
- The Contractor and subcontractor may be required to attend a daily airfield safety coordination meeting as determined by the Engineer.

The Contractor shall schedule a pre-construction safety meeting prior to the start of construction activities within 24-hours of the first work shift. The Contractor, ITO, and all sub-contractors active on the site must be represented at the meeting. This meeting is vital to identify any activity which may impact airport operations and to ensure the required Notice to Airmen (NOTAM) has been issued. The contractor, sub-contractors, and all other personnel involved on site during

construction activities, shall review this CSPP prior to the meeting. The contractor shall conduct the meeting and provide for keeping the meeting minutes. A copy of the meeting minutes will be provided to ITO. The purpose of the meeting is to review any safety issues that have been identified, arrange for any changes that require coordination with airport operations, discuss changes in procedures and personnel, and resolve other problems that may develop.

During construction activities, the Contractor's representative shall attend all weekly Project Coordination Meetings organized by ITO. During these meetings, the proposed construction work and closures shall be coordinated to minimize the construction impact to ITO operations. At each weekly meeting, the Contractor shall present an updated three-week work schedule with the proposed phasing/barricade plan. The three-week schedule shall include the construction activity for each day and the phasing/barricade plan (working hours, required runway closures, required taxiway closures, aircraft operating area (AOA) hauling route, proposed alternate aircraft route, etc.). All parties involved with the weekly meeting (CM, HDOTA, FAA, ITO, AOC, ARFF, ATCT, HCF, Airline Representative, etc.) will be able to provide input and/or voice any concerns to the construction activity and/or proposed closures. The three-week schedule and phasing/barricade plan will be approved at the weekly meetings, and reflected in the meeting minutes or may be approved by FAA-Honolulu Airports District Office (ADO) via email. If any changes to the three-week schedule and/or phasing/barricade plan are required, the Contractor will update and resubmit the plan for approval.

If a closure is required in the movement and/or non-movement areas, the Contractor will provide a proposed alternate route for aircraft taxiing operations. Proposed language for Notices to Airmen (NOTAMs) and low profile barricade plans shall identify the date, time, and proposed closure area for construction work. The proposed closure plan and alternate aircraft travel route(s) shall be submitted for approval and/or comments one week prior to the scheduled closure. HDOTA, ITO, FAA ADO, and FAA HCF must approve alternate routing for aircraft prior to scheduling any NOTAM(s) for this project. The Airport Duty Manager (ITO) will be responsible for the issuance of any NOTAM(s) for the project.

In addition to the Project Coordination Meetings, the contractor shall attend a weekly Owner/CM/Contractor (OAC) meeting. The meeting shall be located at Hilo International Airport. If available, HDOTA will provide teleconference information for individuals unable to attend the weekly meeting in person. A meeting agenda will be provided by the CM, HDOTA, or Contractor, and shall cover Operational Safety, Project Progress, Request(s) for Information (RFI), Submittals, Change Orders, and general discussion items.

Prior to starting any work shift (day or night work), a daily meeting will be held by the construction crew. The meeting shall be led by the Superintendent, Foreman, and/or On-Site Supervisor, and shall include discussion of the work to be performed during that shift, any potential safety issues, the approved barricade plan, closed AOA sections, AOA hauling routes, and construction goals. A weekly safety meeting will be held at the start of each week. As required by occupational safety and health administration (OSHA), the safety meetings shall be documented and recorded. As part of the weekly safety meeting, the construction crew will take time to share any experiences, safety issues experienced the previous week (lessons learned), related to the safety topic of the week.

2.3 Safety Meetings

A safety meeting prior to the start of construction activities is mandatory. The Contractor shall schedule the meeting so that personnel from HDOT-A, Airport Management, and FAA are able to attend. The Contractor shall schedule the pre-construction safety meeting prior to the start of construction activities within 7 days of the first work shift. The Contractor, ITO Airport Management, and all sub-contractors active on the site must be represented at the meeting. This meeting is vital to identify any activity which may impact airport operations and to ensure the required Notice to Airmen (NOTAM) has been issued. The Contractor, sub-contractors, and all other personnel involved on site during construction activities, shall review this CSPP prior to the meeting. The Contractor shall conduct the meeting and provide for keeping the meeting minutes. A copy of the meeting minutes will be provided to ITO. The purpose of the meeting is to review

any safety issues that have been identified, arrange for any changes that require coordination with airport operations, discuss changes in procedures and personnel, and resolve other problems that may develop.

The Contractor shall schedule additional construction safety meetings prior to the start of each new phase of work and periodically throughout the project. Although attendance is not mandatory, the Contractor is encouraged to invite HDOT-A, Airport Management, and FAA to these additional
meetings.

All contractor personnel working within or adjacent to the AOA shall receive a safety briefing approved by Hilo International Airport Operations prior to commencement of work. The safety briefing will cover (but is not limited to) the following:

- Aircraft jet blast
- Aircraft versus vehicles (aircraft right-of-way)
- Airfield layout including signs, marking, and lighting
- Airfield driving rules within movement (AOA) and non-movement areas
- Communicating with ATCT
- Maintaining airport security
- Closed or prohibited areas
- Foreign object debris (FOD)
- Wildlife management procedures

Any personnel without safety training will be required to be accompanied by Contractor personnel with the proper training and security escorting privileges.

2.4 Scope or Schedule Changes

Changes to the schedule noted in Exhibit 1 – Construction Schedule will be coordinated with HDOTA, ITO, FAA ADO, and FAA HCF at least one week in advance. It is possible that Contractor field activity may be canceled for the following reasons:

- Inclement weather; work shall be canceled for the night if heavy consistent rain or wind conditions are predicted to occur at the scheduled weather forecast at 1800 hours, prior to the night of field activity
- Irregular airport operations or emergencies

A Go/No-Go decision shall be made at a minimum of 2 hours before scheduled work closure. In the event of cancellation, work shall be rescheduled for the next scheduled taxiway closure date and time per Exhibit 1 – Construction Schedule. The Contractor will inform all involved parties of work cancellation; otherwise it is generally assumed the weather will be satisfactory. Delays due to inclement weather or irregular airport operations will extend the schedule accordingly.

2.5 Additional Coordination

Early coordination with FAA-ATO and ITO is required to schedule any airport/airfield closures (taxiway closures, runway closures, etc.) on this project. All closures shall be coordinated and approved during the weekly Project Coordination Meetings at least three (3) weeks prior to the scheduled closure. The proposed closures shall be provided on the three-week schedule and illustrated on the phasing and barricade plan. The CM, HDOTA, FAA Honolulu ADO, FAA HCF, FAA-SSC (for navigational aids (NAVAIDs)), ITO, AOC, ARFF, Airline Representative, etc. will be able to provide any comments or concerns regarding the proposed closure date and/or closure plan. The three-week schedule and phasing/barricade plan will be approved at the weekly meetings, and reflected in the meeting minutes or approved by FAA- Honolulu ADO via email. If any change to the three-week schedule and/or phasing/barricade plan is required, the Contractor will update and resubmit for approval prior to starting any work.

The Contractor shall conduct all operations in such a manner so as to maintain a smooth, safe, and uninterrupted flow of aircraft operations and vehicular traffic around the airport. In addition, the Contractor will coordinate with AOC to access the airfield; this also includes airfield driver training, airfield escorts, airfield ride-along(s), etc.

The Contractor shall coordinate Runway and Taxiway closure dates and times with ITO, Air Ambulance, ITO helicopter operations, flight school located at ITO, and other stakeholders identified by ITO.

FAA Form 7460-1, Notice of Proposed Construction or Alteration, shall be filed with the FAA for this project and is required for any construction or alteration associated with any project at or near the airport. Additional FAA Form 7460-1, Notice of Proposed Construction or Alteration, shall be filed for any crane activity associated with construction.

Prior to excavation in the vicinity of existing underground facilities, the Contractor shall notify the Engineer and the respective authorities representing the owners and agencies responsible for the associated facilities, not less than three (3) working days and not more than five (5) working days, prior to excavation so that a representative of the owner(s) or agencies can be present if they so desire. It is required to provide a list of utility companies and representatives whose facilities may be impacted by the project.

It is required to provide a list of utility companies and representatives whose facilities may be impacted by the project.

End of Section 2

SECTION 3 PHASING

3.1 General Description – Scope of Work

The project is composed of **Drainage Improvements** and **Wind Cone Relocation and Replacement** at Hilo International Airport, Hilo, Hawaii. Prior to the start of the project, the Contractor is encouraged to conduct field Investigations of the existing conditions of the runway and taxiway pavement, ponding areas, and wind cone. The project is to occur within the Air Operations Area (AOA) and Aircraft Movement Area (AMA) near Taxiway "C", Taxiway "J", General Aviation Ramp, and Army National Guard Aviation Ramp. A drawing showing the work areas is included in Exhibit 3 – Construction Phasing Plan. The purpose of the project is to address ponding issues on the airfield. The replacement and relocation of the Runway 8, 21, and 26 wind cones are necessary to locate the wind cones outside of the ROFA to comply with an existing Part 139 writeup.

The Contractor shall follow the phasing plan developed by the DOTA and approved by the FAA, ITO, ATCT, HCF, Airlines, and other stakeholders. The phasing plan gives the Contractor a limited amount of work time each day and night to complete the specified work. This compressed work schedule has been determined to minimize impacts to airport operations. The Contractor shall coordinate with ITO prior to the start of work to confirm and finalize scheduled work days and work hours. Work start times may be delayed up to 30 minutes if airline departures run late.

Drainage Improvements involve the installation of dry wells, demolition of broken AC, grading and grassing, and AC patch repairs.

The existing pavement near the Army National Guard Ramp, close to Runway 3-21, is in very poor condition and shall be demolished, regraded, and replaced with new grass. In this new grass area, dry wells shall be installed to address the sheet flow from the existing ramp. The existing pavement near the Army National Guard Ramp, near the Civil Air Patrol (CAP) building, is in better condition and shall remain. Dry wells shall be installed in the existing AC pavement at identified and verified low points.

The service road behind the Runway 3 end has a low spot which floods during heavy rain events. A dry well shall be installed at the low point to address the drainage problem.

The grass areas between Taxiway "C", Taxiway "J", and the General Aviation Ramp are not in compliance with the FAA Advisory Circulars (AC). The grass areas shall be regraded to meet AC standards and address any additional ponding issues. A dry well shall also be installed to address ponding issues.

Wind Cone Relocation and Replacement involves the relocation of the Runway 8, Runway 21, and Runway 26 wind cones. These wind cones have been identified to be located inside the ROFA and this project's intent is to move these wind cones outside the ROFA. Activities include the removal of the existing wind cone, demolition of the existing concrete bases, trenching and installation of new underground conduit, installation of new wind cone footings, and wind cone installation.

During construction there shall always be an operational wind cone available at each runway end. Prior to the start of work the Contractor shall coordinate with HDOTA and ITO Maintenance to turn off the circuit connected to the wind cones. At the end of the work day, the circuit shall be turned back on, as to not interfere with ITO operations.

3.2 Phase Elements

The Contractor shall perform each phase of the work within the periods of time and/or duration specified. The Contractor shall provide all labor, material, and equipment, including standby equipment necessary to guarantee construction and completion of work within the constraints and

timeframe(s) specified for the individual phases and the overall project, and within the requirements of the contract documentation. The terms “work area”, “zone”, and “phase” may be used hereafter to describe either the period of time and/or the area in which certain work is to be done.

The Contract Time for completion of the work of all combined phases shall be 204 calendar days and will consist of the phases listed in Table 3-1 – Airfield Lighting Improvements Phase Duration.

Table 3-1 – Airfield Lighting Improvements Phase Duration

Phase Name	Location	Work Hours	Phase Duration (Calendar Days)	Contract Calendar Days (Total)
1	Taxiway L (Closure) Army National Guard Aviation Ramp (Partial Closure)	Mon-Sun: 0600-1600 HST	90	90
2	Runway 3-21 (Closure) Taxiway L (Closure) Taxiway C South of Taxiway I (Closure) Army National Guard Aviation Ramp (WIP)	Mon-Sun: 0600-1600 HST	30	120
3	Taxiway C (WIP) Taxiway J (WIP) Northwest Ramp (Partial Closure)	Mon-Sun: 0600-1600 HST	14	134
4	Army National Guard Aviation Ramp (WIP)	Mon-Sun: 0600-0900 HST	14	148
5	Runway 3-21 (WIP) Runway 8-26 (WIP)	Mon-Sun: 0600-1600 HST	28	176
6	Runway 8-26 (Closure) Taxiway A East of Taxiway F (Closure) Taxiway B (Closure) Taxiway D (Closure) Taxiway E North of Taxiway A (Closure)	Mon-Sun: 0600-1600 HST	28	204

Certain phases of work are dependent on completion of other phases (construction and/or operational), while other phases are required to work within nighttime periods to minimize the impact to airport and aircraft operations. The relationship of phases is outlined in Table 3-2 – Relationship of Phases of Work.

Table 3-2 – Relationship of Phases of Work

Phase Name	Pre-Requisite Prior to Commencing Work	Concurrent Phase	Comments / Description of Work
1	Submittals	All	The commencement of Phase 1 shall only begin once appropriate submittals are approved. Phase 1 may occur concurrently during all phases of the project. Phase 1 shall not delay work times or closures of any other phase.
2	Submittals	All	The commencement of Phase 2 shall only begin once appropriate submittals are approved. Phase 2 may occur concurrently during all

			phases of the project. Phase 2 shall not delay work times or closures of any other phase.
3	Submittals	All	The commencement of Phase 3 shall only begin once appropriate submittals are approved. Phase 3 may occur concurrently during all phases of the project. Phase 3 shall not delay work times or closures of any other phase.
4	Submittals	All	The commencement of Phase 4 shall only begin once appropriate submittals are approved. Phase 4 may occur concurrently during all phases of the project. Phase 4 shall not delay work times or closures of any other phase.
5	Submittals	All	The commencement of Phase 5 shall only begin once appropriate submittals are approved. Phase 5 may occur concurrently during all phases of the project. Phase 5 shall not delay work times or closures of any other phase.
6	Submittals	All	The commencement of Phase 6 shall only begin once appropriate submittals are approved. Phase 6 may occur concurrently during all phases of the project. Phase 6 shall not delay work times or closures of any other phase.

3.3 Field Activity - Construction Safety Drawings (CSD's)

The limits of work for each construction phase are clearly shown in Exhibit 3 – Construction Phasing Plans, indicating offset distances from adjacent active taxilanes and/or taxiways. For each phase, these lines show the limit of the work area in which the Contractor may have workers, equipment, and materials, and areas where work may be conducted for that phase.

No construction activity is permissible within runway safety area(s) (RSA) or taxiway/taxilane safety area(s) (TSA) while the adjacent runway, taxiway, or taxilane is open to aircraft operations. Work within the RSA/TSA shall only be accomplished during closure of the runway, taxiway, or taxilane during hours that have been previously coordinated and approved by ITO and FAA during Project Coordination Meetings. Prior to any approved closure, the Contractor shall contact ITO to confirm NOTAM issuance. ITO will coordinate and notify HCF to deactivate NAVAIDs, runway approach lights, and/or runway(s) and taxiway(s) edge lights. The Contractor shall place illuminated X's at both ends of each runway that is scheduled to be closed along with low-profile barricades at the locations designated on the approved barricade plan. Jet blast considerations shall be discussed before final implementation of the phasing/barricade plans. Aircraft Rescue and Fire Fighting (ARFF) travel routes shall remain open at all times.

3.4 Work Shutdown Procedures

Work shutdown procedures for runway and taxiway closures shall be as follows:

- The Contractor shall ensure all new AC pavement, dry wells, and compass calibration pad are either barricaded off or complete and capable of handling aircraft loading.
- Remove any excess construction material from the site.
- Clean all debris and surface laitance from the project location.
- The Contractor shall perform foreign object debris (FOD) checks in all work areas and on all taxiways used as haul routes.
- The Contractor shall request a FOD inspection from ITO.
- Once the ITO FOD inspection is complete and cleared for opening, the Contractor shall remove the low profile barricades and lighted runway closure “X”s if applicable.

Prior to reopening a runway/taxiway/taxilane closed for construction for any period, all equipment and materials shall be moved outside of the ROFA/TOFA. No stockpiles shall remain within ROFA/TOFA, grading shall be covered in a manner to prevent dust and rock movement due to jet blast, or other objectionable movement of material onto the open runway or taxiway/taxilane, and the adjacent runway or taxiway pavement shall be swept and cleaned of all construction debris. The CM and ITO shall retain the right to shut down contractor operations in any work area if these conditions are not being met. Prior to re-opening of runways or taxiways the Contractor shall contact ITO at least 30 minutes prior to the scheduled re-opening to request a FOD inspection. Once ITO has completed the FOD inspection and cleared the runway or taxiway for opening, the Contractor shall remove all barricades and illuminated X’s. The Contractor shall then contact ITO to inform them that work is complete, and the runway and/or taxiway may be reopened.

End of Section 3

SECTION 4 AREAS AND OPERATIONS AFFECTED BY CONSTRUCTION ACTIVITIES

4.1 General Description

A general description of the impacted locations and airfield areas affected by each phase of work is shown in Table 4-1 – Airfield Operational Impacts below.

Table 4-1 – Airfield Operational Impacts

Phase Name	Location of Airfield Impacts	Airfield Restrictions/Closures	Additional Description
1	Army National Guard Aviation Ramp	• ITO Taxiway L Closed • ITO Army National Guard Aviation Ramp Partially Closed	See Phasing Plans
2	Runway 3-21	• ITO Rwy 3-21 Closed • ITO Taxiway L Closed • ITO Taxiway C Closed South of Taxiway I • ITO Army National Guard Aviation Ramp Work in Progress	See Phasing Plans
3	Taxiway C	• ITO Taxiway C Work In Progress • ITO Taxiway C Aircraft Wingspan Limited To 70’ Between Taxiway J and 200 Ft Northwest of Taxiway K • ITO Taxiway J Work in Progress • ITO Taxiway J Aircraft Wingspan limited to 70’ • ITO Northwest Ramp Partially Closed	See Phasing Plans
4	Army National Guard Aviation Ramp	• ITO Army National Guard Aviation Ramp Work In Progress	See Phasing Plans
5	Runway 8-26	• ITO Runway 3-21 Work In Progress • ITO Runway 8-26 Work In Progress • ITO Taxiway C Work In Progress	See Phasing Plans
6	Runway 8-26	• ITO Runway 8-26 Closed • ITO Taxiway A Closed East of Taxiway F • ITO Taxiway B Closed • ITO Taxiway D Closed • ITO Taxiway E Closed North of Taxiway A	See Phasing Plans

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4.2 Identification of Affected Areas

Identifying the work areas affected by construction will help to determine possible safety problems that may occur. Please refer to “Exhibit 1 – Construction Schedule” and Exhibit 3 – Construction Phasing Plans regarding the initial phasing/barricade plans.

4.3 Mitigations of Effects

The following hazards created by the construction activity have been identified in a Safety Risk Assessment (SRA) Panel conducted by HDOTA. The SRA Panel consisted of subject matter experts made up of representatives from HDOTA, ITO, FAA, ATCT, Airlines, and other stakeholders. The Contractor shall incorporate additional controls to mitigate the risks identified in Table 4-2.

Table 4-2 – Identified Hazards			
Identified Hazard	Cause(s)	Associated Phases	Additional Controls & Mitigations
Foreign Object Debris (FOD)	• Weather • Parts, Equipment, Tools, ect… • Debris	All Phases	• n/a
Loss of Situational Awareness (LOSA) for Vehicle Drivers & Pedestrians	• Losing sight of RSA demarcation • Unfamiliarity to airfield and movement area procedures • Insufficient driver training	All Phases	• n/a
LOSA for Pilots	• Miscommunication • Not reading NOTAMs • Not listening to ATIS • Sequenced to the wrong runway	All Phases	• n/a
LOSA for Controllers	• Miscommunication • Taxi aircraft onto a closed area • NOTAMs not up to date • Controller not properly briefed • Failure to use existing runway memory aids	All Phases	• n/a

The ”Additional Controls & Mitigations” identified in Table 4-2 to be implemented by the Contractor are in addition to the existing mitigations that are currently in place at ITO. Controls and mitigations are not limited to what is listed in this section. The Contractor shall review the Safety Risk Management Document produced as a result of the SRA Panel conducted by HDOTA, for all identified hazards, controls, and mitigations.

End of Section 4

SECTION 5 PROTECTION OF NAVAIDS

5.1 Summary

Visual Electronic NAVAIDs (ILS, LOC/DME, VORTAC, Glide Slope, etc.) and their critical areas shall be protected at all times during the construction work. Requests for NAVAID shutdown for all runway closures on this project will be coordinated with FAA, HCF, and/or ATC at the ITO weekly Project Coordination meeting. For Runway closures, any electronic NAVAIDs impacted by the work on said runway shall be taken offline when the runway is closed and reactivated when the runway is reopened. HCF will be responsible for coordinating the turning off and on of all electronic NAVAIDs for the runway closures. Shall any NAVAIDs be impacted and require shutdown, the process notated in Section 3.3 shall be followed and the request will be confirmed during the Project Coordination Meetings.

The Contractor shall ensure that all runway lighting, taxiway lighting, and NAVAIDs are undamaged by construction operations. Parking of equipment or vehicles near electronic NAVAIDs will not be permitted. To the extent possible, the Contractor and its subcontractors shall remain clear from the electronic NAVAID critical areas, thus minimizing interference with signals essential to air navigation.

End of Section 5

SECTION 6 AIRFIELD ACCESS

6.1 Site Security

The airport is operated in strict compliance with FAA and ITO Transportation Security Administration (Hilo TSA) regulations, which prohibit unauthorized persons or vehicles in the AOA. Equipment and personnel will be restricted to the work area as defined in Exhibit 3 – Construction Phasing Plans. Any violation by the Contractor or subcontractors will be subjected to penalties imposed by FAA and/or Hilo TSA.

The Contractor shall conform to the FAA air carriers' Standard Security Program (SSP) (Title 49 CFR Part 1542, Airport Security) employee background check requirement as administered and enforced by the airport director. Public law 106-528 requires that all new employees comply with the "criminal history record checks" by being fingerprinted.

The Contractor shall obtain ITO security badges for employees expected to work within the AOA. Workers shall abide by requirements dictated by the badging agreement. These include, but are not limited to, regulations for entering/exiting, operating vehicles on the AOA, escorting procedures, and visibility requirements.

Access to the airport AOA will be through Gate #17 located by the Army National Guard Aviation Ramp, Gate #22 near the West Ramp T-Hangars, and Gate #32 located off Kamehameha Ave. The gates will be unlocked for entry and exit of contractor personnel only. The gate will remain locked at all other times. The contractor will submit a request for a key of the vehicle gate lock to be used for the duration of construction. Contractor locks shall not be placed on gates. Airport locks shall be used. The Contractor shall provide security guards approved by ITO Management at gates used by the Contractor for vehicle ingress and egress through the airport perimeter security fences. The Contractor shall stop any unauthorized person entering the airport through these gates. Gates shall be close at all times when not in use. Airfield security shall be maintained at all times.

- The gate shall be opened to allow authorized vehicular passage and closed and locked at all other times.
- All vehicles must have an up to date ramp license sticker and an approved logo or company name displayed on both sides of the vehicle.
- Unless a gate guard is performing guard duty, the gate must be secured and locked.
- No one is allowed to enter the AOA unless the preceding conditions are met.
- Checking all incoming individuals and vehicles for airport authorized identification (AOA badges) and vehicle permits to prevent unauthorized entrance onto the AOA.
- Comparing the name on the identification badge for each individual entering through the gate with an Airport-provided "stop list." If a person's name is on the stop list, entry shall be denied and the Honolulu Security Office immediately notified.
- Conducting vehicle searches to ensure weapons, explosive devices, and other prohibited items are not allowed into the secured area of the airport. If weapons or other prohibited items are found, the guard shall prevent entry and immediately notify the Contractor and the Honolulu Security Office.
- Ensuring that the security gate is closed when not actively being used to prevent security breaches.

6.2 Contractor Staging Area

Contractor staging areas as depicted in Exhibit 3 – Construction Phasing Plan shall be used to store all idle equipment, supplies and construction materials. Storage shall not interfere with operations areas. When not in use during working hours, and at all other times, all material and equipment shall be stored at the storage site indicated on the drawings unless prior approval is provided by the CM and HDOTA.

6.2.1 Equipment Storage Area

Storage of equipment and materials shall be in the Contractor's staging area as shown in Exhibit 3 – Construction Phasing Plan. The Contractor shall be solely responsible for the security of the lay-down area and shall be liable for any damage caused to such premises. The Contractor shall restore the staging and storage areas and adjacent areas to their original condition prior to final acceptance of the work.

When required, Best Management Practices (BMP's) will be installed around the staging/stockpile areas as approved by HDOTA and the CM.

6.2.2 Location of Stockpiled or Construction Material

- The stockpile and staging area(s) shall not be permitted within the RSA, obstacle free zone (OFZ), and if possible, not permitted within the runway or taxiway object free areas (OFA). Stockpiling materials and/or parking equipment near electronic NAVAIDs or within five (5) feet of the AOA fence line shall not be permitted.
- The Contractor staging area shall be used to store all idle equipment, supplies, and construction materials. Storage shall not interfere with operational areas.
- The Contractor shall not store materials or equipment in areas in which the equipment or material will affect the operation of FAA electronics equipment.
- Any approved storage of equipment shall not present a line of sight problem with FAA ATCT, flagman operations, vehicle traffic, or aircraft.
- Stockpiling of material will only be allowed at the Contractor's staging area. The Contractor shall be responsible for any blown debris or dust from stockpiles. The stockpile height is restricted to 20 feet and shall remain below the Title 14 FAR Part 77 imaginary surface contours. However, barricades with red flashing lights shall be installed where potential conflicts with aircraft or ground vehicular traffic exists.

6.3 Haul Routes

1. Haul route for vehicles delivering materials to, or hauling material from, the work sites shall use the gates and haul routes as shown on the plans. Exhibit 3 – Construction Phasing Plans, clearly delineates how the Contractor will access the airfield including preferred haul and travel routes.
2. Roads designated as contractor haul routes may be used by other airport vehicles, contractors, and the general public (along public roads). The contractor shall not interfere with other vehicle traffic and shall yield to emergency vehicles and aircraft along any of the airport or public roads. The contractor shall provide all flagging, signing, lighting, etc. required by the city, airport, county, and state to provide all reasonable safety measures to protect all persons utilizing the AOA service road, the haul road, and all public roads used by the Contractor. The Contractor shall obey all vehicular weight and speed limits established as posted on airport property and public streets.
3. All vehicles and equipment shall be kept within the work areas established for that work shift unless traveling to or from the site. Under no circumstances shall vehicles be parked or equipment stored outside of the work areas.
4. Any equipment temporarily parked at a work site for use during the current work shift shall be properly marked, parked outside all safety areas, and within the barricaded work site. Equipment shall not exceed 15 feet in height and shall be left in the lowest possible profile position.
5. All airfield markings along haul routes and areas adjacent to the work area shall be maintained by the Contractor to the satisfaction of the CM for the duration of the project.
6. Trucks delivering asphalt pavement or concrete shall wash out chutes, beds, mixers, etc. only at locations previously approved by the CM and HDOTA.
7. Locations of access roads are approximate. Exact locations shall be coordinated with the CM to avoid surface utilities, navigational equipment, TOFAs, RSA, etc. Access roads

must be constructed and operational before any other work can begin. All vehicles and equipment must access the work area along designated access roads.

8. Contractor's vehicles shall not deviate from approved haul routes specified on the plans or as directed by the CM. Crossover between construction sites is prohibited. To move from one construction site to another, a vehicle must exit the AOA via the approved haul route and access point and re-enter through the approved area. If vehicles are required to travel over any portion of that area, they shall be accompanied by an approved radio-equipped escort vehicle.
9. Contractor shall monitor and control FOD on the haul route at all times using powered sweepers.
10. When driving from dirt areas to paved areas, the Contractor shall implement FOD check-points for vehicle operators to check and remove FOD on the tires to prevent tracking of FOD to aircraft operational areas.

6.4 Requirements and Regulations Relating to the Operation of Motor Vehicles

During the duration of the work, the Contractor shall recognize and abide by all rules, regulations, and controls, as modified by federal regulations.

In addition to the federal regulations, the CM and HDOTA is empowered to issue such other instructions as may be deemed necessary for the safety and well-being of airport users or otherwise in the best interest of the public.

Vehicles entering the AOA must comply with AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport, (latest edition). Contractor vehicles and equipment, except those under escort, shall be marked with the company name or logo on both sides in no less than 4-inch high letters of a contrasting color. Markings may be painted on the vehicle, or magnetic signs may be used. Construction vehicles under escort are the responsibility of the properly equipped lead vehicle and are required to have a flag or beacon.

All contractor vehicles and equipment operating in the AOA must display orange and white checkered flags or flashing yellow beacons during daytime use and flashing yellow beacons during nighttime use. The flag shall be on a staff attached to the vehicle and shall be at least a 3-foot square having a checkered pattern of International Orange and White squares at least one (1) foot on each side. Flags and beacons must be mounted on the vehicle where they are visible from any direction.

Each contractor, including each contractor/subcontractor employee, who operates a ground vehicle on any portion of the AOA at ITO must be familiar with and comply with:

- Hilo International Airport's AOA vehicle rules and regulations
- Hilo International Airport's procedures for the operation of ground vehicles
- The consequences of noncompliance with Honolulu Airport's rules and regulation and/or procedures for the operation of ground vehicles as shown on plans

6.4.1 Operation of Motor Vehicles within the AOA

Motor vehicle operations within the vicinity and on the airport premises shall be governed by the provisions of the Hawai'i state motor vehicle codes and traffic direction procedures and signs and signals for turns. Lights and safe-driving precaution shall be in conformity therewith. In addition, motor vehicles shall conform to all special regulations prescribed by the airport.

Traffic on perimeter roads, enplaning and deplaning areas (ramp areas), public thoroughfares, and parking areas of the airport is limited to those vehicles properly licensed to operate on public streets and highways or as approved by ITO management and ITO-MS.

Every person operating motorized equipment of any character on any area shall operate the same in a careful and prudent manner and at a speed posted or fixed by this section or the general provisions and at no time greater than is reasonable and proper under the conditions existing at the point of operating, taking into account weather, traffic and road conditions, view and obstructions, and shall be consistent with all conditions so as not to endanger the life, limb or property, or the rights of others entitled to the use thereof.

The Contractor shall be aware that operations of aircraft in an adjacent area will result in jet blast occurring in the work area. Contractor vehicles, equipment, and supplies must remain inside the work area established for the work shift unless in transit to or from the site. All vehicles and equipment must access the work area along designated access roads/haul routes.

All motor vehicles that enter the AOA shall possess exhaust system that are protected with screens, mufflers, or other devices adequate to prevent the escape of sparks or the propagation of flame.

All vehicles within the AOA shall be equipped with reflectors or lights on both front and rear ends and on the sides.

All vehicles and equipment used on the AOA must display an orange and white checkered flag or a flashing yellow beacon during daytime work, and a yellow flashing beacon during nighttime work.

No person shall operate any motor vehicle or motorized equipment in the AOA of the airport unless such motor vehicle or motorized equipment is in a safe and mechanically reliable condition for such operation.

Any person operating equipment within the AOA shall, in addition to this section, abide by all existing FAA and other governmental rules and regulations and shall at all times comply with any lawful signals or direction of airport employees. All traffic signs, lights, and signals shall be obeyed.

No person shall operate any motor vehicle or motorized equipment on the aircraft movement area or non-movement area(s) of the airport at a speed in excess of the posted (established) speed limit of 15 mph unless otherwise noted or when conditions require a reduction in speed. Designated motor vehicle drive lanes shall be utilized where provided unless specific direction is given by the CM, ITO Management, or AOC.

No person operating a motor vehicle or motorized equipment within the AOA shall in any way hinder, stop, slow, or otherwise interfere with the operation of any aircraft. Aircraft shall have the right-of-way at all times.

All aircraft and emergency vehicles have priority over Contractor vehicles. Contractor vehicles shall yield right-of-way to aircraft and emergency vehicles. Contractor shall ensure that under no circumstances will any Contractor or other vehicle associated with the project pass beneath any part of an aircraft or loading bridge, or block the access to any parking gate or delay any aircraft movement.

Vehicles shall remain within established drive lanes. It is prohibited to use active runways or taxiways or adjacent field areas unless specifically allowed by ATCT. Vehicles shall remain within established drive lanes. It is emphasized that the Contractor's authority to operate does not extend to active aircraft movement areas. The Contractor shall operate along established access roads/haul routes with prior approval of the CM, ITO Management, and AOC.

All construction personnel (Contractor and Subcontractors) requiring access to the AOA shall obtain an AOA badge. Should individuals require a temporary pass to enter the AOA, Contractor will request Escort Required Temporary Badges (ERTB) from HDOTA. The individual possessing

an ERTB must be escorted at all time while within the AOA by a badge holder who possesses an Escort privilege on his/her AOA badge. While in the closed construction area (barricaded area), the Escort must maintain full control of the ERTB personnel.

6.4.2 Parking

- No parking is permitted on the airport roadway as the primary purpose of the airport roadways is for motor vehicle traffic.
- No person shall park any motor vehicle, other equipment, or materials within the AOA, except in a neat and orderly manner and at such locations prescribed or as directed by the CM and HDOTA.
- No person shall park any motor vehicle or other equipment or place materials within the AOA or within 15 feet of any fire hydrant or standpipe.
- Parking of construction workers' private vehicles shall also be in a public parking or private parking facility outside the AOA.
- Under no circumstances shall vehicles or equipment be parked within five (5) feet of the airport perimeter security fence line.

6.4.3 Vehicle Identification including Lighting and Markings

Each vehicle or unit of equipment that travels or operates on any part of the AOA shall have an approved decal or painted company name applied to both sides of the vehicles in a location opposite the driver's seat. The identification should be applied to the front door panels. Magnetic or temporary signs are acceptable.

All vehicles and equipment, except those under escort, must be marked with the company name and/or logo on both sides. Per the (Most up to date version Contractor's Training Guide, the lettering for the company name shall be in bold characters of a minimum 4" in height, and 1-1/2" in width, and the height of the logo shall be a minimum of 6"). Escort vehicles must be marked with the company logo as stated above, and must be properly equipped with a two-way radio. Escort vehicles may be used to escort a maximum of two (2) vehicles onto the AOA. The vehicle(s) providing the escort must lead the convoy and is responsible for all trailing vehicle(s). This vehicle may escort unmarked vehicles onto the AOA. Vehicles being escorted shall be in radio or cell phone contact with the lead escort vehicle. Under no circumstances may an employee provide an escort from inside an unmarked vehicle. Drivers of escorted vehicles must display a delivery escort badge or a construction escort badge.

Use of logos or symbols in lieu of letters is subject to approval by the ITO Airport Manager.

Vehicles that appear at access gates without signs on both sides of the vehicle will be denied access. Vehicles found to be missing signs within the AOA will be escorted off the jobsite and not be permitted to re-enter until signs have been installed.

Any person operating equipment in the AOA shall, in addition to this section, abide by all existing FAA and other governmental rules and regulations.

It is emphasized that the Contractor's authority to operate does not extend to active aircraft movement area. The Contractor shall operate along established access roads/haul routes with prior approval of the HDOTA and ITO Management.

6.4.4 Load Limits

When using airport roadways, the Contractor shall restrict the gross weight as required by local codes. For heavier vehicle loads, permits shall be obtained through the agency having jurisdiction. All vehicle weights are subject to verification by the CM.

6.4.5 Delivery and Parking of Construction Equipment and Vehicles

No equipment or construction vehicles shall be parked or left unattended outside the airfield access gates or on public roadways. When equipment or vehicles are to be delivered to the work site, the Contractor must be present to accept the equipment or vehicles and shall escort them inside the airfield fence and have them parked in the contractors staging area or other approved location on the airfield. Any construction equipment or vehicles left unattended outside the airfield gates or on public roadways shall be impounded by the City.

6.4.6 Requirements and Regulations Relating to Vehicle Drivers

All drivers operating vehicles on airport property must carry a valid United States driver's license on his/her person, appropriately endorsed for the type of equipment being operated.

Drivers designated to operate vehicles within the AOA shall receive special drivers training as required in Section 6.4.7 and be approved by the airport before being allowed to operate within the AOA or must be escorted by an approved escort.

Drivers operating outside the AOA may operate vehicles without attending the special drivers training.

Permission to apply for vehicle permits shall be made in writing to the ITO Airport District Manager through the CM and/or HDOTA, and must list all vehicles requesting a permit. Construction equipment (cold planer, AC paver, AC rollers, backhoes, etc.) that remain at the jobsite do not require a vehicle permit (vehicle permit required for licensed vehicles only), and may be stored in the staging area or closed construction areas as approved by HDOTA, ITO, and FAA. An orange and white checkered flag shall be displayed on all equipment while within the AOA during non-working hours.

Use of tall equipment (cranes, concrete pumps, etc.) will not be allowed unless the FAA Form 7460-1 determination letter is issued and approved for such equipment.

6.4.7 Vehicle Driver Training

Every driver who operates a vehicle on the AOA of the airport must be familiar with the pertinent provisions of the state of Hawai‘i vehicle code and the traffic and licensing subsections of these rules and regulations. The driver must have been trained in the vehicle to be operated.

All Contractor employees and subcontractors who will be driving a company identified vehicle within the AOA will be required to obtain an Airport Motor Vehicle Operator’s Permit (Ramp License). A ramp license, in conjunction with a valid, state issued driver license, current AOA badge, and permission from AOC will qualify drivers to operate vehicles within the non-movement areas of the airport only. To qualify for the ramp license, each operator must attend the ramp license class provided by ITO, and pass the written examination.

One approved vehicle with an operator who possesses an Escort privilege on his/her AOA badge can escort up to two (2) vehicles onto the AOA.

The applicant must pass a written 25 question multiple-choice test administered by the airport Pass and ID office covering AOA safety rules and regulations. A score of 80% (20 correct responses out of 25) is required to pass. If the applicant fails the test, it can be re-administered the following day. Ramp licenses are valid for a period of 8 years or until the expiration of the applicant’s state issued driver license, whichever is shorter.

For employees working or driving inside the movement areas, a “Movement Area” stamp shall be placed on the AOA badge. In order to qualify for the movement area license, each operator must

attend the movement area training class provided by ITO and pass the written examination which includes proper procedures for radio communications with Ground Control and the ATCT.

The applicant must attend a movement area training class and pass a written test administered by the Ramp Control Supervisor. The test covers AOA safety rules and regulations, proper procedures and phraseology for communicating with Ground Control and ATCT, knowledge of airport layout including all taxiway designations, and familiarity with airport signing and pavement markings. The training class and test are offered three (3) times per month. A score of 90% is required to pass. If the applicant fails the test, it can be re-administered at the next scheduled offering. Movement area qualification is good for a period of 1 year or until the expiration of the applicant's driver license or ramp license.

The preferred procedure for Contractors unfamiliar with the airport who require movement area access is to be escorted by AOC until such time as they have proven competency in navigation and communication on the airfield as determined by the Ramp Control Supervisor. The Contractor shall coordinate the need for escort with ITO and AOC at least one week prior.

6.4.8 Two-Way Radio Communications

Radio communications with the ATCT will be in accordance with the procedures specified by the most current memorandum of understanding between FAA control tower (or contract tower) and ITO.

The contractor will provide at least two (2) Radio Monitoring Personnel (RMP) to coordinate access in the movement area. The RMP will acquire the necessary training as directed by ITO management. The RMP shall acquire the movement area certification at ITO, and be familiar with proper radio communication procedures and phraseology. The RMP's only duty shall be to monitor the radio. Contractor employees with valid airport movement area certification and properly equipped and marked vehicles may escort up to two other vehicles onto the AOA. The vehicle providing the escort must lead and is responsible for the trailing vehicles. Communication with escorted vehicles is also required with use of a hand held radio or mobile phone.

The qualified RMP(s) will be expected to communicate with one or more of the following:

- ITO ATCT – Hours of Operation: 0600-2200 hrs, HST
- Honolulu Control Facility Air Traffic (FAA-HCF), when ITO ATCT is closed: 2200-0600 hrs, HST

The RMP shall monitor the following frequencies at all times while within the movement area:

118.1 "Hilo Tower" (During ITO ATCT Hours of Operations)
121.9 "Hilo Ground" (During ITO ATCT Hours of Operations)
119.7 "Sector 3 FAA-HCF Approach Control Frequency" (During ITO ATCT Non-Working Hours)
118.1 "Common Traffic Advisory Frequency" (During ITO ATCT Non-Working Hours)

The RMP(s) will communicate with "ITO Ground" (frequency 121.9) prior to the start of work for permission to enter the AOA. Prior to crossing the movement area line (one dashed and one solid line) and entering the movement area, the RMP(s) shall contact "ITO Ground" (frequency 121.9) for permission to enter the movement area. RMP(s) shall contact "ITO Tower" (frequency 118.1) to obtain permission to enter the RSA (two dashes and two solid lines). The "ITO Ground" and/or "ITO Tower" frequencies shall be monitored at all times while within the airport movement areas. RMP(s) shall use cellular phones as temporary backup to the radios in the unlikely event of radio communications failure.

121.9 “Hilo Ramp” – used to communicate with AOC and monitored when entering or within the movement areas
118.1 “Hilo Tower” – monitored when traveling, crossing and/or working within the RSA

For the area(s) and/or runway section(s) closed for construction activities, FAA-HCF gives HDOTA jurisdiction for control of vehicles, equipment, and personnel in the closed area as long as the Contractor complies with the movement of vehicles, equipment and personnel within the designated areas for movement on and off the runway and taxiways. In addition to the RMP(s), the Contractor may use escorts, flagmen, signal lights, or other means as approved by ITO, HDOTA, and FAA. The RMP shall not instruct aircraft at any time.

6.4.9 Airport Security

The contractor shall be responsible to provide and maintain ITO security-badged personnel in all areas of the work, obtain necessary training required to drive vehicles within the AOA and Aircraft Movement Area (AMA) as directed by ITO management, and obtain necessary vehicle ramp permits for all vehicles entering the AOA.

Access to the airport AOA will be through Gate #17 located by the Army National Guard Aviation Ramp, Gate #22 near the West Ramp T-Hangars, and Gate #32 located off Kamehameha Ave. The gates will be unlocked for entry and exit of contractor personnel only. The gate will remain locked at all other times. The Contractor will submit a request for the combination code of the vehicle gates to be used for the construction duration. Contractor locks shall not be placed on gates. Airport locks shall be used.

End of Section 6

SECTION 7 WILDLIFE MANAGEMENT

7.1 Summary

This project will use the following protocols to mitigate any wildlife hazards created:

Hilo Airport shall coordinate all wildlife hazards and issues identified by the Contractor. All project personnel working on the AOA will receive an airfield safety briefing that will include information on the dangers of wildlife and aircraft operations. Inspection of the construction area will be conducted on a daily basis by Hilo International Airport Operations personnel.

Personnel shall take immediate action to eliminate wildlife hazards whenever they are detected. Hazards include, but are not limited to:

- Trash (food scraps and miscellaneous waste), standing water, or tall grass and seeds which may attract unwanted wildlife to the airport. All personnel shall take immediate action to eliminate wildlife hazards and shall be promptly removed to prevent attracting birds and animals.
- Poorly maintained or damaged security and wildlife fencing and gates, which may allow animals to enter the AOA.
- Any unusual wildlife activity will be noted on the airfield inspection checklist.
- Notifications will be made to the USDA Staff Wildlife biologist and Airport Operation wildlife superintendent and the ATC tower.
- The Contractor in consultation with Hilo International Airport Operations and the USDA wildlife biologist will develop and implement corrective measures to eliminate any wildlife threat.

7.2 Trash

All trash will be collected and contained in covered bins during construction activity, and disposed of properly off-site. All contractor vehicles shall have trash receptacles or use by personnel while on the project site. Trash receptacles stored in open portions of vehicles must have tight fitting or latching covers to prevent trash from blowing out of the receptacle due to wind, jet blast, or normal vehicle operation. Receptacles may be plastic trash bags if stored in the vehicle cab or other closed space.

7.3 Standing Water

Contractor shall manage storm water drainage within the project site to eliminate areas of standing or ponding water. Following rainfall events, any area with standing water within or immediately adjacent to the project site shall be immediately modified to drain the standing water. The Contractor shall make drainage improvements approved by the CM and HDOTA to prevent the future accumulation of storm water in these areas.

7.4 Tall Grass and Seeds

The Contractor shall be responsible for the proper maintenance of grass and other vegetated areas within the project site. Grass shall be trimmed and kept at less than 3-inches in height.

New grass shall be sod or grass plugs; the use of grass seed requires prior approval from ITO and

7.5 Poorly Maintained Fencing and Gates

The Contractor shall be responsible for the maintenance of security at all locations affected by the Contractor's activities at all times. Unless approved by the CM, HDOTA, and ITO, the integrity of the existing airport security fence shall be maintained at all times. During working hours the

Contractor will provide security personnel at all gates used for Contractor access. Gates will remain locked at all other times.

Projects which require alteration of the existing airport security fence shall require the Contractor to submit detailed phasing plans for fence construction showing how security will be maintained. Contractor fence phasing plans must be approved by the CM, HDOTA, and ITO prior to construction. All changes to the airport security fence shall be completed in a manner which maintains the existing level or airport security, as approved by the CM and ITO, by the end of each work day. Whenever possible, new security fence shall be constructed and approved by the CM and ITO prior to the removal of the existing fence.

7.6 Construction Lighting

The Contractor shall keep construction lighting to a minimum. Construction lighting shall be shielded to shine downward towards the pavement and not upward, to avoid disorientation of seabirds flying over the project area. The Contractor shall position light towers low to the ground and turn off construction lighting when not in use.

7.7 Disruption of Existing Wildlife Habitat

Projects on runways, taxiways, aprons and other paved areas of the airport are not expected to disrupt wildlife habitat. Work in non-paved areas of the airport may encounter wildlife habitat. The Contractor shall report all wildlife sightings to “Hilo Ground” on radio frequency 121.9 or ITO Maintenance at (808) 961-6336.

End of Section 7

SECTION 8 FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

8.1 Summary

Upon completion of each day's work, the contractor shall clean and remove from the project area all FOD materials generated by the Contractor's activities. The Contractor shall perform FOD checks on all paved areas used for Contractor access and haul routes within the AOA. Prior to reopening any closed portions of the airfield to aircraft, the Contractor shall request a FOD inspection from ITO-MS, Airport Operations, and Maintenance. Once the FOD inspection has been completed and the pavement areas cleared for opening, ITO will contact HCF to coordinate reopening the closed portions of the airfield.

All aircraft movement areas will be under constant surveillance by all parties to ensure they are acceptable for aircraft operations.

The Contractor shall maintain FOD control of all haul routes to and from the construction site. Sweepers shall be in continuous operation along paved haul routes within airport property while construction is ongoing. All utilities within and passing through the work/area phase shall be kept operational at all times, unless otherwise specified.

No loose material or waste (FOD), capable of causing damage to aircraft or capable of being ingested into jet engines, may be left in the working area on or next to runways, taxiways, ramps, or aprons. The Contractor shall direct special attention to all areas that are operational to aircraft during construction. These shall be kept clean and clear of all materials or debris at all time.

Common sources of FOD during construction include trucking or hauling operations of construction materials to and from the construction site, demolition and removal of items (i.e. cold-milling or PCC demolition), and during placement and construction of improvements (i.e. placement of aggregate subbase).

All loose material or waste (FOD) located on aircraft movement areas shall be reported to the inspectors immediately; the inspectors shall coordinate with ITO-MS to close the area to aircraft traffic if required until cleanup is accomplished.

Trucks and equipment shall have all accumulated dirt, mud, rocks, and debris removed before accessing the AOA, and when leaving the work area. Loads shall be struck flush and secured to prohibit loss of material. If spillage occurs, such roadways shall be swept clean immediately after such spillage to allow for safe operation of vehicles as determined by the CM. If the Contractor is negligent in cleanup and airport resources are required to perform the work, the expense of said cleanup shall be paid by the Contractor.

The Contractor shall continuously sweep and wash down all access routes to the construction areas and existing adjacent paved areas and AOA pavements. These areas shall be kept free of debris at all limes, at no additional cost to the owner.

The Contractor shall keep operational vacuum sweeper trucks and water trucks on site and operational at all times during working and nonworking hours and shall maintain the sites free from dust and objectionable debris. During the period of time that there is no construction activity (between work shifts), the vacuum sweeper trucks, and water trucks must be ready and on-site with Contractor's personnel available by phone to respond immediately to a dust or debris problem as identified by ITO-MS staff or the CM. At no time shall there be more than a 10-minute response time to calls concerning dust/debris problems during work hours and a 60-minute response time at all other times on a 24-hour-per-day basis. The Contractor shall provide whatever means necessary to prevent FOD in aircraft movement areas and provide construction area generated dust control on a 24-hour basis.

The Contractor shall provide truck washes, rumble strips, shakers, or other means as necessary to prevent FOD in AOA and will be monitored by the CM. If the Contractor's method does not remove debris adequately to meet safety requirements, the Contractor may be shut down and will be required to utilize other methods at no additional cost to the airport or HDOTA.

End of Section 8

SECTION 9 HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT

9.1 Summary

In the event of a spill the Contractor shall immediately contact ARFF at (808) 961-9317

The Contractor shall have an emergency spill cleanup kit on the project site at all times. The spill kit will include absorbent pads and one 5-gallon bucket with cover. In the unlikely event of fuel or hydraulic oil spills; the Contractor shall contain the spill and place the absorbent pads on the spill immediately, used pads shall be placed in the bucket and disposed of properly off-site at a later time.

All construction activity involved with the handling of hazardous materials must provide the CM with a hazardous materials removal plan. The plan will include the name of the company used for removal of hazardous materials and the names and 24-hour telephone numbers of staff authorized to handle such removals.

No fuel, oil, grease, flammable liquids, or contaminants of any kind, including detergents, shall be allowed to flow into or be placed in any sewer system or open water areas without a separator or unless connected to an industrial waste system.

Transport and handling of hazardous materials requires special procedures as outlined in the project specifications.

End of Section 9

SECTION 10 NOTIFICATION OF CONSTRUCTION ACTIVITIES

ITO Airport Operations will make notifications to airport users through email based distribution methodologies.

During weekly Project Coordination meetings, construction activities for the next three (3) weeks shall be discussed. Specific items should include, but are not limited to, phase beginning or ending, construction activities requiring closure of taxiways, modification to the vehicle service roads, and construction activities requiring FAA Form 7460-1 submittal.

10.1 Notices to Airman (NOTAM) Issuance

The Contractor will provide a written request to ITO management, not less than 72 hours in advance prior to the start of the work, so that local NOTAMs can be issued for the scheduled closures of runway or taxiways, work in progress, and affected NAVAIDs. The NOTAM must be filed a minimum of 48 hours prior to closing of the runway and taxiways.

- ITO-MS and ATO will coordinate the scheduling of the NOTAMs.
- Should the NOTAMs be cancelled, the Contractor shall notify ITO-MS and ATO.

Prior to the start of field activity each day or night, the Contractor will coordinate via ITO-MS to shutdown required runways and taxiways during the scheduled work hours. At the end of field activity each day or night, the Contractor shall notify ITO-MS. ITO-MS will then coordinate with HCF to re-open any closed runways and taxiways for aircraft traffic.

10.2 Aircraft Rescue and Firefighting (ARFF) Coordination

ARFF personnel, although involved in the planning and design phases, will receive a briefing prior to the start of construction along with periodic briefings on the status of the project. The Contractor shall provide uninterrupted ARFF access to all areas of the airport. Additionally, ARFF personnel will be invited to weekly construction meetings when work is expected to directly affect ARFF operations. The Contractor shall advise ARFF personnel of the following occurrences:

- AOA fence relocations
- Waterline and fire hydrant deactivation and activation
- Re-routing, blocking and restoration of emergency access routes
- The use of hazardous materials on the airfield
- Location of construction activities

10.3 Department of Transportation Airports (HDOTA) Coordination

Contractor is to work with HDOTA and ITO to maintain a list of the responsible representatives/points of contact for all parties and procedures for contacting them 24 hours a day, seven days a week. This list includes local FAA HCF, FAA Technical Operations personnel, and the Contractor including all subcontractors.

In the event of an aircraft emergency that may affect construction activities determined by ITO; the Contractor's personnel and/or equipment may be required to immediately vacate the area. ITO will notify the CM, who will then coordinate with the Contractor. In cases of imminent danger; ITO will coordinate directly with the Contractor.

10.4 FAA Coordination

10.4.1 Marking of Equipment and Restrictions on Cranes

If cranes or other similar equipment are to be used, the Contractor will be required to submit for approval the FAA's application Form 7460-1. The submittal will be made to HDOTA for review and acceptance. HDOTA will forward submittals to FAA for approval.

HDOTA has no control over the FAA's review and approval time. Contractor is encouraged to submit any required applications well in advance (at least three (3) months) of the need for the use of the equipment or crane.

Contractor to Submit:

- Latitude
- Longitude
- Existing ground elevation including vertical datum
- Height of crane, structure, stockpile, etc.
- Exhibit indicating operating area of the equipment or crane

FAA Form 7460-1 will be filed for this project along with all crane activity associated with construction.

End of Section 10

SECTION 11 SPECIAL INSPECTION REQUIREMENTS

11.1 Summary

HDOTA, ITO, and Contractor personnel will conduct continual inspections of the construction site to ensure that areas surrounding the sites are safe for aircraft operations.

ITO personnel will note any discrepancies on the daily inspection checklist.

Any aircraft movement surface or adjoining runway, taxiway, or taxilane safety area that does not pass inspection must remain closed until such time cleanup is performed and approved.

ITO-MS shall conduct final inspections prior to opening the area for aircraft operations. ITO will notify HCF when areas may be opened for aircraft operations.

Frequent inspections will be made by ITO-MS and the HDOTA Engineer or his authorized representative during the critical phases of the work to insure that the Contractor is following the recommended safety procedures. The inspector shall report any violations or potential safety hazards to the CM who will in turn advise the Contractor of the concern for immediate correction by the Contractor.

11.2 Daily (or More Frequent) Inspections

At the end of each work shift or work phase, the area will be cleaned to remove all FOD created by the construction activity from all runways, taxiways, and apron areas. Prior to opening of a closed area, the Contractor shall perform a FOD check of the work area and the haul route used for the shift or phase, and will not remove any low profile barricades and/or lighted X's until the area has been cleared by ITO-MS. The Contractor will inspect and clean the haul route outside of the barricaded area, and ensure there is no FOD on the active airport areas.

11.3 Final Inspections

The Contractor will request a FOD inspection from the CM and ITO-MS when the FOD check and cleaning is completed. Once the FOD inspection has been completed and cleared for opening, ITO will contact the HCF and cancel the issued NOTAMs. The Contractor's request for inspection shall be at least 30 minutes prior to reopening the area to allow adequate time for inspection and final approval.

End of Section 11

SECTION 12 UNDERGROUND UTILITIES

12.1 Summary

The Contractor will tone for existing buried utilities prior to starting excavation operations, if necessary. ITO-MS and FAA-ATO will be notified to assist the Contractor and Subcontractors in locating the airport and FAA utilities that may be in the construction areas. If underground utilities are identified and located, the Contractor will protect and mark these utilities. Significant utilities of concern include the following, but are not limited to:

- Airfield lighting, signage and associated cabling
- Stormwater drainage pipes and inlets

The Contractor shall provide utility locations on the as-built drawings that will be submitted at the end of the project.

12.2 Electrical Conduit

The relocation and installation of new wind cones will require the extending and connecting of new electrical conduit to the new wind cone locations. The Contractor or the Contractor's electrical subcontractor shall be on call throughout the course of construction in case any underground electrical conduits are damaged during construction.

Active direct burial electrical lines have been discovered around the airport. The Contractor shall take proper precautions to protect these lines.

12.3 Procedures for Locating and Protecting Existing Underground Utilities/Facilities in Excavation Area

In accordance with State law, the Contractor shall contact the Hawaii One Call Center (866-423-7287) to locate any public utilities and the FAA HCF or FAA Technical Operations to locate any airport utilities prior to excavation. All existing utilities within the construction areas or the staging area that are designated to remain in place shall be maintained, accessible, and protected at all times (i.e., waterlines, fire hydrants, valves, drainage structures, electrical and FAA cables/equipment, etc.). Refer to the specifications, phasing plans, and demolition plans for additional requirements that are associated with this project.

The existence, location, and characteristics of underground utility information shown on these plans were obtained from available record data. No representation is made as to the accuracy or completeness of utility lines shown or any unknown utilities. Contractor shall make reasonable inferences as to existing underground utilities from observation of visible conditions and take appropriate measures to protect all utilities, including underground communication installation, which are owned and operated by ITO, FAA, HECO, AT&T, or other third parties.

Contractor shall perform site investigation to verify location and depth of all utilities. Investigate by means of vacuum or air pressure pot-holing or other means as approved by ITO and HDOTA. Contractor shall accurately record and stake the location of all utilities.

The Contractor shall be responsible for and repair, at Contractor's own expense, any damages resulting from his/her failure to locate utilities as specified.

Exercise extreme care when using any equipment to prevent contact with any nearby power lines and power sources. Safe working clearances shall conform to the national electrical code.

All structures shall be designed to support aircraft loads specified unless otherwise noted. The Contractor may make certain temporary connections to the existing airfield lighting system only if

it is associated with keeping the required lighting systems operational and approved by the CM. The Contractor shall provide a separate power source for other construction related power needs.

When power and control cables for airfield lighting and navigational aids are located in the construction areas, the Contractor's personnel shall be familiar with these cable locations and keep vehicles and equipment clear of any cables at all times. Mark/delineate the surface for each utility in a manner acceptable to the CM. As indicated on the plans and the specifications, the Contractor shall locate all utilities (operational and abandoned) prior to starting any excavation, demolition, or earthwork. The CM shall contact FAA technical support unit to facilitate locating FAA facilities and cables.

The Contractor's attention is directed to the existence of certain underground facilities that may require special precautions by the Contractor to protect the health, safety, and welfare of workers and of the public. Facilities requiring special precautions include: compressed air lines; conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than six (6) inches in diameter, or pipelines operating at pressures greater than 60 psi (gauge); underground electric supply system conductors or cables, with the potential to ground more than 300 V, either directly buried or in duct or conduit that do not have concentric grounding; or other effectively grounded metal shields or sheaths.

All utilities encountered along the line of the work shall be maintained in service during all operations under the contract, unless other arrangements satisfactory to the utility owner, the affected agency, and the CM are made in advance. Utilities shall include, all above or below ground conduit, pipes, wet wells, ducts, cables, and appurtenances associated with oil, gas, water, steam, irrigation, storm drain, wastewater, air, electrical, power, instrumentation, communication, telephone, TV, and lighting systems, whether or not owned by ITO. All valves, switches, vaults, and meters shall be maintained readily accessible for emergency shutoff.

Any utility that is damaged by the Contractor shall be immediately reported to the CM and ITO and immediately repaired to a condition equal to, or better than, the condition they were in prior to such damage. Repair work shall be continuous until the utility or improvement is placed back in service.

12.4 Underground Service Alert

The Contractor shall mark all FAA utility lines prior to any work in a given area. Marking shall consist of a 36-inch-high lathe, placed ten (10) feet on center. Lathe shall be marked with the words DANGER – FAA or equivalent, and shall be affixed with red or orange surveyor tape to enhance visibility. Additionally, the Contractor shall expose and verify (by field survey) the depth and alignment of all underground utilities in the construction site. The Contractor shall pot-hole and field survey all utilities within a five (5)-foot distance of any footing work, utilities, etc. prior to excavation.

End of Section 12

SECTION 13 PENALTIES

13.1 Summary

Safety and security precautions are necessary at the Airport. Failure of the contractor to adhere to prescribed requirements may have consequences that jeopardize the health, safety or lives of customers and employees at the Airport. Security violations of HDOT, FAA or TSA rules or regulations; or safety violations of this CSPP or FAA requirements, may result in fines up to $10,000 per occurrence or individual, revocation of the AOA badge, or loss of AOA driving privileges, depending on the severity of the offense.

The Airport employs a contractual law enforcement firm to support the overall Security Program:

1 **Contract Law Enforcement:** Security personnel under contract to the State Airports Division and who are deputized under State law to engage in law enforcement activities prescribed under Federal Regulations Part 107.17. The current contract is performed by **Allied Universal**, which provides personnel to man security screening station law enforcement positions, access gates, traffic control, perimeter and ramp patrols and the Pass and ID office.
2 **Transportation Security Administration (TSA):** Federal Security personnel who perform pre-departure passenger screening.

Misuse of Airport security access privileges by any badge holder or any violation of Airport, State and/or Federal rules and regulations will subject violators to arrest or fine as prescribed by law and revocation of all further clearance and access into security areas.

The Operations Division has the option to issue warnings on the first offense based upon the circumstances of the incident. Individuals involved in noncompliance violations may be required to surrender their Airport ID badges pending investigation of the matter.

Penalties for violations related to (HDOT, FAA, & TSA) procedures include the following:

1 Warning citation, Airport ID badge confiscation, retraining, and a letter from the employer stating what action if any has been taken to prevent this from happening again.
2 Project shutdown and/or removal of personnel involved from the AOA.
3 Class B Misdemeanor citation - (Hilo International Airport Rules & Regulations.) Ordinance Title 19 Administrative Rules.

Project shutdown or misdemeanor citation may be issued on a first offense.

End of Section 13

SECTION 14 SPECIAL CONDITIONS

14.1 Summary

It is possible that unexpected emergencies may arise during the progress of the construction work. Construction emergencies may be caused by equipment breakdowns, accidents, or even damages to nearby existing structures, property, or light fixtures. Airport emergencies may arise during the progress of the work, such as in-flight emergencies that may develop. In the event of a construction or airport emergency, ITO security will be notified immediately, informing them of the situation. ITO will decide on the appropriate remedial actions that are needed to stabilize the situation.

In the event of work cancellation, whether cancelled by the Contractor, CM, FAA, ITO, or HDOTA, the Contractor shall make all required notifications as detailed in the appropriate communication flow chart to inform all parties of the work cancellation, the reason for the cancellation, and anticipated duration of the work stoppage. In addition to the notifications identified in the communication flow chart, the Contractor shall contact ITO-MS to inform them of any NOTAM changes required due to the work cancellation. ITO-MS or Operations shall be responsible for cancelling or modifying any published NOTAMs and contacting FAA HCF Air Traffic to inform them of the NOTAM Changes.

Other special conditions that may affect the construction work are listed below:

Weather Conditions
In the event of adverse weather conditions, the Contractor may be required to reschedule the work and/or runway and taxiway closures and cancel active NOTAMs. Adverse weather conditions would include winds that dictate the use of certain runways or taxiways under construction. In the event of Kona Wind conditions, arrivals from the east, all work shall be canceled and rescheduled for the day.

Instrument Flight Rules (IFR) weather conditions when the ceiling is less than 2,500 feet and visibility is less than three (3) statute miles, and/or continuing heavy rain showers. The Contractor will obtain the current and forecasted weather conditions and confirm with ITO and FAA HCF Air Traffic (when ATCT is closed) whether to proceed with the scheduled work. Once the “Go” / “No Go” call is made, work will continue until the runway has been restored to the original conditions (i.e. all paving work has been completed). The “Go” / “No Go” call for work will be made two (2) hours prior to the scheduled closure time.

The Contractor shall assume that work will be canceled by ITO or FAA with 2-hour notice due to weather or other airport operational limitations, up to 5 full work shifts over the duration of the project, at no additional cost to the owner.

Aircraft Emergency:
During aircraft and life safety incidents, the Contractor may be required to temporarily stop and vacate the AOA to allow operations of aircraft and emergency personnel and vehicles. The Contractor will be notified of emergencies by either AOC, ATC, or FAA HCF. The Contractor and AOC will decide on the appropriate remedial actions that are needed to stabilize the situation. The Contractor will then notify the CM responsible for the project. In cases of all emergencies the Contractor shall clear the movement area immediately.

End of Section 14

SECTION 15 RUNWAY AND TAXIWAY VISUAL AIDS – MARKING, LIGHTING, AND SIGNS

15.1 Marking Removal

All existing pavement markings requiring removal shall be obliterated in a manner that will not leave marking shadows at the direction of the ITO and the CM. All permanent pavement markings shall be restored at project completion.

Proposed runway and taxiway closures necessary to complete the work will be short term closures occurring at night with the runway and taxiways re-opening the next day.

15.2 AOA Closures (Runways, Taxiways, Ramps)

All lights and equipment designated to remain within the work areas, safety areas, and on the AOA shall be protected at all times. The Contractor shall protect these lights and equipment from damage while working at the work site. When a runway, taxiway, or taxilane is closed, the lights shall be turned off or masked. The Contractor shall place barricades around any elevated lights and equipment that may be in the work area to delineate and protect them. Damage due to the Contractor's operations shall be repaired immediately at the Contractors' expense.

For temporary closures of taxiways or taxilanes, the Contractor shall turn off/mask centerline lights, edge lights, and signage around the work areas during the work shift. The Contractor shall protect these lights from damage at all times while working at the work sites. All centerline and edge lights designated to remain shall be operational at the end of the closure. Submit proposed method for CM's approval.

15.3 Lighting and Visual NAVAIDS

The Contractor shall coordinate with ITO, SSC, ATC, and HCF/TechOps to shut down the runway/taxiway edge lights and any other required NAVAIDs deemed necessary. Coordination between the Contractor, ITO, SSC, ATC, and HCF/TechOps shall occur a minimum of 30 days prior to the scheduled shut down.

Visual NAVAIDs shall be protected as stated in Section 5 of this CSPP.

15.4 Permanent Signs

The Contractor shall ensure that all signs are undamaged by construction operations. Signs shall not be obstructed in any way for pilots.

All permanent signs affected by construction shall be completely covered or replaced by temporary signs acceptable to ITO and the CM. The Contractor shall submit a sign relocation plan to ITO and the CM for approval prior to any relocation of any existing signs.

15.5 Wind Cones

The Runway 8, 21, and 26 wind cones will be altered and affected by the project. Each runway end shall have an operational wind cone at all times. The Contractor shall ensure that the operational wind cone is undamaged by construction operations. Once the new wind cone is mounted and operational, the existing wind cone shall be demolished. The operational wind cones shall not be obstructed in any way for pilots. See Exhibit 3 – Construction Phasing Plans for wind cone locations and phasing.

15.6 Temporary Lighting

When existing edge lighting is rendered inoperable on an active runway or taxiway, the

Contractor may consider installing temporary edge lights as directed by the ITO, HDOTA, and/or the CM.

Every effort possible shall be made to construct temporary taxiway lighting to conform to the runway or taxiway safety area frangibility and height restrictions as specified in the FAA Advisory Circular 150/5370-2, Operational Safety on Airports During Construction, (latest edition).

Temporary edge lights shall be securely fastened down and the electrical power cable shall not be driven across. Airfield lighting cables operate at high voltage; they have the potential of 5,000 volts and should be handled by qualified personnel only.

Temporary light plants used in conjunction with nighttime work will not be located in such a manner as to be an obstruction or hazard. In addition, these light plants will not be located where the glare of the light will cause visual or physical interference to operating aircraft and the FAA ATCT.

End of Section 15

SECTION 16 MARKING AND SIGNS FOR ACCESS ROUTES

16.1 Summary

All haul routes shall conform to marking and signage in the ITO Approved Airport Certification Manual.

Marking and signs for access routes will not be used on this project. As construction vehicles and/or equipment arrive to the project site, they will enter the AOA through the designated AOA access gates. Construction vehicles and equipment will wait in an area not affecting Hilo International Airport Operations (or in the staging area) until all necessary notifications have been made and the lighted “X” and low-profile barricades have been placed. All construction vehicles and equipment necessary to complete the work will remain on the closed area for the duration of the work shift. At the end of the work shift, all construction vehicles and equipment shall be escorted back to the staging area or to the access gate if exiting the AOA. Please refer to Exhibit 3 – Construction Phasing Plans regarding the proposed hauling routes.

End of Section 16

SECTION 17 HAZARD MARKING AND LIGHTING

17.1 Summary

When areas on the airport are closed or present hazards due to Contractor activities, they shall be marked and lighted according to AC 150/5340-1 (current edition) “Standards of Airport Markings” and AC 150/5370-2 (current edition) “Safety During Construction”. Marking and lighting must be approved by the Airport Project Manager.

Every excavation or hazard on or adjacent to the airfield or other areas shall be marked. Please see Exhibit 3 – Construction Phasing Plan, for location and type.

The Contractor shall barricade the work area as shown on Exhibit 3. Low profile barricades with lights or other hazard lighting devices stipulated on the phasing plans shall be operative at all times while in place. It shall be the Contractor’s responsibility to immediately repair or replace any light that is not operating.

Barricades shall be in place prior to commencing construction operations and shall be maintained for the life of the construction phase/contract.

Beacons and flags required on all contractor vehicles/equipment must be maintained in good working condition, and flags shall be replaced if they become faded, discolored, or ragged.

Limits of the various phases of work shall be clearly delineated with barricades, warning signs with attached steady or flashing red lights; "standing red" barricade lights and other markings as shown on the plans specified herein, in order to deter aircraft and vehicles from entering the construction areas.

The Contractor shall continually inspect and maintain all construction barriers, fencing, and gates in good condition.

Portable lighting provided for any night work shall not interfere with air navigation. Lights shall be transported to the work areas pointed down and turned off to avoid affecting FAA ATCT Operations.

17.2 Equipment

Please refer to Exhibit 4 – Product Information regarding the product data for the low-profile barricades, type I-II barricades, traffic cones, and runway lighted “X”s to be used on this project.

1. Runway Lighted “X”:
   Whenever work is required in the RSA, lighted “X”’s shall be place at each end of the runway directly on or as near as practicable to the runway designation numbers of the specific runway to be closed. Lighted “X”’s shall face the approach surface for the respective runway end. The lighted “X”’s shall be removed at the end of each work shift and/or work phase.

2. Low Profile Barricades:
   Low profile barricades shall be used to identify the closed areas due to construction activities. These low-profile barricades shall be orange or white and shall have at least one (1) red 360-degree light mounted to each barricade. Low profile barricades shall be placed approximately 15’-0” O.C. (maximum 20’-0” O.C.) while construction is ongoing and during non-working hours. The orange and white barricades shall be placed in alternating colors (orange base and white base) and shall be located and secured to prevent displacement from jet blast or other surface wind conditions. Low profile barricades shall be either Neubert Aero Corporation Model NAC-PC 2410, Multi-Barrier

Safety Barricade Model No. AR-10x96 or FAA approved equivalent. Please refer to Exhibit 3 – Phasing and Barricade Boring Plan, regarding the proposed locations of the low-profile barricades. The barricades will be filled with water to weigh them down and prevent FOD or movement from jet blast and/or high wind conditions.

3. Reflective Cones and Type II Barricades:
   If required, reflective cones and or Type II barricades shall be used to demarcate AOA travel route(s), and locations where vehicles shall yield to aircraft and shall be adequately anchored from jet blast.

4. Construction Lighting:
   For night working hours, the Contractor is not allowed to use light towers for this project. The construction lighting shall be located away from any obstruction or hazard and positioned and point away in such a manner that it does not cause visual or physical interference to operating aircraft and the FAA ATCT. Construction lighting shall be taken down at the end of the work shift and stored at the equipment staging area. All Contractor personnel and subcontractors working on the AOA during hours of darkness shall wear high visibility vests with reflective markings and orange/visible hard hats. The Contractor shall also conform to restrictions stated in Section 7.6, Construction Lighting.

End of Section 17

SECTION 18 PROTECTION OF RUNWAY AND TAXIWAY SAFETY AREAS AND SURFACES

18.1 Summary

Runway Safety Area (RSA), Taxiway Safety Area (TSA), Object Free Zones (OFZ), and Object Free Areas (OFA) will be impacted by the work, including the closure of runways and taxiways adjacent to the work area.

The Contractor will be required to coordinate the construction work to accommodate clearance requirements for arrival and departure of scheduled aircraft, and maintain compliance with AC 150/5370-2, Operational Safety on Airports During Construction, (current edition). The AC sets forth guidelines for maintaining desired levels of operational safety during construction.

The Contractor will require that project staff attend mandatory training sessions to reinforce the importance of airport protocol. The intent of the presentations will be to highlight common threats such as safety area encroachments, improper ground vehicle operations, and unmarked or uncovered holes and trenches in the vicinity of aircraft operating surfaces. Airport staff will be invited to make presentations on topics of their choosing.

18.2 Runway Safety Area (RSA)

The RSA is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. No construction may occur within the RSA while the runway is open for aircraft operations. All work within the RSA shall be coordinated with HDOTA, FAA-ADO, FAA-ATO, FAA-HCF, ITO, ITO-MS, and ITO ATCT. The Runway 3-21 RSA width is 150 feet and the Runway 8-26 RSA width is 500 feet.

Open trenches or excavations are not permitted within the RSA while the runway is open. All trenches and excavations shall be backfilled before a temporarily closed runway is opened to aircraft.

Soil erosion must be controlled to maintain RSA standards. The RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and must be capable, under dry conditions, of supporting aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft. The Contractor will be required to minimize dust by frequent watering/dampening of the work area.

18.3 Runway Object Free Area (ROFA)

Construction, including excavations, may be permitted in the ROFA. Equipment must be removed from the ROFA when not in use, and material shall not be stockpiled in the ROFA if not necessary. All work within the ROFA shall be coordinated with HDOTA, FAA-ADO, FAA-ATO, FAA-HCF, ITO, ITO-MS, and ITO ATCT. The Runway 3-21 ROFA width is 500 feet and the Runway 8-26 ROFA width is 800 feet.

18.4 Taxiway Safety Area (TSA)

The TSA is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. No construction may occur within the TSA while the taxiway is open for aircraft operations. All work within the TSA shall be coordinated with HDOTA, FAA, and ITO. The TSA width for taxiways associated with Runway 3-21 and Runway 8-26 is 214 feet.

18.5 Taxiway Object Free Area (TOFA)

The TOFA is regularly penetrated by aircraft wings during normal operations, thus the restrictions are more stringent. No construction may occur within the TOFA while the taxiway is open for aircraft operations. All work within the TOFA shall be coordinated with HDOTA, FAA, and ITO. The TOFA width for taxiways associated with Runway 3-21 and Runway 8-26 is 320 feet.

18.6 Obstacle Free Zone (OFZ)

In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If penetrations to the OFZ are necessary, it may be possible to continue aircraft operations through operational restrictions. All work within the OFZ shall be coordinate with HDOTA, FAA, and ITO.

18.7 Runway Approach/Departure Surfaces

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, FAR Part 77 Approach Surfaces, Terminal Instrument Procedures (TERPs) surfaces, or One Engine Inoperative (OEI) surfaces. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Should construction work occur within the runway approach and/or departure surfaces, a runway closure may be required. All work within or adjacent to the runway approach and/or departure surfaces shall be coordinated with HDOTA, FAA, and ITO.

18.8 Procedures and Equipment to Delineate Closed Construction Areas from Airport Operational Areas

No ramp, apron, taxiway, or runway area shall be closed to aircraft without approval of ITO and the CM.

The Contractor shall place solar powered standing red lights placed at all locations in which aircraft could inadvertently enter the construction area for limited duration closures as approved by ITO and the CM.

All pertinent airfield signage will be removed, covered, and de-energized where appropriate.

End of Section 18

SECTION 19 OTHER LIMITATIONS ON CONSTRUCTION

19.1 Additional Restrictions

1. Runway and Taxiway closure areas will be limited to the areas shown for each phase in Exhibit 3 – Construction Phasing Plans per the construction schedule, the project working hours are listed below. If necessary, the working hours may be adjusted by HDOTA, ITO, ATC, and/or the FAA:
    - Phase 1 – Monday-Sunday: 0600 to 1600 HST
    - Phase 2 – Monday-Sunday: 0600 to 1600 HST
    - Phase 3 – Monday-Sunday: 0600 to 1600 HST
    - Phase 4 – Monday-Sunday: 0600 to 1600 HST
    - Phase 5 – Monday-Sunday: 0600 to 1600 HST
    - Phase 6 – Monday-Sunday: 2100 to 0600 HST

2. Jet blast considerations – Jet blast considerations were included as part of the planning process. The review included aircraft distance from construction and aircraft movement around the construction area. Equipment, small tools, construction material, stockpile material, and excavation trenches shall be constrained in a manner to prevent movement resulting from aircraft jet blast or high wind conditions. Equipment and materials will not be stored near areas susceptible to jet blast.

3. Contractor shall maintain a safe operating area, free of FOD, at all times. Vacuum sweepers, as outlined in these specifications and on the plans, shall be continuously utilized to maintain the work site and haul routes. Non-badged vehicle operators shall be escorted at all times while within the AOA between access gate and work site. Access gate guards shall be provided to register all Contractor personnel accessing the AOA subject to the requirements of airport security, TSA and ITO Security Provider which may include vehicle searches for weapons, explosive devices or other prohibited items not allowed within the AOA. Only Contractor and HDOTA authorized personnel shall be allowed through contractor gates.

4. The existing condition of the project may be altered due to construction currently being performed at the Airport. It is the Contractor's responsibility to work with the ultimate existing condition of the project at the time of construction.

5. Other contracts adjacent to the project may be ongoing at the time of construction. The Contractor shall coordinate his/her efforts with adjacent contracts to the satisfaction of HDOTA and at no additional cost to the owner.

6. The Contractor shall be solely responsible for the safety and security of the site, including during nonworking hours.

7. All site preparation as indicated shall be made under the continuous inspection of the CM. Secure the required permit for the construction of trenches or excavations that are five (5) feet or deeper or work that may jeopardize the workers.

8. The Contractor shall at all times maintain positive drainage away from existing buildings. The Contractor shall be responsible for installation, maintenance, and removal of temporary haul routes to support his/her operations within the work area. The Contractor shall maintain work area free of FOD at all times and dust control measures shall be implemented to the satisfaction of the CM.

9. No lantern, flare pots, or open-flame welding or other devices shall be used. Blasting is not allowed.

10. Open flame welding or torch cutting operations are prohibited within the AOA unless adequate precautions have been taken and the written procedure approved by HDOTA, ITO, FAA, and/or ARFF. In addition, the Contractor will obtain an airport “Burn Permit” from ARFF.

11. No smoking by employees while within the AOA.

12. Use of tall equipment (cranes, concrete pumps, etc.) will not be allowed unless the FAA Form 7460-1 determination letter is issued and approved for such equipment.

19.2 Police Coordination

In case of an emergency caused by an accident, fire, personal injury, or illness, airport security are to be immediately notified. Police will coordinate with other emergency agencies as necessary. Contractor shall also notify the CM and ITO-MS so that any coordination or closures that may be required can be addressed immediately.

19.3 ITO Airport Operations

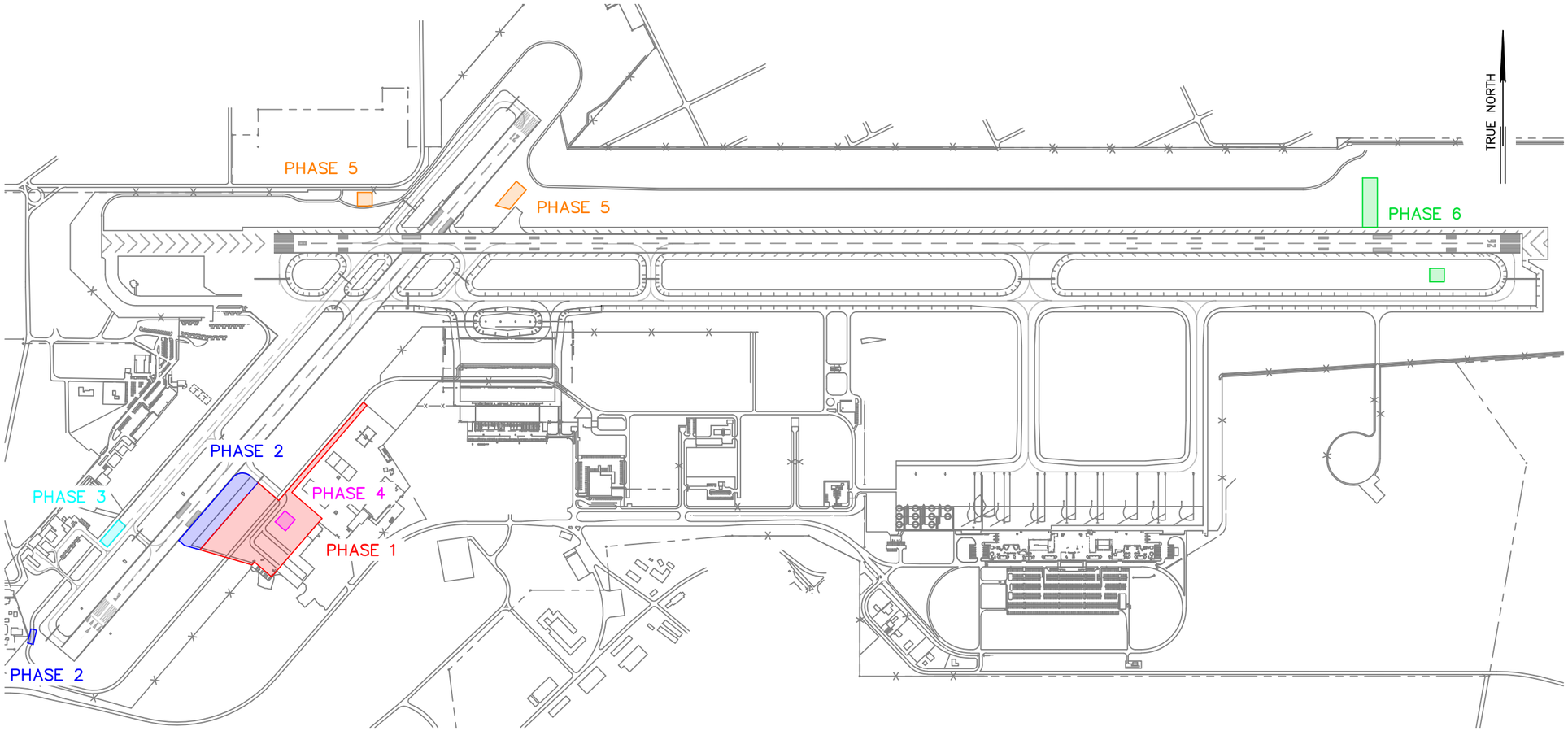
Construction may be stopped by ITO or the CM, any time he/she considers that the intent of the regulations regarding safety or security requirements is being violated or that a hazardous condition exists. This decision to suspend the operation will be final and will only be rescinded by ITO when satisfied that the Contractor has taken action to correct the condition and prevent recurrence.

Construction may also be stopped or suspended by ITO, in consultation with the CM during periods of inclement weather, such as low visibility, or when it is necessary to provide an extra margin of safety to aircraft operations or reduce other activities to keep the airport operational.

End of Section 19

APPENDIX A – FIGURES

Contractor to include the project schedule



SCOPE OF WORK:

PHASE 1
- INSTALLATION OF DRY WELLS NEAR THE ARMY NATIONAL GUARD AVIATION RAMP.
- REPAIR OF AC PAVEMENT AT THE CIVIL AIR PATROL DRIVEWAY ENTRANCE ON AIRPORT ROAD.

PHASE 2
- DEMOLITION OF BROKEN AC PAVEMENT IN FRONT OF THE ARMY NATIONAL GUARD AVIATION RAMP.
- INSTALLATION OF DRY WELLS.
- GRASS AND GRADE DEMOLISHED AC PAVEMENT AREAS.
- INSTALLATION OF DRY WELLS ALONG THE PERIMETER ROAD BEHIND RUNWAY 3.

PHASE 3
- INSTALLATION OF DRY WELL.
- GRADE AND GRASS SPECIFIED AREAS.

PHASE 4
- INSTALLATION OF COMPASS CALIBRATION PAD.

PHASE 5
- DEMOLITION OF RUNWAY 8 SEGMENTED CIRCLE.
- DEMOLITION AND RELOCATION OF THE RUNWAY 8 WIND CONE.
- DEMOLITION AND RELOCATION OF THE RUNWAY 21 WIND CONE.

PHASE 6
- DEMOLITION AND RELOCATION OF THE RUNWAY 26 WIND CONE.

TENTATIVE CONSTRUCTION SCHEDULE:

PHASE 1: 90 CALENDAR DAYS
PHASE 2: 30 CALENDAR DAYS (RUNWAY 3–21 CLOSED)
PHASE 3: 14 CALENDAR DAYS
PHASE 4: 14 CALENDAR DAYS
PHASE 5: 28 CALENDAR DAYS
PHASE 6: 28 CALENDAR DAYS (RUNWAY 8–26 CLOSED)

TENTATIVE PHASE WORK HOURS:

PHASES 1–5: 0600 TO 1600 HOURS, HST
PHASE 6: 2100 TO 0600 HOURS, HST

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:

NO.	DATE	REVISIONS

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

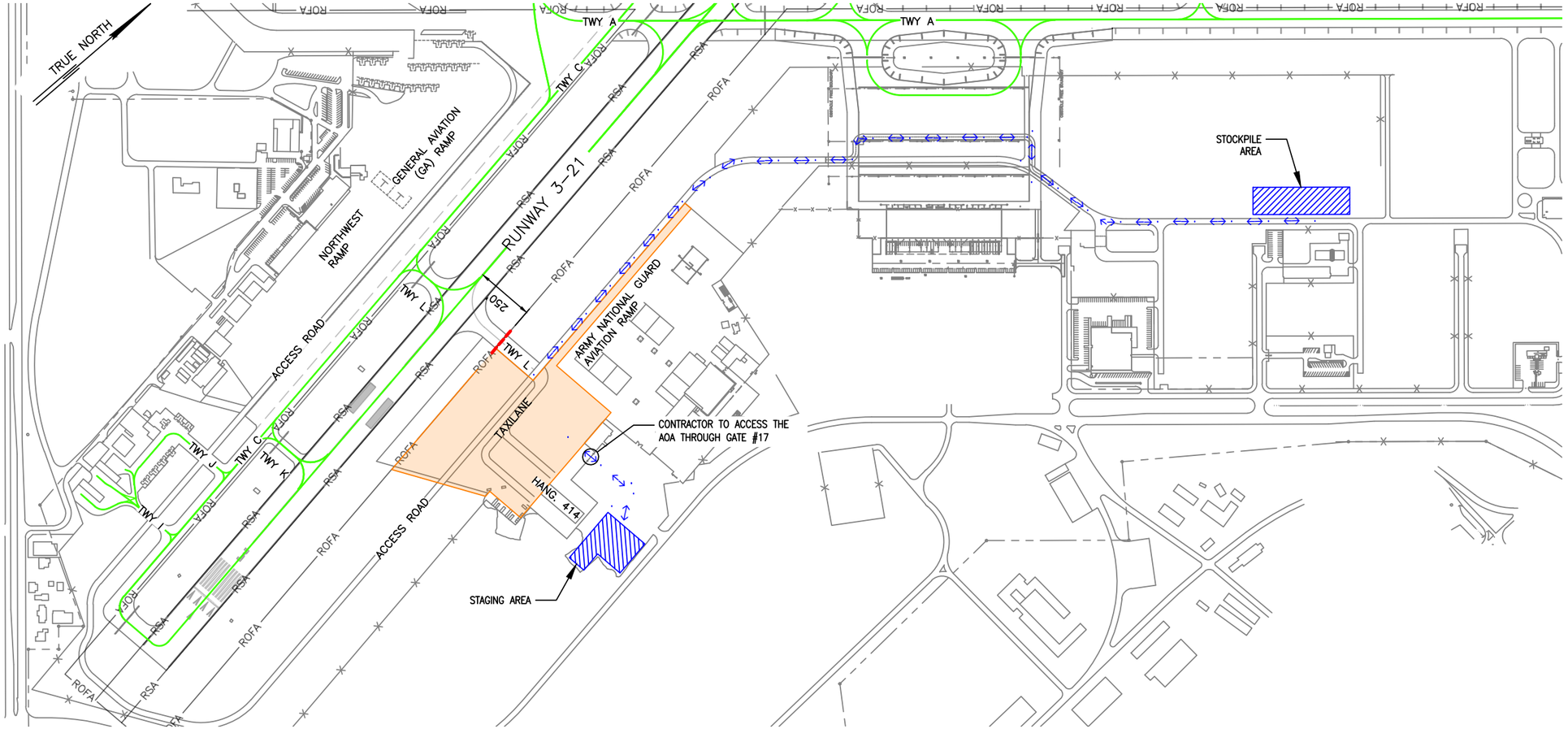
SHEET TITLE:

OVERALL PHASING PLAN

DATE :	DWG. NO.
FEBRUARY 2021	G-3
SHEET :	
3 OF 47 SHEETS	

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-135
OCTOBER 2022



ITO DRAINAGE IMPROVEMENTS – PHASE 1
SCALE: 1"=250'

PHASING AND BARRICADE PLAN – PHASE 1

DESCRIPTION:
1. DEMOLITION OF BROKEN AC PAVEMENT IN FRONT OF THE ARMY NATIONAL GUARD AVIATION RAMP, INSTALLATION OF DRY WELLS TO ADDRESS PONDING ISSUES, AND GRASS AND GRADE DEMOLISHED AC PAVEMENT LOCATED OUTSIDE THE ROFA.

TYPE:
PARTIAL RAMP CLOSURE

DURATION:
90 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. TAXIWAY L EAST OF RUNWAY 3–21 CLOSED
2. ARMY NATIONAL GUARD AVIATION RAMP PARTIALLY CLOSED
3. HELICOPTER OPERATIONS, CAUTION WORK IN PROGRESS
4. NOTAMs FOR TALL EQUIPMENT (WHEN APPLICABLE)

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. WHEN THE CONTRACTOR IS DIRECTED TO PULLBACK BY THE ATCT, THE CONTRACTOR SHALL BARRICADE OFF THE WORK AREA AND REMOVE ALL LARGE EQUIPMENT FROM THE WORK AREA.
4. THE CONTRACTOR SHALL ENSURE THE ACCESS ROAD REMAINS OPEN THROUGHOUT THE ENTIRETY OF CONSTRUCTION.
5. THE CONTRACTOR SHALL COORDINATE WITH ITO TO RELOCATE HANGAR 414 PARKED AIRCRAFT.
6. HELICOPTER OPERATIONS USUALLY USE THE TAXIWAYS IN THE WORK AREA. THE CONTRACTOR SHALL COORDINATE WITH ITO AND ATCT TO NOTIFY HELICOPTER OPERATIONS OF WORK TIMES AND REROUTE HELICOPTER FLIGHT PATHS WHEN NECESSARY. ARMY NATIONAL GUARD HELICOPTERS COULD POSSIBLY BE DIVERTED TO DEPART TO THE NORTHEAST.

NOTES (CONT.)
7. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460–1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

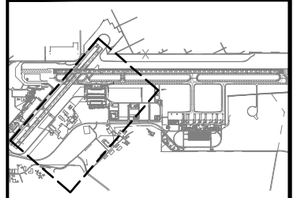
RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

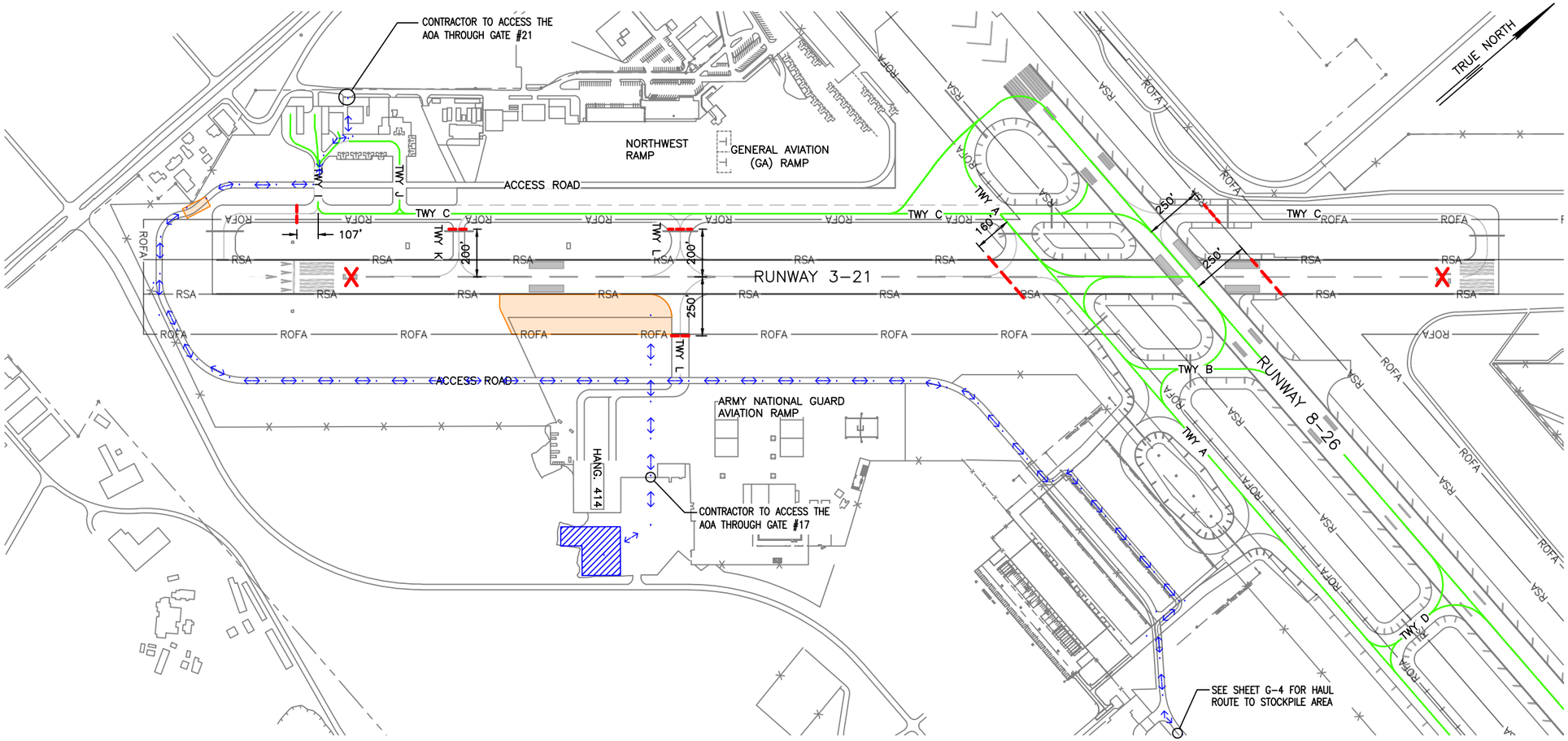
SHEET TITLE:

CSPP - PHASE 1

DATE :	DWG. NO.
FEBRUARY 2021	G-4
SHEET :	
4 OF 47 SHEETS	

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-136
OCTOBER 2022



ITO DRAINAGE IMPROVEMENTS – PHASE 2
SCALE: 1"=250'

PHASING AND BARRICADE PLAN – PHASE 2

DESCRIPTION:
1. DEMOLITION OF BROKEN AC PAVEMENT IN FRONT OF THE ARMY NATIONAL GUARD AVIATION RAMP, INSTALLATION OF DRY WELLS TO ADDRESS PONDING ISSUES, AND GRASS AND GRADE DEMOLISHED AC PAVEMENT, LOCATED INSIDE THE ROFA.
2. INSTALLATION OF DRY WELLS ALONG THE ACCESS ROAD BEHIND RUNWAY 3–21.

TYPE:
RUNWAY CLOSURE

DURATION:
30 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. RUNWAY 3–21 CLOSED
2. TAXIWAY C CLOSED SOUTH OF TAXIWAY I
3. TAXIWAY C CLOSED NORTH OF RUNWAY 8–26
4. TAXIWAY K CLOSED
5. TAXIWAY L CLOSED
6. ARMY NATIONAL GUARD AVIATION RAMP WORK IN PROGRESS
7. RUNWAY 3–21 VASI OTS (0600–1600 HST)
8. NOTAMs FOR TALL EQUIPMENT (WHEN APPLICABLE)

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. A LIGHTED "X" SHALL BE PLACED AT EACH RUNWAY END AND LOW PROFILE BARRICADES SHALL BE PLACED AT EACH TAXIWAY CONNECTION BEFORE CLOSING THE RUNWAY.
4. THE CONTRACTOR SHALL ENSURE THE ACCESS ROAD REMAINS OPEN THROUGHOUT THE ENTIRETY OF CONSTRUCTION.
5. THE CONTRACTOR SHALL COORDINATE WITH ITO TO RELOCATE HANGAR 414 PARKED AIRCRAFT.

NOTES (CONT.)
6. HELICOPTER OPERATIONS USUALLY USE THE TAXIWAYS IN THE WORK AREA. THE CONTRACTOR SHALL COORDINATE WITH ITO TO NOTIFY HELICOPTER OPERATIONS OF WORK TIMES AND REROUTE HELICOPTER FLIGHT PATHS WHEN NECESSARY. ARMY NATIONAL GUARD HELICOPTERS COULD POSSIBLY DEPART TO THE NORTHEAST.
7. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460–1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.
8. AT THE END OF EACH WORKING PERIOD, THE CONTRACTOR MUST ENSURE THE EDGE OF RUNWAY DOES NOT HAVE MORE THAN A 3" DROP FROM TOP OF RUNWAY TO GRADE.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

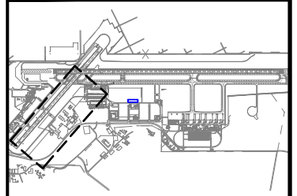
RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES
- X — LIGHTED "X"

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

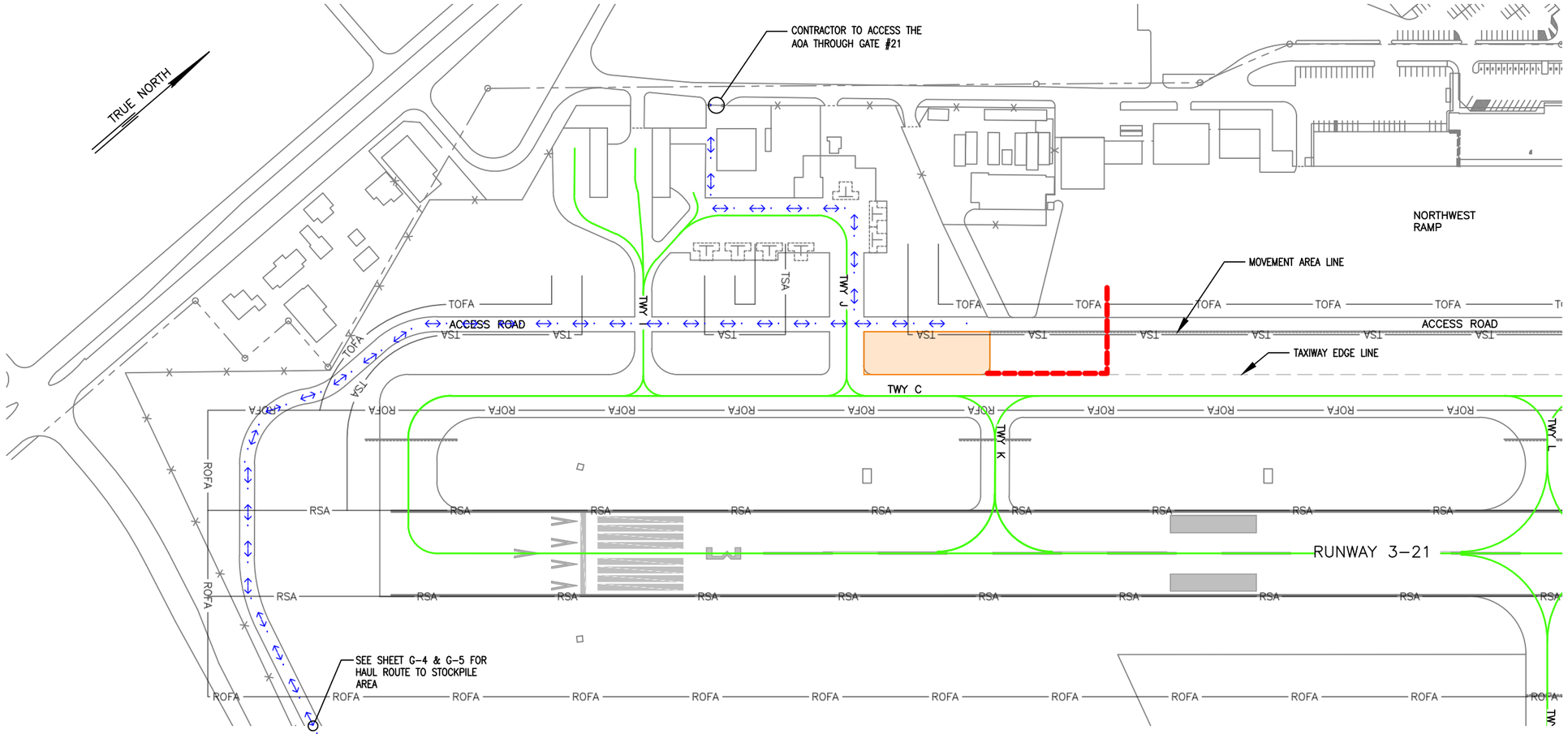
CSPP - PHASE 2

DATE :
FEBRUARY 2021
SHEET :
5 OF 47 SHEETS

DWG. NO.
G-5

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-137
OCTOBER 2022



ITO DRAINAGE IMPROVEMENTS – PHASE 3
SCALE: 1"=100'

PHASING AND BARRICADE PLAN – PHASE 3

DESCRIPTION:
1. REGRADE AND REGRASS SHOULDER AREA TO ADDRESS PONDING ISSUES.
2. INSTALL DRY WELL.

TYPE:
WORK IN PROGRESS

DURATION:
14 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. TAXIWAY C WORK IN PROGRESS
2. TAXIWAY C AIRCRAFT WINGSPAN LIMITED TO 70' BETWEEN TAXIWAY J AND 200 FT NORTHEAST OF TAXIWAY K
3. TAXIWAY J WORK IN PROGRESS
4. TAXIWAY J AIRCRAFT WINGSPAN LIMITED TO 70'
5. NORTHWEST RAMP PARTIAL CLOSURE
6. NOTAMs FOR TALL EQUIPMENT (WHEN APPLICABLE)

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. THE CONTRACTOR SHALL SETUP BARRICADES AROUND THE AFFECTED AREAS OF WORK THROUGH OUT THE PHASE.
4. THE CONTRACTOR SHALL ENSURE THE ACCESS ROAD REMAINS OPEN THROUGHOUT THE ENTIRETY OF CONSTRUCTION.
5. THE CONTRACTOR SHALL COORDINATE WITH ITO AND ATC TO IMPLEMENT REQUIRED AIRCRAFT GROUP RESTRICTIONS FOR TAXIWAY C DURING WORK HOURS.
6. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460–1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

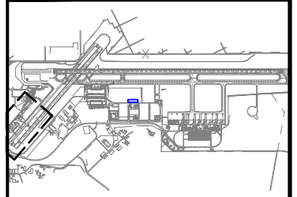
RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

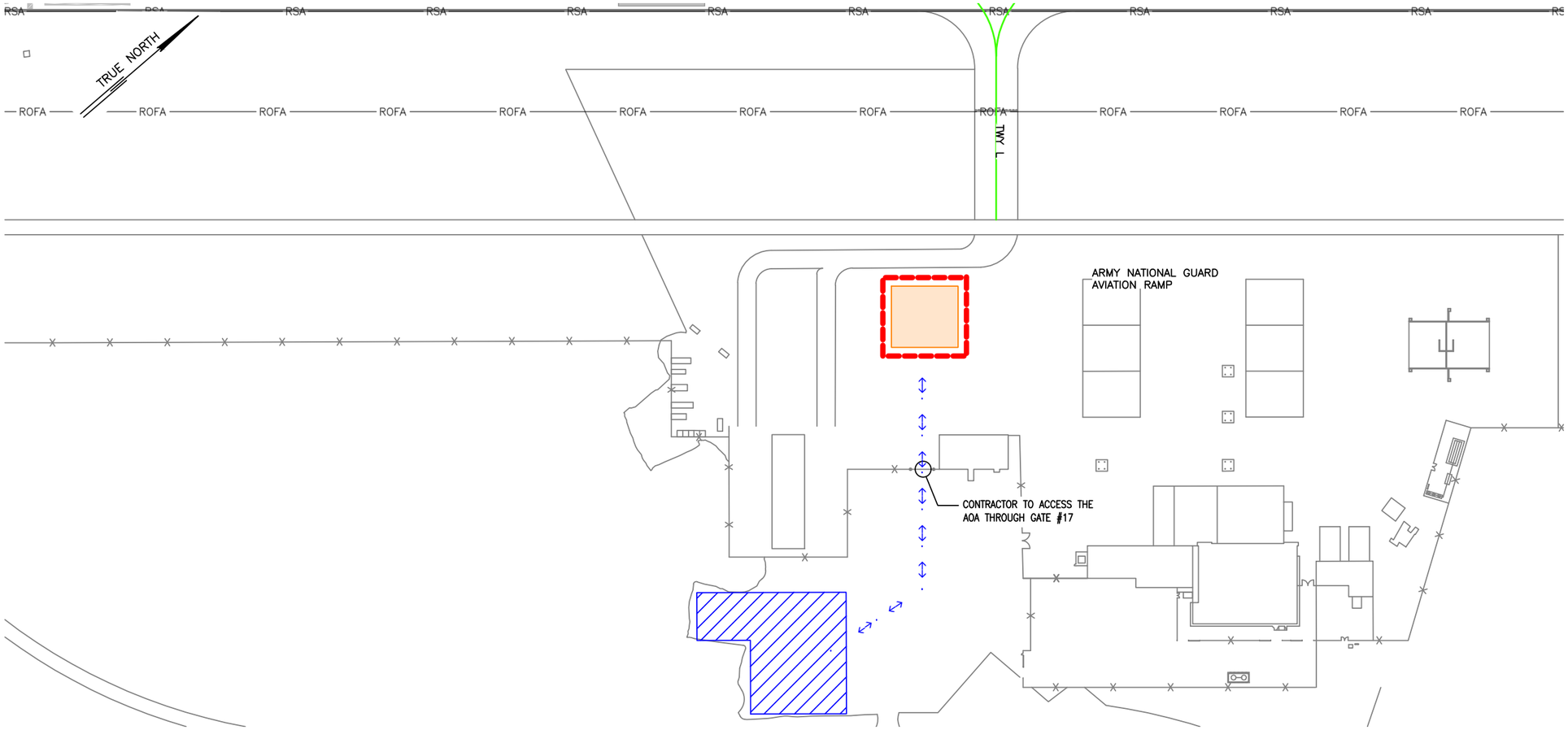
SHEET TITLE:

CSPP - PHASE 3

DATE :	DWG. NO.
FEBRUARY 2021	G-6
SHEET :	
6 OF 47 SHEETS	

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-138
OCTOBER 2022



ITO DRAINAGE IMPROVEMENTS – PHASE 4
SCALE: 1"=100'

PHASING AND BARRICADE PLAN – PHASE 4

DESCRIPTION:
1. INSTALLATION OF COMPASS CALIBRATION PAD.

TYPE:
TAXIWAY CLOSURE

DURATION:
14 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. ARMY NATIONAL GUARD AVIATION RAMP WORK IN PROGRESS

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. THE CONTRACTOR SHALL SETUP BARRICADES AROUND THE AFFECTED AREAS OF WORK THROUGH OUT THE PHASE.
4. THE CONTRACTOR MUST COORDINATE WITH ITO TO RELOCATE ANY AIRCRAFT THAT USUALLY PARK IN AND AROUND THE WORK AREA.
5. THE CONTRACTOR SHALL ENSURE THE ACCESS ROAD REMAINS OPEN THROUGHOUT THE ENTIRETY OF CONSTRUCTION.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

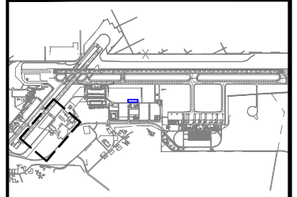
RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

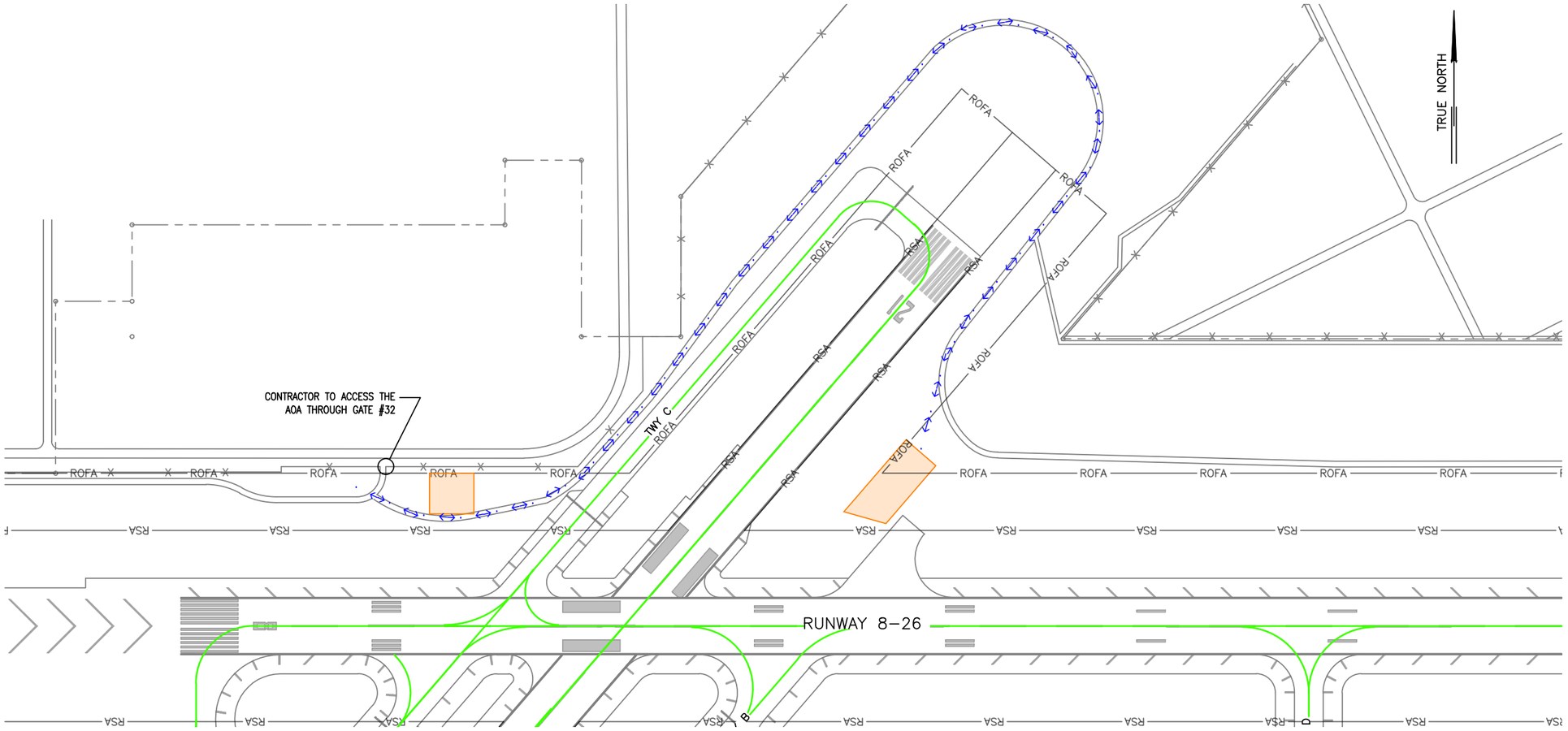
SHEET TITLE:

CSPP - PHASE 4

DATE :	DWG. NO.
FEBRUARY 2021	G-7
SHEET :	
7 OF 47 SHEETS	

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-139
OCTOBER 2022



ITO DRAINAGE IMPROVEMENTS – PHASE 5
SCALE: 1"=150'

PHASING AND BARRICADE PLAN – PHASE 5

DESCRIPTION:
1. DEMOLITION AND RELOCATION OF THE RUNWAY 8 SUPPLEMENTAL WIND CONE AND DEMOLITION OF SEGMENTED CIRCLE.
2. DEMOLITION AND RELOCATION OF THE RUNWAY 21 SUPPLEMENTAL WIND CONE AND INSTALLATION OF NEW SEGMENTED CIRCLE.

TYPE:
WORK IN PROGRESS

DURATION:
28 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. RUNWAY 3–21 WORK IN PROGRESS
2. RUNWAY 8–26 WORK IN PROGRESS
3. TAXIWAY C WORK IN PROGRESS
4. NOTAMs FOR TALL EQUIPMENT (WHEN APPLICABLE)

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. THERE SHALL BE AN OPERATIONAL WIND CONE AVAILABLE AT THE RUNWAY 8 AND RUNWAY 21 ENDS AT ALL TIMES.
4. THE CONTRACTOR SHALL COORDINATE WITH ITO, HCF, AND SOC TO VERIFY EXISTING UNDERGROUND UTILITIES AND REQUIRED OUTAGES.
5. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460–1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

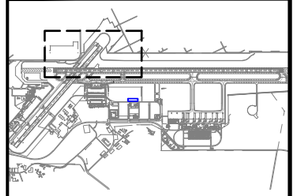
RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

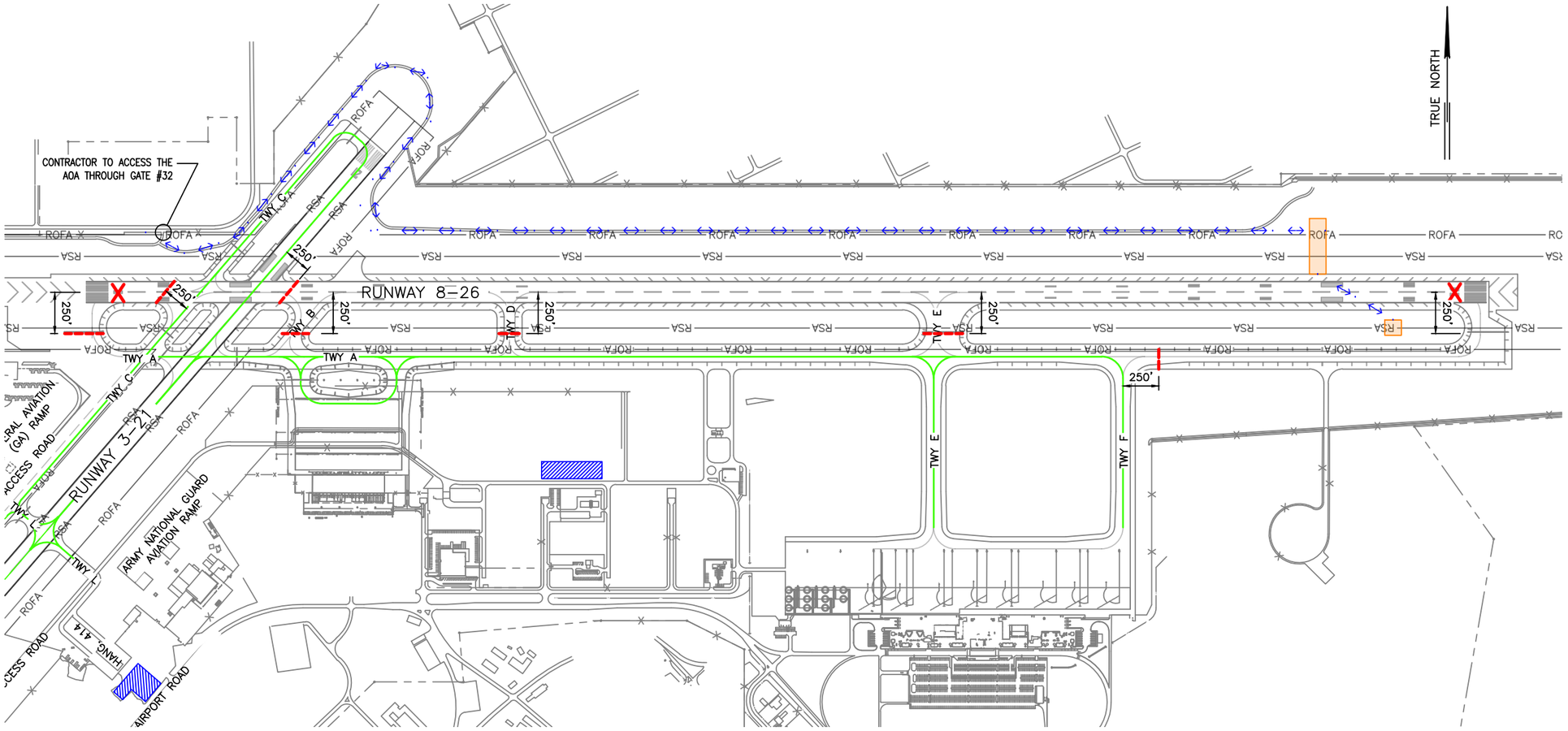
SHEET TITLE:

CSPP - PHASE 5

DATE :	DWG. NO.
FEBRUARY 2021	G-8
SHEET :	
8 OF 47 SHEETS	

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-140
OCTOBER 2022



ITO DRAINAGE IMPROVEMENTS – PHASE 6
SCALE: 1"=400'

PHASING AND BARRICADE PLAN – PHASE 6

DESCRIPTION:
1. DEMOLITION AND RELOCATION OF THE RUNWAY 26 SUPPLEMENTAL WIND CONE.

TYPE:
WORK IN PROGRESS

DURATION:
28 CALENDAR DAYS

WORKING HOURS:
2100 TO 0600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. RUNWAY 8–26 CLOSED
2. TAXIWAY A CLOSED EAST OF TAXIWAY F
3. TAXIWAY B CLOSED
4. TAXIWAY D CLOSED
5. TAXIWAY E CLOSED NORTH OF TAXIWAY A
6. RUNWAY 8–26 GLIDE SLOPE OTS (2100–0600 HST)
7. RUNWAY 8–26 VASI OTS (2100–0600 HST)
8. RUNWAY 8–26 LOC OTS (2100–0600 HST)
9. RUNWAY 8–26 DME OTS (2100–0600 HST)
10. NOTAMs FOR TALL EQUIPMENT WHEN APPLICABLE

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. THERE SHALL BE AN OPERATIONAL WIND CONE AVAILABLE AT THE RUNWAY 26 END AT ALL TIMES.
4. THE CONTRACTOR SHALL COORDINATE WITH ITO, HCF, AND SOC TO VERIFY EXISTING UNDERGROUND UTILITIES AND REQUIRED OUTAGES.

NOTES (CONT.):
5. PRIOR TO THE CLOSURE OF RUNWAY 8–26 THE CONTRACTOR SHALL COORDINATE WITH ITO TO ENSURE ALL UPDATED POSTINGS FOR RUNWAY 3–21 ARE ISSUED.
6. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460–1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

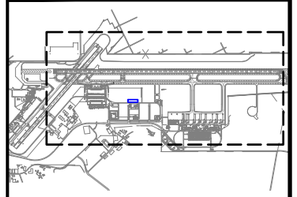
RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES
- X LIGHTED "X"

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

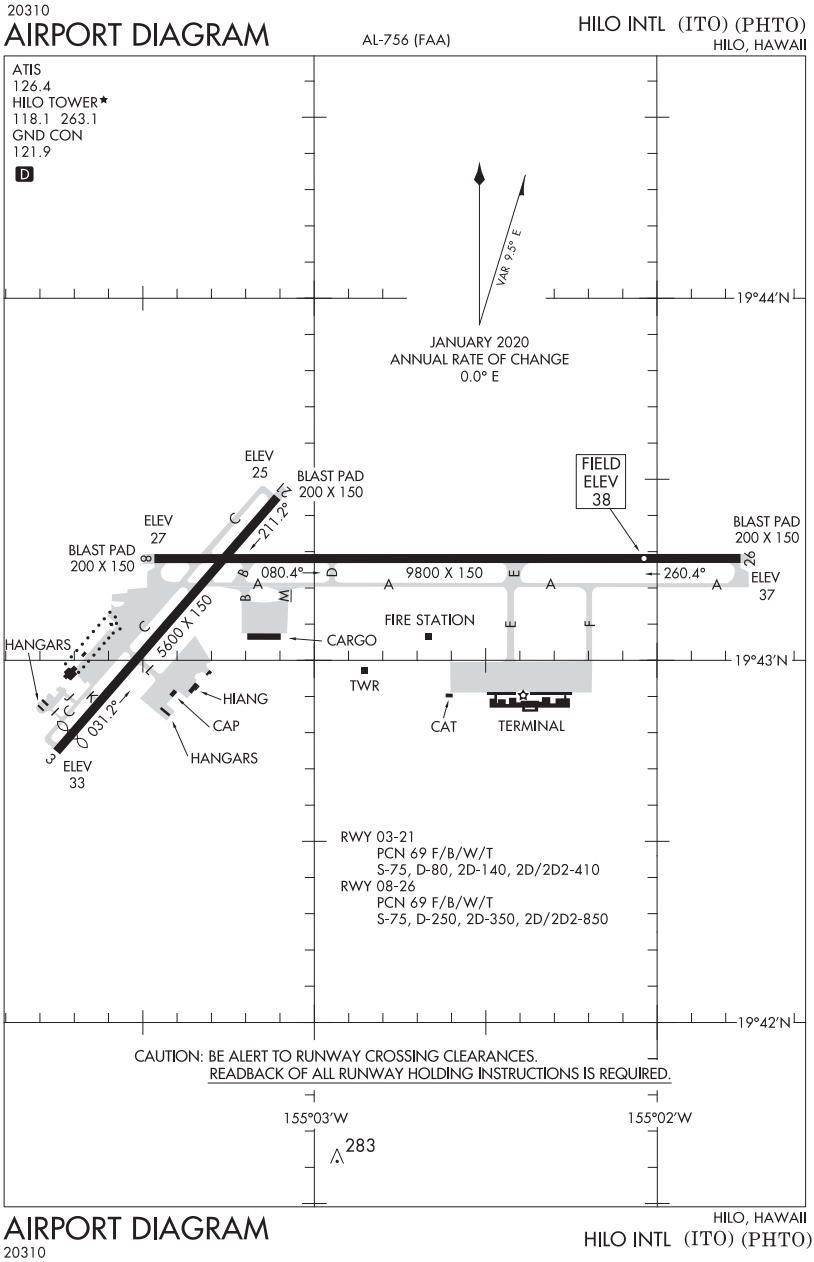
SHEET TITLE:

CSPP - PHASE 6

DATE :	DWG. NO.
FEBRUARY 2021	G-9
SHEET :	
9 OF 47 SHEETS	

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-141
OCTOBER 2022



DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT DESCRIPTION OF WORK
STATE PROJECT NO. AH1021-20 01005-142
AIP PROJECT NO. 3-15-0004-### OCTOBER 2022

Barricades

Aerocade®

Low-Profile Airport Barricade

TRINITY HIGHWAY

Ahead of the Curve™

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-143
OCTOBER 2022

EXHIBIT 4

Aerocade® Low-Profile Airport Barricade

The Aerocade Airport Barricade is a low-profile, water-filled, highly-visible, collapsible channelization device used to delineate work zones for construction and maintenance on airport runways and taxiways.

The Aerocade can be easily interconnected end-to-end and used as a channelizer or demarcation device. Additional accessories include warning flags and warning lights.

The Aerocade Low-Profile Airport Barricade complies with FAA Advisory Circular 150/5370-2F requirements.

TRINITY HIGHWAY

LOW-PROFILE, HIGH VISIBILITY

Features

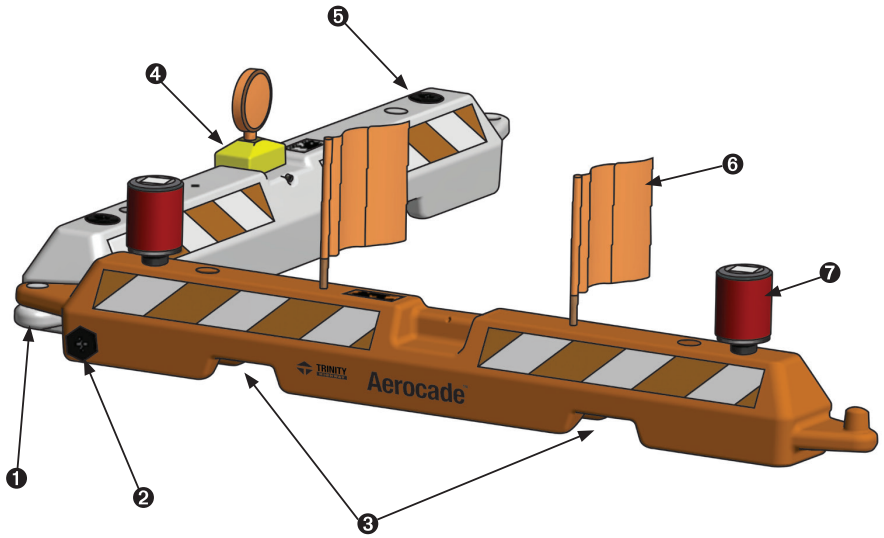
- Barricade available in orange or white.
- Reflective sheeting for improved visibility.
- Can be accessorized with lights and flags.
- Stackable for efficient transportation and storage.
- Light-weight system eliminates the need for large equipment.
- Jet blast resistant when properly filled with water.
- FOD free
- Collapsible

Applications

- Airport construction & maintenance
- Runway projects
- Closed runway perimeter
- Longitudinal channelizer

Specifications

- Length: 96"
- Width: 10"
- Height: 10"
- Empty: 20 lbs.
- Water Filled: 205 lbs.
- Capacity: 22 Gallons



1. Connection Ends
2. Drain Hole
3. Forklift Access
4. Optional Bolt-on Warning Light
5. Fill Hole
6. Optional Flag
7. Optional Screw-in Warning Light

Distributed by:

12-15

www.trinityhighway.com

1.888.496.3625

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

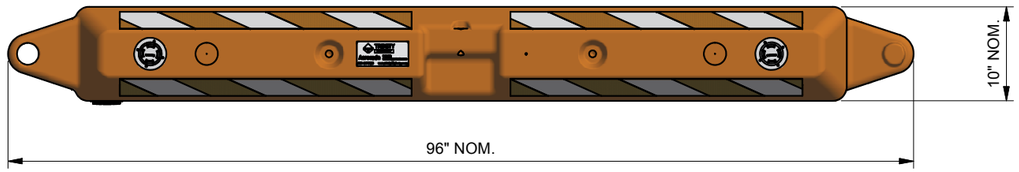
DESCRIPTION OF WORK
01005-144
OCTOBER 2022

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	QTY.
1	*	AEROCADE,BLOW MOLD ORANGE OR WHITE	1
2	118874	REFLECTIVE TAPE,4"X31",L	4
3	118862	DECAL,AEROCADE	1
4	118418	PLUG,2 NPT,PPA-57	1
5	118937	PLUG,2 NPT,PPA-71	2

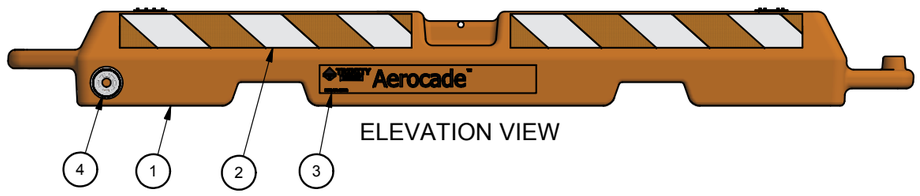
**

* 621282 - ORANGE

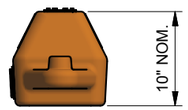
* 621283 - WHITE



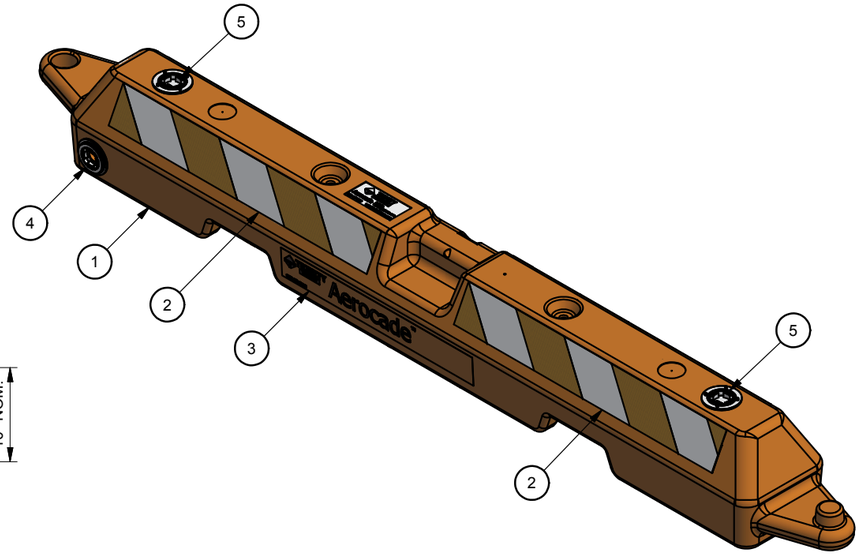
PLAN VIEW



ELEVATION VIEW



END VIEW



BOTTOM VIEW

**ASSEMBLY NO.
621284 - AEROCADE, BASE ASSEMBLY, ORANGE - (SHOWN)
621285 - AEROCADE, BASE ASSEMBLY, WHITE

MATERIAL: SEE PARTS LIST	DRAWN: R. VENZON	DATE: 3/25/2015	TOLERANCES PER QMS-SF-001, UNLESS OTHERWISE SPECIFIED.					AEROCADE,BASE ASSY,O OR W	TRINITY HIGHWAY
	CHECKED: J. WELCH	DATE: 3/26/2015							
FINISH: N/A	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES. DIMENSIONS ACCORDING TO ASME Y14.5M-1994 UNLESS OTHERWISE SPECIFIED.		DO NOT SCALE DRAWING						
	Revision		ECO	Date	Rev	By	Chk.		
	REMOVED BOX LIGHT, ADDED ITEM 4 (2 PLACES), ADDED NOMINAL LENGTH,WIDTH & HEIGHT DIMENSIONS		/	04/07/15	A	RJV	JBW		
	ADDED ITEM 5, REPLACED (2) ITEM 4 (TOP) W/ ITEM 5		/	05/14/15	B	RJV	JBW		
ESTIMATED WEIGHT: 21.98 lbmass	ITEM 3 QTY CHANGED FROM 2 TO 1		/	06/05/15	C	RJV		DRAWING: 621284	REV: C
									SHEET: 1 of 1

ENG-FE-046 Rev B, 9/8/2014

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-145
OCTOBER 2022

NAC LIGHTED LED (VISUAL AID) TEMPORARY FOLDABLE RUNWAY CLOSURE MARKER (NAC-LLT-FRCM)

US Patent No. D704,084 : CA Des. Pat. 162299

Part No. DY3000-893L

MEETS FAA PERFORMANCE SPECIFICATIONS IAW AC 150/5345-55

ETL VERIFIED BY INTERTEK

Green Dragon Technology®

**** OPERATES a minimum 3 day on 20 gal. tank unleaded gasoline)****

**** LED Lights include a 50,000 hrs. 5 year warranty****

**** Ground Power 110 V**

FEATURES

- Designed by NAC Dynamics, LLC using solid aluminum X frame with black boarder, yellow composite plastic, with nine(9) white circular 30 degree LED Lights (38 watt, 24 v Sunspot® 36 LED light fixtures driven by a 120 vac drivers).
- Each LED fixture is designed with 16 high power individual LED's includes in a water tight-shock resistant casing .
- Back mounted LED for visual monitoring from the non-display side and synchronized to flash or steady light settings.
- The X display is adjustable up to 3 degrees for matching runway flight approach paths.
- The X frame is constructed of 1.5" x 1.5" aluminum alloy composite with black anodized coating(Black border).
- X panel inserts are painted Yellow code13538
- Flash intervals are controlled for auto controlled and night mode that the RCM signal, bright or dim, will flash at a rate of 2.5 seconds "on" (+/-20%) and 2.5 seconds "off" (+/-20%)using a solid state electronic controller.

GASOLINE POWERED GENERATOR

- Cummins Onan EVAP Generator rated 4000 watts.
- Designed to run only when needed to charge onboard battery pack.
- All switch functions operate from battery powered system with generator support.
- Voltage 120vac. ground charging system
- Low oil pressure automatic shut down control & Electric start.
- Anti-vibration generator and control box mounts.
- Twenty (20) gallon fuel tank(Optional Diesel sold separately)
- System operations bypass for "plugged" into a NEMA L5-30 receptacle without the using generator.
- GFI with reset.
- All electronic components UL listed.

TRAILER

- Dimensions: 115 in. (L) x 82 in. (W) x 75 in. (H)
- Weight: 1,325 lbs.
- DOT Highway compliant.
- DOT approved brake, tail lights, turn signals and side reflectors.
- Rear mount tow harness and hitch for tandem towing.
- Four (4)point 5,000 lb. jacks with 13 in, extension and front hitch 1,200 lb. trailer jockey wheel.
- 175/80/13 tubeless tires, 13 inch wheels and fenders.
- Trailer constructed of 1.5 in. x 3 in. rectangular tubing.
- Power coated gray.

Intertek

MANUALS: A manual containing illustrated parts lists, operation instructions, safety precautions, and routine maintenance procedures shall be furnished with each unit at the time of delivery.

WARRANTY: We shall warrant the above equipment to be free from defects in design, materials, or workmanship for a period of not less than ninety (90) days. A copy of the warranty shall be furnished at the time of delivery. LED panels include a 5 year or 50,000 hour warranty.

PRODUCT SPEC SHEET
All Light Models

360 DEGREE TYPE-D SOLAR POWERED AIRPORT BARRICADE LIGHT

Part Numbers:*360SC (Screw/Threaded Base); 360BX (Box Base); 360ST (Stake/Post Base)
Dual Function Mode: Flashing &/or Steady Burn Modes All-in-One
Flash Rate: +/- 65 Flashes Per Minute
Power/Energy: 0.4 Watt Solar Panel/2.4 Volt NiMH 2,200 mAh Rechargeable Battery Included
Illumination/Brightness: Multiple High-Intensity Super Bright LEDs; 9 Candelas Each
Operational Requirements: Ready to Operate Right Out of the Box; Maintenance Free
Length of Operation: 3 to 5+ Years
Full Solar Charge: Operates 168+ Hours
Charging Requirements: Re-Charges During Day; No Direct Sunlight Required to Charge
On/Off Switch: Light Automatically Turns On at Dusk & Off at Dawn
Lens Cover Material: Polycarbonate
Base Con igurations: Standard Screw/Threaded Base; Standard Box Base; Stake/Post Base
Packaging: 360SC & 360ST: 10 Lights per Box; 360BX: 5 Lights per Box (Fully Assembled)

Colors Available: Red; Amber/Yellow; Clear/White

Light Meets or Exceeds FAA Performance Specs; Advisory Circular No. 150/5370-2F Compliant

TYPE-A/C DUAL FUNCTION SOLAR POWERED BARRICADE LIGHT

Part Number: DF002
Dual Function Mode: Flashing &/or Steady Burn Modes All-in-One
Flash Rate: +/- 65 Flashes Per Minute
Power/Energy: 0.4 Watt Solar Panel/2.4 Volt NiMH 1,600 mAh Rechargeable Battery Included
Illumination/Brightness: 2 High-Intensity Super Bright LEDs; 9 Candelas Each
Operational Requirements: Ready to Operate Right Out of the Box; Maintenance Free
Length of Operation: 3 to 5+ Years
Full Solar Charge: Operates 336+ Hours (Flash Mode); 168+ Hours (Steady Burn Mode)
Charging Requirements: Re-Charges During Day; No Direct Sunlight Required to Charge
On/Off Switch: Light Automatically Turns On at Dusk & Off at Dawn
Lens Cover Material: 7” Polycarbonate Lens with Retro-Re lector Ring
Mounting System: 180 Degree Swivel Box Style Base; Universal Mounting Bracket & Tool
Packaging: 5 Lights per Box (Fully Assembled); All Parts Included
Colors Available: Amber/Yellow; Red; Blue

Light Meets or Exceeds MUTCD Requirements and ITE Specs; NCHRP-350 Certified

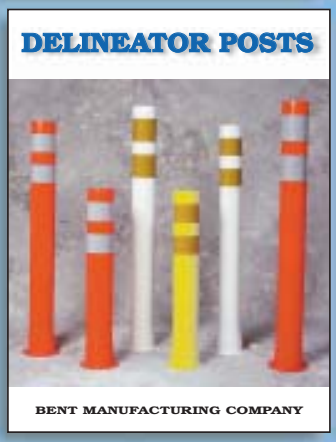
TYPE-B SOLAR POWERED HIGH-INTENSITY BARRICADE LIGHT

Part Number: SBL006
Flash Rate: +/- 65 Flashes Per Minute
Power/Energy: 1.5 Watt Solar Panel/3.6 Volt NiMH 4,600 mAh Rechargeable Battery Included
Illumination/Brightness: 9 High-Intensity Super Bright LEDs; 35+ Candelas
Operational Requirements: Ready to Operate Right Out of the Box; Maintenance Free
Length of Operation: 3+ Years
Full Solar Charge: Operates 168+ Hours Flashing; Overcharge Protection Built-In
Charging Requirements: Re-Charges During Day; No Direct Sunlight Required to Charge
On/Off Switch: Operates 24/7 Flashing
Lens Cover Material: Polycarbonate
Mounting System: Box Style Base with Multiple Mounting Options Available
Packaging: 5 Lights per Box (Fully Assembled); All Parts Included
Colors Available: Amber/Yellow; Red

Light Meets or Exceeds MUTCD Requirements and ITE Specs; NCHRP-350 Certified

3710 Industry Avenue - Suite 204 I Lakewood, CA 90712 I (877) 917-6527 I sales@Solar-Masters.com I www.Solar-Masters.com

AMERICA'S MOST WANTED



Traffic Delineation Devices

BENT

MANUFACTURING COMPANY, INC.

17311 Nichols Street • Huntington Beach, CA 92647-5721 • (714) 842-0600 • FAX (714) 842-2959
(888) 842-0600 • FAX (888) 842-2368 • E-Mail bentmfg@ix.netcom.com • http://www.bentmfg.com

TESTED to meet the CRASHWORTHY requirements of NCHRP-350
FHWA Acceptance #WZ-6 and WZ-16
CERTIFIED

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-149

UNIVERSAL PLASTIC BARRICADE

- Designed for maximum stress & impact absorption w/Bent waffleboard design on back.
- Recessed areas for reflective sheeting and light mount brackets.
- Has convenient carry-handle and non-shifting stacking lugs.

Barricade Type	Type I 8" x 24" 12" x 24"	Type II 12" x 24" or 8" x 24" (top) 8" x 24" (bottom)
Material	High density polyethylene	
Color	White, yellow, orange	
Weight	14 pounds minimum	
Sand Ballasting	Maximum of 30 pounds	
Reflective Sheeting	S.E.G. / ENG. Grade / High Intensity	
Temperature Range	Freeze stress crack: -188° / Heat softening temperature: 216°	
Height	45"	
Width	24"	
Thickness	2-1/4"	

Patent No. 5,458,434

DELINEATOR POSTS

- Designed for maximum visibility, quick set-up and low maintenance.
- All posts feature a 'flare-bottom' design with one-inch wide right angle flare. Insures positive locking of post and base.
- Some models come standard in length, or we can custom cut to your specifications.
- Tested and certified to meet the crashworthy requirements of NCHRP-350.

Available Heights	18", 28", 36", 39" and 42"		
Available Styles	500 Series	600 Series	700 Series
T-Top Handle	N/A	N/A	Standard
Recessed Bands	N/A	N/A	Standard
Reflectivity (available in 3" or 4" band size)	Reflexite super high intensity only	Reflexite super high intensity or 3M flexible high intensity	Reflexite super high intensity or 3M flexible high intensity
Color	Fluorescent orange, yellow or white		
Material	Low density polyethylene		
Post Diameter O.D.	4 inches		
Wall Thickness	.090" - .110"		
Post Bottom Contour	4-5/8" diameter plus 1° wide right angle flare		

T-TOP STACKABLE CHANNELIZER CONE

- Multi-function device (three uses in one), 'sleeved cone,' 'tubular delineator post' and 'channelizer device.'
- Unique T-shaped handle with mounting hole for light. (New longer handgrip area.)
- Stackable with base.
- All rubber base and extra large flanged bottom.
- Tested and certified to meet the crashworthy requirements of NCHRP-350.

Channelizer Material	High density polyethylene
Channelizer Color	Fluorescent orange or white
Channelizer Weight	3 pounds
Channelizer Height	42" plus 3" handle
Base Material	Manufactured with minimum 45% recycled rubber
Base Size	Octagon: 16½" x 1¾" • Rectangular: 18" x 28" x 2"
Base Weight	11, 15 and 30 pounds
Cone Dimensions	Top 4" tapering to 8½" bottom
Bottom Flange	11"
Reflectivity	All sizes: 3M or Reflexite High intensity, super engineer, engineer grade and diamond grade

ULTRA PANEL

- Large arch carry handle allows gloved workers easy, comfortable and secure grip. Molded light mount is designed for standard size light bolt and cup washers.
- Recessed reflective sheeting area, maximum width 8" x 36". Accommodates USA M.U.T.C.D. minimum of 270 square inches of reflective sheeting.
- High gravity molded rubber base hugs the road and quickly assembles and disassembles even with up to a 12" wide sign attached.
- Fully stackable with or without base with the ability to nest within 3½".
- Multiple 60 M.P.H. plus impacts resulted in no damage to any part of the Ultra Panel, the base or the test car.
- Stacking, units stack within approximately 3½" for compact shipping and handling.
- Custom printing available (Kids at Play, Slow, No Parking, Valet Parking, etc.) (see photo below).
- Tested and certified to meet the crashworthy requirements of NCHRP-350, also approved by the Texas D.O.T.

Panel	Low density polyethylene
Color	Cad. orange or white
Panel Weight	4½ pounds
Panel Height	43"
Vertical Panel Height	36"
Vertical Panel Width	8"
Base Material	Manufactured with minimum 45% recycled rubber
Base Size	Rectangular: 18" x 13" x 1⅞" • Rectangular: 20" x 28" x 1¾" Square: 20" x 20" x 1¾"
Base Weight	Rectangular: 9 lbs • Square: 20 lbs • Rectangular: 30 lbs
Panel Dimensions	8⅜" x 1½" top tapering to 12½" x 6" at bottom
Bottom Flange	9¼" x 17"
Temperature Range	Freeze stress crack (tested to) -180ºF Heat softening temp: +240ºF
Reflectivity	High intensity, diamond grade, engineering grade, super engineering grade, or custom printing
Reflective Panel Size	8" x 24; 8" x 34; 8" x 36; 8" x 12" x 27" (270 sq. inches) (U.D.O.T. Approved)

MASTERFLEX POST EX-SERIES

- Available in two models—180° 2-way direction channelizer or a 360° full-view direction channelizer.
- Both models incorporate the latest molding techniques and materials technology.
- High impact resistant designed to withstand numerous high-speed traffic impacts with minimal adverse effect.
- Available, one piece molded rubber base made from *Hy-Last*, the highest elastic natural rubber available or the one piece injection molded A.B.S. high impact plastic with two (2) plastic anchor drive pins.
- Both styles of bases are very compatible with all styles of mounting applications, i.e.; mechanical anchors, butyl pads, hot bituminous or epoxy.
- Tested and certified to meet the crashworthy requirements of NCHRP-350.

Post	180° two-way	360° full-view
Diameter (O.D.)	3¼" with 4" x 12" flat	3¼"
Height	18", 24", 28", 36", 39", 42" and 48" (custom available)	18", 24", 28", 36", 39", 42" and 48" (custom available)
Reflectivity	3" x 12" or 4" x 12"	Multi-band 2", 3", 4", 5", 6" wide, etc.
Post Material	High impact polyethylene blend or polyurethane	High impact polyethylene blend or polyurethane
Base Material	Hy-Last rubber or A.B.S. plastic	Hy-Last rubber or A.B.S. plastic

WAFFLEBOARD PLASTIC BARRICADE PANELS

- High impact resistant, unique 'waffle' pattern optimizes board strength and rigidity.
- Capable of withstanding extremely variable environmental conditions.
- Has pre-molded bolt holes, 'squared' to accept carriage bolts.
- Sheeting side of panel is smooth, easy application of reflective sheeting.

Intended Application	Type I & II Barricades and Vertical Panels
Material	High density homopolymer polyethylene with UV inhibitors
Dimensions (panel size)	6" x 24", 8" x 24", 12" x 24" Thickness: .500 (1/2 inch)
Tensile Strength (ASTM) D638-72	4000 PSI
Elongation 2" min % (ASTM) D638-72	600%
Flexural Modulus (ASTM) D790-71	240,000 PSI
Brittle Temperature	-180°F
Softening Temperature	+320°F

T-TOP DELINEATOR POST

- Standard with molded lower handhold grip.
- Convenient T-top carry handle (a Bent Mfg. Co. exclusive) and molded in bolt hole for flashing light (new longer handgrip area).
- Improved recesses create a deeper area for reflective bands—stronger ribs provide maximum band protection.
- Bent T-top delineator posts are manufactured using state-of-the-art technology. New precision molding machines produce consistent, high quality parts.
- Tested and certified to meet the crashworthy requirements of NCHRP-350.

Post Material	Low density polyethylene
Post Color	Fluorescent, orange, yellow, white
Post Diameter	4"
Post Height	18", 28", 36", 39" and 42"
Base Material	Manufactured with 45% recycled rubber
Base Weight	8, 12, 15, 18 and 22 pounds

Patent no. 6,[illegible]4,941

BARRICADES TYPE I & II

- Barricades available as complete units or as separate components (boards & legs).

Barricade Legs	Painted / Galvanized
Leg Thickness	14, 12, 11 gauge
Leg Material	Steel angle iron or steel roll formed
Leg Length	45° standard 'Universal Fitting'
Board Hole Pattern on Ctrs	4, 6, 10 inch

Panel Width	6"		8"		12"	
Material	Plastic	Plywood	Plastic	Plywood	Plastic	Plywood
Panel Thickness	1/2" waffle .290/.350	1/2"	1/2" waffle .290/.350	1/2"	1/2" waffle .290/.350	1/2"
Panel Color	White	White	White	White	White	White
Reflective Sheeting	EG Hi-Int	NS EG Hi-Int	EG Hi-Int	NS EG Hi-Int	EG Hi-Int	NS EG Hi-Int
Panel Standard Lengths	24"	24" 30" 32" 36"	24"	24" 30" 32" 36"	24"	24" 30" 32" 36"

TYPE III BARRICADES

- Easy to assemble, bolt together, very portable.
- Accommodates reflective sheeting on both sides of panel and accepts two flashing lights.
- Unique base design allows for short term or permanent securing.
- Multiple barricades can be joined in series.

Material	[illegible]
Dimensions — Panel	
Height (top)	5'
Height (center)	3'4"
Height (bottom)	2'8"
Width	8"
Length	4', 5', 6'
Thickness	ACX plywood: 3/4" / Douglas fir: 2"
Steel Upright Frame	1-1/2" x 1-1/2" x 3/16" x 63"
Steel Base Stand	1-1/2" x 1-1/2" x 3/16" x 60" with 2" x 2" x 8" square tubing receiver
Weight	66 pounds

SUPERDOME DRUM

- Double (one on each side) flag mount holes with pre-molded stops for all-purpose flagging situations.
- Enlarged arch carry handle allows gloved workers easy, comfortable and secure grip.
- Ribbed dome top for increased target value and superior structural strength.
- High gravity molded rubber base hugs the road as if it were "glued down."
- Recessed reflective band tiers, maximum width 6". Accommodates USA M.U.T.C.D. 2" maximum spacing specifications.
- Two pre-molded light mounts are designed for standard size bolt and cup washers.
- Rounded dome top discourages any dangerous debris or rocks to collect on top of drum.
- Tested and certified to meet the crashworthy requirements of NCHRP-350.

Drum Materials	Low or high density polyethylene				
Color	Cad. orange				
Drum Weight	LDPE (12 lbs), HDPE (10 lbs)				
Drum Height	Base of drum to bottom of dome – 36" (meets Fed. M.U.T.C.D. VI, Section 6F-5e.) Base of drum to top of dome – 39" Base of drum to top of handle – 41½"				
Drum Diameter	18" minimum (meets Fed. M.U.T.C.D. Part VI, Section 6F-5e.)				
Reflectivity	H.I. / E.G. / D.G.				
Reflective Band Size	4" / 6"				
Light Brackets	2 each				
Flag Brackets	2 each				
OPTIONAL BASE					
Base Material	Molded rubber snap-on base	Drop over base (natural bio-degradable materials or molded rubber	Drop over base (blow-molded polyethylene plastic, sand fillable)	Sand filled snap-on (LDPE/ HDPE)	Sand bag snap-on base (LDPE/ HDPE)
Base Weight	25, 30, 40 lbs	28 lbs	3½ lbs (empty) to 40 lbs (filled)	4 to 40 lbs	2½
Base Height	2.8"	3.25"	3.5"	3.5"	3.5"
Base Diameter	24"	26"	26"	24"	24"
Base Color	Black	Natural/black	Black/ cad. orange	Cad. orange	Cad. orange

Patent No. 5,722,788
Patent No. 6,019,542

MASTERFLEX POST

- Available in two models—a 180° 2-way direction channelizer or a 360° full-view direction channelizer.
- Both models incorporate the latest molding techniques and materials technology.
- High impact resistant designed to withstand numerous high speed traffic impacts with minimal adverse effect.
- New one piece, hollow molded rubber base made from Hy-Last®, the highest elastic natural rubber available.
- Effective in K-marker applications.

Posts	180° two-way	360° full-view
Diameter	2-1/4"	2-1/4"
Height	18", 24", 28", 36", 39", 42", 48" (custom available)	18", 24", 28", 36", 39", 42", 48" (custom available)
Reflectivity	3" x 12" or special order	Multi-band 2", 3", 4", 5", 6" wide, etc.
Post Material	High impact polyethylene blend	High impact polyethylene blend
Base Material	Hy-Last® rubber	Hy-Last® rubber

DELINEATOR BASES

Type of Base	Standard Delineator	T-Top Cone	T-Top Cone (Rectangular)	Cone Weight for 28" Cone	Masterflex Post	Glue-Down T-Top Post
Weight (pounds)	8, 12, 15, 18 and 22	11 and 15	30	8	1, 1½, 1¾	5½
Size (diameter & thickness)	Octagon 16" x 16" x 1¼"	Octagon 16" x 16" x 1¼" x 1¾"	Rectangular 18" x 28" x 2"	Octagon 16" x 16" x 1¼"	Round 8" diameter x 3"	Round 10" x 3¾"
Center Opening	4¾"	8½"	8½"	10¾"	Solid round	4¾"
Diameter					2" O.D. & 3" O.D.	
Material	Black rubber	Black rubber	Black rubber	Black rubber	Black rubber or A.B.S.	Black hard rubber

Type of Base	Superdome Drum (Rubber)	Superdome Drum (Drop-Over Rubber)	Superdome Drum (Drop-Over Blow-Mold, Sand Fillable)	Superdome Drum (Plastic Sandbag or Sand Filled)	T-Top Cone and Superdome Combo (D-Shape)	Ultra Panel Vertical Panel	Lite Post (Octagon)
Weight (pounds)	25, 30 and 40	28	3½ empty 40 filled	2½ up to 50 (ballast)	30	9, 20 and 30	22
Size (diameter & thickness)	D-Shape 22" x 24" x 3½"	D-Shape O.D. 26" Height 3¼"	D-Shape O.D. 26" Height 3¼"	D-Shape 22" x 24" x 3½"	D-Shape 22" x 24" x 3½"	Rectangular 13" x 18" x 1½" 20" x 20" x 1½" 20" x 28" x 1¾"	Octagon 24" x 24" x 2¼"
Center Opening	4¾" x 8½"	I.D. 22"	I.D. 22"	N/A	8½"	6" x 12½"	12" x 9"
Diameter		O.D. 26"	O.D. 26"				
Material	Black rubber	Natural bio-degradable materials or black rubber Patent #6,019,542	Polyethylene plastic, black/ cad. orange	Polyethylene plastic, cad. orange	Black rubber	Black rubber	Black rubber

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

DESCRIPTION OF WORK
01005-150
OCTOBER 2022

SECTION 01040 – SCOPE OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Section 40: Scope of Work, as included as an attachment to this Section.

1.02 SUMMARY

A. This Section Includes:

a. Intent of contract

b. Alterations of work and quantities

c. Omitted items

d. Extra work

e. Maintenance of traffic

f. Removal of existing structures

g. Rights in and use of materials found in the work

h. Final cleanup

1.03 REFERENCES

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

B. Federal Aviation Administration (FAA)

a. FAA Specification Section 40: Scope of Work

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

PART 5 – ATTACHMENTS

5.01 FAA Specification Section 40 Scope of Work

Section 40 Scope of Work

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

40-02 Alteration of work and quantities. The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, *Compensation for Altered Quantities.*

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement. Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

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

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

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

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work

covered by the original contract shall be covered by a supplemental agreement as defined in the Special Provisions.

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

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

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

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

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

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

40-06 Removal of existing structures. All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

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

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

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

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

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

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

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

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

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

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

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

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

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

END OF SECTION 40

END OF SECTION 01040

SECTION 01050 – CONTROL OF WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Section 50: Control of Work, as included as an attachment to this Section.

1.02 SUMMARY

A. This Section includes:

a. Authority of the Resident Project Representative (RPR)

b. Conformity with plans and specifications

c. Coordination of contract, plans, and specifications

d. List of Special Provisions

e. Cooperation of Contractor

f. Cooperation between Contractors

g. Construction layout and stakes

h. Authority and duties of Quality Assurance (QA) inspectors

i. Inspection of the work

j. Removal of unacceptable and unauthorized work

k. Load restrictions

l. Maintenance during construction

m. Failure to maintain the work

n. Partial acceptance

o. Final acceptance

p. Claims for adjustment and disputes

1.03 REFERENCES

A. 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.

B. Federal Aviation Administration (FAA)

a. FAA Specification Section 50: Control of Work

1.04 SUBMITTALS

A. Submit in accordance with Specification Section 01300 – Submittals

B. Copies of survey notes must be submitted for each area of construction and for each placement of material in accordance with FAA Specification Section 50, paragraph 50-07.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

PART 5 – ATTACHMENTS

5.01 FAA Specification Section 50 Control of Work

Section 50 Control of Work

50-01 Authority of the Resident Project Representative (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

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

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

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

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

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

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

50-03 Coordination of contract, plans, and specifications. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If

any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

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

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

50-04 List of Special Provisions. Special Provisions.

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

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

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

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

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

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

50-07 Construction layout and stakes. The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

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

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in a format acceptable by the RPR.

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

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

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

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

50-17 Value Engineering Cost Proposal.

The provisions of this paragraph will apply only to contracts awarded to the lowest bidder pursuant to competitive bidding.

On projects with original contract amounts in excess of $100,000, the Contractor may submit to the RPR, in writing, proposals for modifying the plans, specifications or other requirements of the contract for the sole purpose of reducing the cost of construction. The value engineering cost proposal shall not impair, in any manner, the essential functions or characteristics of the project, including but not limited to service life, economy of operation, ease of maintenance, desired appearance, design and safety standards. This provision shall not apply unless the proposal submitted is specifically identified by the Contractor as being presented for consideration as a value engineering proposal.

Not eligible for value engineering cost proposals are changes in the basic design of a pavement type, runway and taxiway lighting, visual aids, hydraulic capacity of drainage facilities, or changes in grade or alignment that reduce the geometric standards of the project.

As a minimum, the following information shall be submitted by the Contractor with each proposal:

a. A description of both existing contract requirements for performing the work and the proposed changes, with a discussion of the comparative advantages and disadvantages of each.

b. An itemization of the contract requirements that must be changed if the proposal is adopted.

c. A detailed estimate of the cost of performing the work under the existing contract and under the proposed changes.

d. A statement of the time by which a change order adopting the proposal must be issued.

e. A statement of the effect adoption of the proposal will have on the time for completion of the contract.

f. The contract items of work affected by the proposed changes, including any quantity variation attributable to them.

The Contractor may withdraw, in whole or in part, any value engineering cost proposal not accepted by the RPR, within the period specified in the proposal. The provisions of this subsection shall not be construed to require the RPR to consider any value engineering cost proposal that may be submitted.

The Contractor shall continue to perform the work in accordance with the requirements of the contract until a change order incorporating the value engineering cost proposal has been issued. If a change order has not been issued by the date upon which the Contractor's value engineering cost proposal specifies that a decision should be made, or such other date as the Contractor may subsequently have requested in writing, such value engineering cost proposal shall be deemed rejected.

The RPR shall be the sole judge of the acceptability of a value engineering cost proposal and of the estimated net savings from the adoption of all or any part of such proposal. In determining the estimated net savings, the RPR may disregard the contract bid prices if, in the RPR's judgment such prices do not represent a fair measure of the value of the work to be performed or deleted.

The Owner may require the Contractor to share in the Owner's costs of investigating a value engineering cost proposal submitted by the Contractor as a condition of considering such proposal. Where such a condition is imposed, the Contractor shall acknowledge acceptance of it in writing. Such acceptance shall constitute full authority for the Owner to deduct the cost of investigating a value engineering cost proposal from amounts payable to the Contractor under the contract.

If the Contractor's value engineering cost proposal is accepted in whole or in part, such acceptance will be by a contract change order that shall specifically state that it is executed pursuant to this paragraph. Such change order shall incorporate the changes in the plans and specifications which are necessary to permit the value engineering cost proposal or such part of it as has been accepted and shall include any conditions upon which the RPR's approval is based. The change order shall also set forth the estimated net savings attributable to the value engineering cost proposal. The net savings shall be determined as the difference in costs between the original contract costs for the involved work items and the costs occurring as a result of the proposed change. The change order shall also establish the net savings agreed upon and shall provide for adjustment in the contract price that will divide the net savings equally between the Contractor and the Owner.

The Contractor's 50% share of the net savings shall constitute full compensation to the Contractor for the value engineering cost proposal and the performance of the work.

Acceptance of the value engineering cost proposal and performance of the work shall not extend the time of completion of the contract unless specifically provided for in the contract change order.

END OF SECTION 50

END OF SECTION 01050

SECTION 01060 – CONTROL OF MATERIALS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Section 60: Control of Materials, as included as an attachment to this Section.

1.02 SUMMARY

A. This Section includes:

a. Source of supply and quality requirements

b. Samples, tests, and cited specifications

c. Certification of compliance/analysis (COC/COA)

d. Plant inspection

e. Engineer/Resident Project Representative (RPR) field office

f. Storage of material

g. Unacceptable materials

h. Owner furnished materials

1.03 REFERENCES

A. 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.

B. Federal Aviation Administration (FAA)

a. FAA Specification Section 60: Control of Materials

1.04 SUBMITTALS

A. Submit in accordance with Specification Section 01300 – Submittals

B. Copies of all Contractor QC test data must be submitted daily in accordance with FAA Specifications Section 60, paragraph 60-02.

C. Certificates of compliance, if used, must be submitted in accordance with FAA Specification Section 60, paragraph 60-03.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

PART 5 – ATTACHMENTS

5.01 FAA Specification Section 60 Control of Materials

Section 60 Control of Materials

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

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

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

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

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

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

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

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

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program (CQCP).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

60-05 Engineer/ Resident Project Representative (RPR) field office. Not Required.

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

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

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

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

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

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

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

END OF SECTION 60

END OF SECTION 01060

SECTION 01070 – LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Section 70: Legal Regulations and Responsibility to Public, as included as an attachment to this Section.

1.02 REFERENCES

A. 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.

B. Federal Aviation Administration (FAA)

a. FAA Specification Section 70: Legal Regulations and Responsibility to Public

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

PART 5 – ATTACHMENTS

5.01 FAA Specification Section 70 Legal Regulations and Responsibility to Public

Section 70 Legal Regulations and Responsibility to Public

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

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

70-03 Patented devices, materials, and processes. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

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

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

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

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

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

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

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

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

70-08 Construction Safety and Phasing Plan (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP is shown on the project plans and is part of the bid documents.

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

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

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

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

70-11 Responsibility for damage claims. The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the

Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

70-12 Third party beneficiary clause. It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

70-13 Opening sections of the work to traffic. If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such "phasing" of the work must be specified below and indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

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

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

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

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

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

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

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at their own expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

70-15 Contractor's responsibility for utility service and facilities of others. As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the owner of any

public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

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

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

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

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

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

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

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

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

70-15.1 FAA facilities and cable runs. The Contractor is hereby advised that the construction limits of the project include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the execution of the project work, shall comply with the following:

a. The Contractor shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.

b. The Contractor shall provide notice to the FAA Air Traffic Organization (ATO)/Technical Operations/System Support Center (SSC) Point-of-Contact through the airport Owner a minimum of seven (7) calendar days prior to commencement of construction activities in order to permit sufficient time to locate and mark existing buried cables and to schedule any required facility outages.

c. If execution of the project work requires a facility outage, the Contractor shall contact the FAA Point-of-Contact a minimum of 72 hours prior to the time of the required outage.

d. Any damage to FAA cables, access roads, or FAA facilities during construction caused by the Contractor's equipment or personnel whether by negligence or accident will require the Contractor to repair or replace the damaged cables, access road, or FAA facilities to FAA requirements. The Contractor shall not bear the cost to repair damage to underground facilities or utilities improperly located by the FAA.

e. If the project work requires the cutting or splicing of FAA owned cables, the FAA Point-of-Contact shall be contacted a minimum of 72 hours prior to the time the cable work commences. The FAA reserves the right to have a FAA representative on site to observe the splicing of the cables as a condition of acceptance. All cable splices are to be accomplished in accordance with FAA specifications and require approval by the FAA Point-of-Contact as a condition of acceptance by the Owner. The Contractor is hereby advised that FAA restricts the location of where splices may be installed. If a cable splice is required in a location that is not permitted by FAA, the Contractor shall furnish and install a sufficient length of new cable that eliminates the need for any splice.

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

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

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

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

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

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

Should the Contractor encounter, during their operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that

location and notify the RPR. The RPR will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

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

70-21 Insurance Requirements. The Contractor shall obtain and maintain the required insurance coverages outlined in the Special Provisions included in Part 0.D – Supplemental Provisions and Part I – General Provisions for Construction Projects.

END OF SECTION 70

END OF SECTION 01070

SECTION 01080 – EXECUTION AND PROGRESS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Section 80: Execution and Progress, as included as an attachment to this Section.

1.02 SUMMARY

A. This Section includes:

a. Subletting of Contract

b. Notice to Proceed

c. Execution and Progress

d. Limitations of Operations

e. Operational Safety on Airports During Construction

f. Character of Workers, Methods, and Equipment

g. Temporary Suspension of the Work

h. Determination and Extension of Contract Time

i. Failure to Complete on Time

j. Default and Termination of Contract

k. Termination for National Emergencies

l. Work Area, Storage Area and Sequence of Operations

1.03 REFERENCES

A. 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.

B. Federal Aviation Administration (FAA)

a. FAA Specification Section 80: Execution and Progress

1.04 SUBMITTALS

A. The Contractor must submit their progress schedule for the Engineer's approval in accordance with FAA Specification Section 80, paragraph 80-03.

B. The Contractor must submit a Safety Plan Compliance Document in accordance with FAA Specifications Section 80, paragraph 80-04.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

PART 5 – ATTACHMENTS

5.01 FAA Specification Section 80 Execution and Progress

Section 80 Execution and Progress

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

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

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

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

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

80-02 Notice to proceed (NTP). The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within 10 days of the date set by the Engineer in written notice to proceed. The Contractor shall notify the RPR at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

80-03 Execution and progress. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least 30 days after the effective date of the notice to proceed. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR's request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least 24 hours in advance of resuming operations.

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

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

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

80-04 Limitation of operations. The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP).*

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

Airfield Operational Impacts			
Phase Name	Location of Airfield Impacts	Airfield Restrictions/Closures	Additional Description
1	Army National Guard Aviation Ramp	• ITO Taxiway L Closed • ITO Army National Guard Aviation Ramp Partially Closed	See Phasing Plans
2	Runway 3-21	• ITO Rwy 3-21 Closed • ITO Taxiway L Closed • ITO Taxiway C Closed South of Taxiway I • ITO Army National Guard Aviation Ramp Work in Progress	See Phasing Plans
3	Taxiway C	• ITO Taxiway C Work In Progress • ITO Taxiway C Aircraft Wingspan Limited To 70’ Between Taxiway J and 200 Ft Northwest of Taxiway K • ITO Taxiway J Work in Progress • ITO Taxiway J Aircraft Wingspan limited to 70’ • ITO Northwest Ramp Partially Closed	See Phasing Plans
4	Army National Guard Aviation Ramp	• ITO Army National Guard Aviation Ramp Work In Progress	See Phasing Plans
5	Runway 8-26	• ITO Runway 3-21 Work In Progress • ITO Runway 8-26 Work In Progress • ITO Taxiway C Work In Progress	See Phasing Plans
6	Runway 8-26	• ITO Runway 8-26 Closed • ITO Taxiway A Closed East of Taxiway F • ITO Taxiway B Closed • ITO Taxiway D Closed • ITO Taxiway E Closed North of Taxiway A	See Phasing Plans
7	Army National Guard Aviation Ramp	• ITO Taxiway L Closed • ITO Army National Guard Aviation Ramp Work in Progress	See Phasing Plans
8	Army National Guard Aviation Ramp	• ITO Army National Guard Aviation Ramp Work in Progress	See Phasing Plans

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

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

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

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

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

80-05 Character of workers, methods, and equipment. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

Should the Contractor fail to remove such person or persons, or fail to furnish suitable and sufficient personnel for the proper execution of the work, the RPR may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such

other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

80-06 Temporary suspension of the work. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

If it becomes necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The Contractor shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

80-07 Determination and extension of contract time. The number of calendar days shall be stated in the proposal and contract and shall be known as the Contract Time.

If the contract time requires extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

80-07.1 Contract time based on working days. Not Used.

80-07.2 Contract time based on calendar days. Contract Time based on calendar days shall consist of the number of calendar days stated in the contract counting from the effective date of the Notice to Proceed and including all Saturdays, Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of the Owner's orders to suspend and resume all work, due to causes not the fault of the Contractor, shall be excluded.

At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance.

80-08 Failure to complete on time. For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *Determination and Extension of Contract Time*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional

engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract.

See the "Proposal to the State of Hawaii Department of Transportation" for the contract completion time. See the "Special Provisions" section 8.8 for liquidated damage costs related to failure to complete the project and delay in re-opening runways and taxiways.

The maximum construction time allowed for Phase 1 through Phase 8 will be the sum of the time allowed for individual phases but not more than 360 calendar days. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a wavier on the part of the Owner of any of its rights under the contract.

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

a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or

b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or

c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or

d. Discontinues the execution of the work, or

e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or

f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or

g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or

h. Makes an assignment for the benefit of creditors, or

i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

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

If the Contractor or surety, within a period of 7 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the RPR of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the RPR will be required for the completion of said contract in an acceptable manner.

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

80-10 Termination for national emergencies. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

80-11 Work area, storage area and sequence of operations. The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

END OF SECTION 80

END OF SECTION 01080

SECTION 01090 – MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Section 90: Measurement and Payment, as included as an attachment to this Section.

1.02 SUMMARY

A. This Section Includes:

a. Measurement of quantities

b. Scope of payment

c. Compensation for altered quantities

d. Payment for omitted items

e. Payment for extra work

f. Partial payment

g. Payment for materials on hand

h. Payment of withheld funds

i. Acceptance and final payment

j. Construction warranty

k. Project closeout

1.03 REFERENCES

A. 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.

B. Federal Aviation Administration (FAA)

a. FAA Specification Section 90: Measurement and Payment

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

PART 5 – ATTACHMENTS

5.01 FAA Specification Section 90 Measurement and Payment

Section 90 Measurement and Payment

90-01 Measurement of quantities. All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

The term “lump sum” when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, “lump sum” work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When requested by the Contractor and approved by the RPR in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the RPR and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Measurement and Payment Terms

Term	Description
Excavation and Embankment Volume	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
Measurement and Proportion by Weight	The term “ton” will mean the short ton consisting of 2,000 pounds (907 km) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark.

Term	Description
Measurement by Volume	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.
Asphalt Material	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
Cement	Cement will be measured by the ton (kg) or hundredweight (km).
Structure	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
Timber	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.
Plates and Sheets	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
Miscellaneous Items	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
Scales	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end. Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the

Term	Description
	scale, but not less than one pound (454 grams). The use of spring balances will not be permitted. In the event inspection reveals the scales have been "overweighing" (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%. In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded. Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them. Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment. All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.
Rental Equipment	Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 *Payment for Extra Work*.
Pay Quantities	When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

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

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

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

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

90-04 Payment for omitted items. As specified in Section 40, paragraph 40-03, *Omitted Items,* the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR's order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR's order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR's order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

90-05 Payment for extra work. Extra work, performed in accordance with Section 40, paragraph 40-04, *Extra Work,* will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

90-06 Partial payments. Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *Payment for Materials on Hand.* No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *Acceptance and Final Payment.*

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

90-07 Payment for materials on hand. Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other

sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.

b. The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.

d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material stored or stockpiled.

e. The Contractor has furnished the Owner evidence that the material stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of their responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

90-08 Payment of withheld funds. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

d. The Contractor shall obtain the written consent of the surety to such agreement.

90-09 Acceptance and final payment. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

After the Contractor has approved, or approved under protest, the RPR's final estimate, and after the RPR's receipt of the project closeout documentation required in paragraph 90-11, *Contractor Final Project Documentation*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, *Claims for Adjustments and Disputes,* or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

90-10 Construction warranty.

a. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.

c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *Final Cleanup*.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

g. When applicable per state requirements, return copies of sales tax completion forms.

h. Manufacturer's certifications for all items incorporated in the work.

i. All required record drawings, as-built drawings or as-constructed drawings.

j. Project Operation and Maintenance (O&M) Manual(s).

k. Security for Construction Warranty.

l. Equipment commissioning documentation submitted, if required.

END OF SECTION 90

END OF SECTION 01090

SECTION 01100 - CONTRACTOR QUALITY CONTROL PROGRAM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Item C-100: Contractor Quality Control Program, as included as an attachment to this Section.

1.02 SUMMARY

A. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving the quality project. The Contractor must establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor must assume full responsibility for accomplishing the stated purpose.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 01562 – Management of Contaminated Medias

C. Section 02401 – Asphalt Mix Pavement

D. Section 02610 – Dry Wells

E. Section 02620 – Runway and Taxiway Markings

F. Section 03300 – Concrete for Miscellaneous Structures

G. Section 16522 – Airfield Lighting System

1.04 REFERENCES

A. 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.

B. National Institute for Certification in Engineering Technologies (NICET)

C. Federal Aviation Administration (FAA)

1. FAA Specification Item C-100: Contractor Quality Control Program (CQCP)

D. ASTM International (ASTM)

1. ASTM C1077 Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.

2. ASTM D3665 Standard Practice for Random Sampling of Construction Materials.

3. ASTM D3666 Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials.

1.05 SUBMITTALS

A. Submittals must be in accordance with Section 01300 – Submittals.

B. A Contractor Quality Control Program must be submitted in accordance with FAA Specification Item C-100.

C. A detailed list of submittals must be submitted in accordance with FAA Specification Item C-100, paragraph 100-5.

D. Contractor must submit QC Daily Test results in accordance with FAA Specification Item C-100, paragraph 100-9.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Description of Program must be in accordance with FAA Specification Item C-100, paragraph 100-2.

B. CQCP Organization must be in accordance with FAA Specification Item C-100, paragraph 100-3.

C. Project Progress Schedule must be in accordance with FAA Specification Item C-100, paragraph 100-4.

D. Submittal Schedule must be in accordance with FAA Specification Item C-100, paragraph 100-5.

E. Contractor QC Testing Facility must be in accordance with FAA Specification Item C-100, paragraph 100-7.

F. QC Testing Plan must be in accordance with FAA Specification Item C-100, paragraph 100-8.

G. Documentation must be in accordance with FAA Specification Item C-100, paragraph 100-9.

H. Corrective Action Requirements must be in accordance with FAA Specification Item C-100, paragraph 100-10.

I. Inspection and/or Observations by the RPR must be in accordance with FAA Specification Item C-100, paragraph 100-11.

J. Noncompliance must be in accordance with FAA Specification Item C-100, paragraph 100-12.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. CQCP is for the personnel, tests, facilities, and documentation required to implement the CQCP. The CQCP will be paid as a lump sum with the following schedule of partial payments.

1. With first pay request, 25% with approval of CQCP and completion of the Quality Control (QC)/Quality Assurance (QA) workshop.

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

3. When 50% or more of the original contract is earned, an additional 20%.

4. When 75% or more of the original contract is earned, an additional 20%.

5. After final inspection and acceptance of project, the final 10%.

B. The CQCP must not be measured for payment. The minimum bid allowed for CQCP is an amount not to be less than one and one/half (1.5) percent of the sum of all items (excluding this item, mobilization, and all Allowances). If the proposal submitted by the bidder indicates an amount less than the allowable minimum, the indicated amount or amounts must be increased to the allowable minimum; the “Total Amount for Comparison of Bids,” in the proposal schedule must be adjusted to reflect any such increase. For the purposes of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the “Total Amount for Comparison of Bids” adjusted in accordance with the foregoing must be used and the bidder’s proposal

must be deemed to have been submitted for the amounts as increased and adjusted in accordance herewith.

C. Items covered by this section will be paid by lump sum. The contract price paid must 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:

Item No.	**Item**	**Unit**
01100.1	Contractor Quality Control Program	Lump Sum (L.S.)

PART 5 – ATTACHMENTS

5.01 FAA Specification Item C-100 Contractor Quality Control Program (CQCP)

Item C-100 Contractor Quality Control Program (CQCP)

100-1 General. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

a. Provide qualified personnel to develop and implement the CQCP.

b. Provide for the production of acceptable quality materials.

c. Provide sufficient information to assure that the specification requirements can be met.

d. Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the Resident Project Representative (RPR). No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the RPR or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Resident Project Representative (RPR), Contractor, subcontractors, testing laboratories, and Owner's representative must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the RPR on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

a. Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.

b. Discussion of the QA program.

c. Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.

d. Establish regular meetings to discuss control of materials, methods and testing.

e. Establishment of the overall QC culture.

100-2 Description of program.

a. General description. The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be

effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

b. Contractor Quality Control Program (CQCP). The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the RPR prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the RPR for review and approval at least 14 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

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

1. QC organization and resumes of key staff
2. Project progress schedule
3. Submittals schedule
4. Inspection requirements
5. QC testing plan
6. Documentation of QC activities and distribution of QC reports
7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract.

100-3 CQCP organization. The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function, and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

a. Program Administrator. The Contractor Quality Control Program Administrator (CQCPA) must be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of QC experience, the CQCPA must meet at least one of the following requirements:

(1) Professional Engineer with one (1) year of airport experience.

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

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

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

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

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

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

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

(2) Performance of all QC tests as required by the technical specifications and paragraph100-8.

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

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

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

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

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

a. Specification item number

b. Item description

c. Description of submittal

d. Specification paragraph requiring submittal

e. Scheduled date of submittal

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

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

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

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

100-7 Contractor QC testing facility.

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

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

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

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

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

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

a. Specification item number (e.g., P-401)

b. Item description (e.g., Hot Mix Asphalt Pavements)

c. Test type (e.g., gradation, grade, asphalt content)

d. Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)

e. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)

f. Responsibility (e.g., plant technician)

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

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

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

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

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

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

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

(1) Technical specification item number and description

(2) Compliance with approved submittals

(3) Proper storage of materials and equipment

(4) Proper operation of all equipment

(5) Adherence to plans and technical specifications

(6) Summary of any necessary corrective actions

(7) Safety inspection.

(8) Photographs and/or video

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

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

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

(1) Technical specification item number and description

(2) Test designation

(3) Location

(4) Date of test

(5) Control requirements

(6) Test results

(7) Causes for rejection

(8) Recommended remedial actions

(9) Retests

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

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

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

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

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

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

100-12 Noncompliance.

a. The Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.

b. When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of non-compliance, the RPR will recommend the Owner take the following actions:

(1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or

(2) Order the Contractor to stop operations until appropriate corrective actions are taken.

END OF ITEM C-100

END OF SECTION 01100

SECTION 01105 – MOBILIZATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Item C-105: Mobilization, as included as an attachment to this Section.

1.02 SUMMARY

A. Mobilization must consist of those operations necessary for the movement of personnel, equipment, supplies, and incidentals to the Project Site, and for the establishment of temporary offices, staging areas, crushing facilities and batch plants, utilities, employee parking lots, stockpile areas, access and haul roads, building facilities including provision of utility services from utility providers and utility locate firms, safety equipment and first aid supplies, sanitary and other facilities required, and all requirements indicated by the Contract Drawings, General Requirements, General and Special Provisions, Technical Specifications, and State and local laws and regulations.

B. This Section must consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

C. The mobilization limit identified in FAA Specification Item C-105, paragraph 105-3.

D. Post notices must be in accordance with FAA Specification Item C-105, paragraph 105-3.

1.03 REFERENCES

A. 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.

B. Federal Aviation Administration (FAA)

1. FAA Specification Item C-105: Mobilization

C. Office of Federal Contract Compliance Programs (OFCCP)

1. Executive Order 11246, as amended

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

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

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

A. Mobilization must not be measured for payment. The maximum bid allowed for "Mobilization" is an amount not to exceed ten (10) percent of the sum of all items (excluding this item and all Allowances). If the proposal submitted by the bidder indicates an amount in excess of the allowable maximum, the indicated amount or amounts must be reduced to the allowable maximum; the "Total Amount for Comparison of Bids" in the proposal schedule must be adjusted to reflect any such reduction. For the purposes of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the " Total Amount for Comparison of Bids" adjusted in accordance with the foregoing must be used and the bidder's proposal must be deemed to have been submitted for the amounts as reduced and adjusted in accordance herewith."

B. Demobilization will not be measured for payment, and the cost will be included in this work item.

C. Mobilization will be paid as a lump sum with the following schedule of partial payments

1. With first pay request, 20%

2. When 25% or more of the original contract is earned, an additional 20%

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

4. After demobilization of large equipment, an additional 10%

5. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by FAA Specification Section 90, paragraph 90-11, Contractor Final Project Documentation, the final 10%

4.02 BASIS OF PAYMENT

A. Payment will be made under:

Item No.	Item	Unit
01105.1	Mobilization (Not to exceed 10% of sum of all items, excluding this item and all allowances)	Lump Sum (L.S.)

PART 5 – ATTACHMENTS

5.01 FAA Specification Item C-105 Mobilization

Item C-105 Mobilization

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

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

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

105-4 Engineer/RPR field office. Not Used.

END OF ITEM C-105

END OF SECTION 01105

SECTION 01110 – METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)

PART 1 - GENERAL

1.01 RELATED SECTIONS

A. The General Provisions 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. This Section shall be in accordance with FAA Specification Item C-110: Method of Estimating Percentage of Material Within Specification Limits (PWL), as included as an attachment to this Section.

1.02 REFERENCES

A. Federal Aviation Administration (FAA)

1. FAA Specification Item C-110: Method of Estimating Percentage of Material Within Specification Limits (PWL)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. All 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.

PART 5 – ATTACHMENTS

5.01 FAA Specification Item C-110 Method of Estimating Percentage of Material Within Specification Limits (PWL)

Item C-110 Method of Estimating Percentage of Material Within Specification Limits (PWL)

110-1 General. When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average (X) and sample standard deviation (S_n) of the specified number (n) of sublots for the lot and the specification tolerance limits, L for lower and U for upper, for the particular acceptance parameter. From these values, the respective Quality index, Q_L for Lower Quality Index and/or Q_U for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

110-2 Method for computing PWL. The computational sequence for computing PWL is as follows:

a. Divide the lot into n sublots in accordance with the acceptance requirements of the specification.

b. Locate the random sampling position within the sublot in accordance with the requirements of the specification.

c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.

d. Find the sample average (X) for all sublot test values within the lot by using the following formula:

$$\mathbf{X = (x_1 + x_2 + x_3 + \ldots x_n) / n}$$

Where: X = Sample average of all sublot test values within a lot

$x_1, x_2, \ldots x_n$ = Individual sublot test values

n = Number of sublot test values

e. Find the sample standard deviation (S_n) by use of the following formula:

$$\mathbf{S_n = [(d_1^2 + d_2^2 + d_3^2 + \ldots d_n^2)/(n-1)]^{1/2}}$$

Where: S_n = Sample standard deviation of the number of sublot test values in the set

$d_1, d_2, \ldots d_n$ = Deviations of the individual sublot test values $x_1, x_2, \ldots$ from the average value X

that is: $d_1 = (x_1 - X)$, $d_2 = (x_2 - X) \ldots d_n = (x_n - X)$

n = Number of sublot test values

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

$$\mathbf{Q_L = (X - L) / S_n}$$

Where: L = specification lower tolerance limit

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

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

$$\mathbf{Q_L = (X - L) / S_n}$$
$$\mathbf{and}$$
$$\mathbf{Q_U = (U - X) / S_n}$$

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

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

$$\mathbf{PWL = (P_U + P_L) - 100}$$

Where: P_L = percent within lower specification limit

P_U = percent within upper specification limit

EXAMPLE OF PWL CALCULATION

Project: Example Project

Test Item: Item P-401, Lot A.

A. PWL Determination for Mat Density.

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

A-1 = 96.60

A-2 = 97.55

A-3 = 99.30

A-4 = 98.35

n = 4

2. Calculate average density for the lot.

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

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

$X = 97.95\%$ density

3. Calculate the standard deviation for the lot.

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

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

$S_n = 1.15$

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

$Q_L = (X - L) / S_n$

$Q_L = (97.95 - 96.30) / 1.15$

$Q_L = 1.4348$

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

PWL = 98

B. PWL Determination for Air Voids.

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

A-1 = 5.00

A-2 = 3.74

A-3 = 2.30

A-4 = 3.25

2. Calculate the average air voids for the lot.

$X = (x_1 + x_2 + x_3 . . . n) / n$

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

$X = 3.57\%$

3. Calculate the standard deviation S_n for the lot.

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

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

$S_n = 1.12$

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

$Q_L = (X - L) / S_n$

$Q_L = (3.57 - 2.00) / 1.12$

$Q_L = 1.3992$

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

$P_L = 97$

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

$Q_U = (U - X) / S_n$

$Q_U = (5.00 - 3.57) / 1.12$

$Q_U = 1.2702$

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

$P_U = 93$

8. Calculate Air Voids PWL

$PWL = (P_L + P_U) - 100$

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

EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)

Project: Example Project

Test Item: Item P-401, Lot A.

A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

A-3 = 99.30

A-4 = 98.35

A-2 = 97.55

A-1 = 96.60

2. From ASTM E178, Table 1, for n=4 an upper 5% significance level, the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

a. For measurements greater than the average:

If (measurement - average)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-3, check if (99.30 - 97.95) / 1.15 is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

b. For measurements less than the average:

If (average - measurement)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-1, check if (97.95 - 96.60) / 1.15 is greater than 1.463.

Since 1.435 is less than 1.463, the value is not an outlier.

Note: In this example, a measurement would be considered an outlier if the density were:

Greater than (97.95 + 1.463 × 1.15) = 99.63%

OR

less than (97.95 - 1.463 × 1.15) = 96.27%.

Table 1. Table for Estimating Percent of Lot Within Limits (PWL)

Percent Within Limits (P_L and P_U)	Positive Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Percent Within Limits (P_L and P_U)	Negative Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

REFERENCES

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

ASTM International (ASTM)

ASTM E178 Standard Practice for Dealing with Outlying Observations

END OF ITEM C-110

END OF SECTION 01110

SECTION 01300 – SUBMITTALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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.

1.02 PROJECT DOCUMENTATION

A. The contract will not be considered complete until required submittals have been received and accepted by the State.

1.03 DETAILED SCHEDULE

A. The Contractor must submit an electronic copy of the schedule in its native format to the State Project Manager for review, no later than thirty (30) calendar days after award of the Contract. The schedule must be based on a detailed critical path analysis of construction activities and sequence of operations needed for the orderly performance and completion of any separable parts of any work and all work in accordance with the Contract. The schedule must be Critical Path Method (CPM) type in the form of an arrow diagram and activity listing or comprehensive bar graph. The network diagram must show in detail and in orderly sequence all activities on a time scale, their descriptions, durations, and dependencies, necessary and required to complete all work and any separable parts thereof. The schedule must show in detail the following information for each activity:

1. Identification by code numbers and description
2. Original and Remaining Duration
3. Resources (both Craft and Equipment)
4. Early start and finish dates
5. Late start and finish dates
6. Total float time
7. Highlighted critical path

B. The schedule must be complete in all respects, covering activities at the site of work, off-site activities such as design, fabrication, and procurement of equipment; the scheduled delivery dates of such equipment; submittal and approval of shop drawings and samples; ordering and delivery of materials; inspections; and testing. The schedule must be cost-loaded with

US dollars and resource-loaded per the Schedule of Values. The

Contractor must promptly inform the State Project Manager of any proposed change in the schedule and must furnish the State Project Manager with a revised schedule and cash flow diagram within fifteen (15) calendar days after approval of such change.

C. The schedule must be kept up to date, taking into account the actual progress of work and must be updated every week. The updated schedule must, as determined by the State Project Manager, be sufficient to meet the requirements for the completion of the separable parts of work and the entire projects as set forth in the contract.

D. Upon commencing work, at the start of each week, the Contractor must submit to the State Project Manager for review, a three (3) week lookahead, one week lookback schedule. This schedule may be maintained in a spreadsheet or other form at the Contractor's discretion but must originate from activities in the detailed schedule and must be used to update the detailed schedule.

E. If at any time during the progress of the Work, the Contractor's actual progress appears to the State Project Manager to be inadequate to meet the requirements of the contract, the State Project Manager will notify the Contractor of such imminent or actual noncompliance with the contract. The Contractor must thereupon take such steps as may be necessary to improve his progress and the State Project Manager may require an increase in the labor force, the number of shifts, and/or overtime operations, days of work and/or the amount of construction plants all without additional cost to the State. Neither such notice by the State Project Manager nor the State Project Manager's failure to issue such notice must relieve the Contractor from his obligation to achieve the quality of work and rate of progress required by the contract. Failure of the Contractor to comply with instructions of the State Project Manager under these provisions may be grounds for determination by the State that the Contractor is not prosecuting work with such diligence as will assure completion within the times specified. Upon such determination, the State may employ labor and equipment and charge the Contractor for the cost thereof, including depreciation for plant and equipment or may terminate the Contractor's right to proceed with the performance of the contract, or any separable part thereof, in accordance with the applicable provisions of the contract.

1.04 SCHEDULE OF VALUES

A. The Contractor must submit the Schedule of Values to the State Project Manager for review, no later than thirty (30) calendar days after award of the Contract.

B. Format and Content: Use the Project Specifications table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section. Provide a breakdown of the

contract sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal work or subcontract amounts down into several smaller, measurable items of work.

C. Identification: Include the following Project identification on the schedule of values:

1. Project name and location

2. Project number

3. Contractor's name and address

4. Contract No.

5. Date of submittal

D. Arrange the Schedule of Values in tabular form with separate columns to indicate the following items listed:

1. Specification Section and, if appropriate, Paragraph

2. Description of work

3. Dollar value and percent complete

E. Correlate line items in the Schedule of Values with other required administrative schedules and forms including;

1. Construction Schedule

2. Application for Payment forms including continuation sheets

3. List of Subcontractors

4. List of principal suppliers and fabricators

5. Schedule of submittals

F. Round each line's amount to nearest whole dollar; the total must equal the contract sum.

G. Provide a separate line item in the Schedule of Values for each part of the work where Applications for Payment may include materials or equipment, purchased, fabricated or stored, but not yet installed.

H. Schedule Updating: Update and resubmit the Schedule of Values prior to the next applications for payment or when change orders or construction change directives result in a change in the contract sum.

1.05 OTHER SUBMITTALS REQUIRED BEFORE CONSTRUCTION

The Contractor must submit the following items prior to or at the pre-construction meeting or unless otherwise noted:

A. Name, residence phone number, addresses and scope of authority for the following persons:

1. Superintendent

2. Contractor's authorized representative to sign documents

3. Two (2) additional persons who can be contacted during non-working hours for emergencies.

4. Field Office location and phone numbers (cellular, pager, fax, etc.)

B. Name of Safety Officer.

C. Notice of Materials to be furnished.

D. Three (3) copies each of Certificates of Insurance. The State of Hawai'i, Department of Transportation, Airports Division must be named as additionally insured. If canceled, thirty (30) days written notice to the State of Hawai'i must be given. If certificates are not correct, work cannot proceed.

E. Three (3) copies each Insurance and Tax Rates.

F. List of apprentices who will be working on the project supported with the Statement of Apprenticeship or copy of the Apprenticeship Agreements registered with the State Board, for each apprentice.

G. List of equipment to be used on the job. Designate maximum working height and capacity of equipment involved and their respective rental rates.

H. Three (3) copies of an expenditure (cash flow) plan consisting of an anticipated work completion graph plotting contract time and gross payment anticipated.

1.06 SHOP DRAWINGS, SAMPLES, CATALOG CUTS, AND CERTIFICATES

A. Submittal Schedule: Prior to the submission of any shop drawings or submittals, the Contractor must submit to the State Project Manager for review, a submittal schedule. The schedule must identify the subject matter of each submittal, the corresponding specification section number and paragraph and the proposed date of submission. For example, this deliverable should be listed on the schedule as follows:

Subject	Specification	Paragraph	Date
Submittal Schedule	01300	1.06	award + 30d

During the progress of work, the Contractor must revise and resubmit the submittal schedule as directed by the State Project Manager.

B. The Contractor must submit for review to the State Project Manager six (6) copies of all shop drawings, samples, catalog cuts and certificates. Three (3) copies will be returned to the Contractor with information of review action. The Contractor must submit additional quantities for their subcontractor's or supplier's use. Each shop drawing, certificate of compliance, sample, and equipment list must be checked and certified correct by the Contractor, and must be identified with the applicable information specified hereinafter under "Submittal Identification."

C. Revisions to the drawings may be made, and when deemed necessary by the State Project Manager during progress of the work, additional detailed drawings will be furnished to the Contractor. These additional drawings will be considered as forming part of the Contract.

D. Items are to be reviewed prior to commencing fabrication or delivery of material to the job site.

E. Each copy of the drawings, certificates, catalog cuts, and lists reviewed by the State Project Manager will be stamped "REVIEW ACTION" with the appropriate action noted therein. The review of the State Project Manager must not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory in accordance with the Invitation for Bids (IFB). Acceptance of such drawings, certificates, catalog cuts, and lists will not relieve the Contractor the responsibility of conforming to the contract drawings and specifications or for any error or omission which may exist as the Contractor must be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. Each shop drawing submitted for review must have, in the lower right-hand corner just above title, a white space 4" x 4" in which the State Project Manager can place the stamp and indicate action taken. The Contractor must also inform their subcontractors to provide this space in their preparation of shop drawings.

F. The Contractor must furnish working drawings for structures which must consist of the detailed plans required to control the work. The working drawings to be furnished by the Contractor must include, but not be limited to, stress sheets, anchor bolt layouts, shop details, erection plans, cribs, cofferdams, falsework, centering, form work, and other temporary work and methods of construction.

G. The Contractor must be responsible for the accuracy of dimensions and details, and for agreement of dimensions and details. The Contractor must also be responsible for the agreement and conformity of the working drawings with the plans and specifications.

H. All working drawings must be accepted by the State Project Manager prior to implementation on the project and such acceptance must not operate to

relieve the Contractor of responsibility under the Contract for the successful completion of the work.

1.07 MAINTENANCE DATA AND OPERATING INSTRUCTIONS

A. Six (6) copies of maintenance data and operating instructions must be submitted by the Contractor at the conclusion for all product and equipment installation based on reviewed shop drawings and submittals. The manuals must be assembled in one or more binders, each with a title page, typed table of contents, and heavy section dividers with numbered plastic index tabs. The binders must be a minimum of 2 inches thick, three ring, “D slant” with hard covers. All data must be punched for binding and composition and printing must be arranged so that punching does not obliterate any data. The project number, project title, and Airport must be inserted in the front and backbone binder cover.

B. The Contractor must submit a draft to the State Project Manager for review prior to the submission of the final copies.

C. The manual must include separate sections describing each equipment. Provide a general description of the equipment, instructions for operation, maintenance, recommended inspection points and periods for inspection, testing, adjustments, calibration procedures with illustrations, wiring diagrams, trouble shooting situations and solutions, and repair methods in a practical, complete, and comprehensive manner.

D. For each equipment, include information on detailed parts listings (part numbers and costs) with the manufacturer’s name, address, contact person, e-mail address and phone/fax numbers. Provide the contact name, address, e-mail address and phone/fax numbers of the distributor in the State of Hawai’i for each equipment.

E. Include a separate section on warranty information on all products and equipment. Provide this information in a tabular format with a listing on all products and equipments with warranty start and completion dates for each item. Include separate sections on all approved submittals, test reports, certifications, etc.

F. All information must be arranged in a logical, orderly sequence. Manuals submitted by the manufacturer will not be accepted.

1.08 TEST REPORTS

A. Six (6) copies of test reports for any material used in this Contract must be submitted when specified or required by the State Project Manager.

1.09 SUBMITTAL IDENTIFICATION

A. To avoid rejection and to clarify each submittal, the General Contractor must have a rubber stamp made up in the following format:

_____

General Contractor's Name

PROJECT TITLE: _____
AIRPORT: _____
STATE PROJECT NO: _____
AIP PROJECT NO: _____
THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR AND IS CERTIFIED CORRECT AND IN COMPLIANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS.

ITEM NO. _____

SUBMITTAL NUMBER _____
DATE RECEIVED _____
SPECIFICATION SECTION # _____
SPECIFICATION PARAGRAPH # _____
DRAWING NUMBER _____
SUBCONTRACTOR NAME _____
SUPPLIER NAME _____
MANUFACTURER NAME _____

CERTIFIED BY _____ (Contractor's Signature, Date)
(Contractor's Name and Title)

B. This stamp "filled in" should appear on each reproducible shop drawing, on the cover sheet of copies of test and mill reports, certificates of compliance, catalog cuts, brochures, etc. The stamp should be placed on a heavy stock paper merchandise (approximately 3" × 6") and one tag tied to each sample submitted for approval. The tag on the samples should state what the sample is, so that if the tag is accidentally separated from the sample they can be matched up again.

C. Submission Number: Each submission is to be sequentially numbered in the space provided in the Contractor's stamp. Correspondence and transmittal will refer to this number.

D. The Contractor must ensure that all submittals, including shop drawings, are complete and in conformance to the requirements of the Contract specifications prior to submission to the State Project Manager. Incomplete submittals will not be processed by the State Project Manager and returned to the Contractor for correction. Any cost impacts and delays in the Project schedule as a result of incomplete submittals must be the responsibility of the Contractor.

1.10 AS-BUILT DRAWINGS

As-built drawings must conform to the requirements of Section 5.8 - "Plans and Working Drawings" of the General Provisions, and the following requirements:

A. The Contractor must maintain at the job site one (1) copy of the specifications, addenda, approved shop drawings, change orders and other modifications in good order and marked to record all changes made during construction.

B. The Contractor must maintain on the job site two (2) sets of full-size contract drawings, marking them in red to show all variations between the construction actually provided and that indicated or specified in the contract documents, including buried or concealed construction.

C. Actual location of work must be clearly recorded as the work progresses including all changes to the contract and equipment size and type. Drawings must be available at the site at all times for inspection.

D. The Contractor at his own expense, must incorporate all field changes, Post Construction Document (PCD) changes, etc. in a clearly legible manner utilizing the symbols of the Contract drawings onto the red-line contract drawings. All underground stubouts must be dimensionally located from the building structure.

E. The Contractor must be responsible for the accuracy of dimensions and details, and for agreement of dimensions and details. The Contractor must also be responsible for the agreement and conformity of the working drawings with the plans and specifications.

F. Where a choice of material or method is permitted herein or where variations in scope of character of work from that of the original contract or authorized, the drawings must be marked to define the construction actually provided. Where equipment installation is involved, the size, manufacturer's name, model number, power input or output characteristics as applicable must be shown on the as-built drawings.

G. The representation of such changes must conform to standard drafting practice and must include such supplementary notes, legends, and details as necessary to clearly portray the as-built construction.

H. The drawings must be maintained and updated on a daily basis. The Contractor must stamp, sign, and date each sheet with the following stamp:

AS-BUILT DRAWINGS/SPECIFICATIONS

This certifies that the dimensions and details shown on this sheet reflect the dimensions and details, and specifications as constructed in the field.

_____

CONTRACTOR'S NAME

_____

Signature Date

I. Monthly and final payments to the Contractor must be subject to prior approval of the drawings. On completion of the work, both sets of marked-up drawings along with complete CAD electronic files incorporating the as-built condition must be delivered to the State Project Manager, and must be subject to approval before acceptance.

1.11 GUARANTEES

A. Guarantee periods must start at time of acceptance in writing by the State.

B. All guarantees and warranties must be made out to the “State of Hawaii.” Supplier and subcontractor guarantees must be co-signed by the Contractor.

C. The Contractor is solely responsible for coincidence or non-coincidence of factory warranties or equipment guarantees, and the Contractor’s own warranties and guarantees as required by the contract. The Contractor is solely responsible for scheduling and coordinating the installation of equipment and materials so as to take maximum advantage of factory warranties.

D. Organize guarantees and warranties into an orderly sequence based on the Table of Contents of the Project Manual.

1. Bind guarantees and warranties in heavy-duty, 3-ring, vinyl covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 - ½ x 11 inch paper (letter size).

2. Provide heavy paper dividers with plastic-covered tabs for each separate guaranty/warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of installer.

3. Identify each binder on the front and spine with the typed or printed title "GUARANTEE AND WARRANTIES", project name, and name of Contractor.

Additional Copies: Provide additional copies of each guarantee and warranty to include in each operation and maintenance manual.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

END OF SECTION 01300

SECTION 01533 – TEMPORARY BARRICADES AND FACILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions 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.

1.02 GENERAL

A. This Specification outlines procedures and regulations to be followed by the Contractor during the course of this work to ensure work site safety and must consist of providing adequate personnel and trained radio operator/flagmen; and furnishing, installing, and removing (as required), all necessary safety equipment, barricades, detours, and other facilities. This includes haul route sweeping, FOD control, and all other work necessary and required during each phase of the work for the entire contract duration. All work must be accomplished in conformance with Federal Aviation Administration (FAA) and Hawaii Department of Transportation (HDOT) guidelines and as directed by the RPR. The Contractor must provide the necessary items for each phase as indicated on the Plans and approved Construction Safety and Phasing Plan (CSPP).

B. The Contractor must be responsible for his own security and protection of his property, including mobilization yard barricades.

C. Barricades, in general, must be neat and in good condition, as required for protection. In areas frequented by the general public, the barricades must be visually presentable and plywood partitions must be painted. Where dust is a problem, the Contractor must erect floor to ceiling dust proof partitions.

D. The Contractor must coordinate and sequence this work in accordance with the approved CSPP to permit the continuing operation of the existing Airport facility. Barricades must be removed upon the completion and acceptance of work and the premises left clean and operational.

1.03 SUBMITTALS

A. Product Data: Submit for each material required, including but not limited to portable lighted runway closure markers, low profile barricades, light towers, supplemental lighting equipment, etc..

PART 2 – PRODUCTS

2.01 MATERIALS

A. All materials must be in conformance with the details provided on the plans or referenced in other technical specifications, in conformance with FAA

and HDOT requirements, and to the satisfaction of the Engineer. All work and installation of materials must be performed in full accordance with the latest applicable rules, regulations, requirements, and specifications included in the current editions of the following:

- Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*
- FAA AC 150/5345-55, *Lighted Visual Aid to Indicate Temporary Runway Closure.*
- FAA AC 150/5370-2, *Operational Safety on Airports During Construction.*

2.02 PORTABLE LIGHTED RUNWAY CLOSURE MARKER (RCM)

A. Two (2) Portable Lighted Runway Closure Markers (RCM) designed to form a lighted "X" must be procured by the Contractor. The Contractor must fuel and maintain the RCM's for any period when they are needed. All materials must be restored to near-new condition and turned over to the DOT-A at the completion of the project.

B. The Portable Lighted RCMs must meet the requirements of the latest edition of FAA AC 150/5345-55, *Specification for L-893, Lighted Visual Aid To Indicate Temporary Runway Closure*.

C. The Portable Lighted RCMs must be equipped with LED lights.

D. The Contractor must coordinate with ITO maintenance and ITO Engineer to determine the model and type of Portable Lighted RCM to be procured, to ensure ITO maintenance is able to operate and upkeep the Portable Lighted RCM once turned over to ITO.

E. Spare bulbs, flasher lights, and fuel shall be kept on site to ensure continuous operation of the Portable Lighted RCM during construction hours.

2.03 LOW-PROFILE BARRICADES

A. Low-profile barricades must be constructed from high-impact, UV resistant, High Density Polyethylene (HDPE) plastic and specifically designed for airport construction. Barricades must be easily collapsible upon contract with an aircraft or any of its components and water-filled to provide sufficient weight to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. Barricades must be marked with diagonal, alternating orange and white highly reflective stripes on each side. Barricade units must be nominally 10 inches in height, 8 feet in length, and must interlock to form a continuous barrier.

B. Two red flashing lights must be mounted on each barricade. Lights must be solar powered, omnidirectional, capable of being seen at a distance of two

miles, and flash at the rate of 45 to 60 flashes per minute. Solar panels, in conjunction with sufficient battery backup capacity, must be provided to power lights during night time hours and extended periods of cloud cover.

C. Where shown on the CSPP, the Contractor must install barricades at the entry points of taxiways leading to closed runways or taxiways.

2.04 CONSTRUCTION AREA ILLUMINATION DURING NIGHTTIME WORK

A. The Contractor must provide supplemental lighting equipment (light plants) sufficient to adequately illuminate all work areas during periods of limited visibility or at night. Additionally, all paving machines, rollers, milling machines, distributor trucks, and other support equipment, (except haul trucks), must be equipped with artificial illumination to safely illuminate the area immediately surrounding these pieces of equipment.

B. For all runway and taxiway edge lighting and wiring replacement and wind cone relocation work, portable lighting equipment must be placed on both sides of the work activity and at locations and at a spacing that provides the most natural color illumination and contrast with a minimum of shadows. The adequacy of such illumination must be determined by the Technical Representative and Airport Operations. The Contractor will be required to provide additional supplemental lighting equipment as directed by the Technical Representative and Airport Operations.

C. Due to concerns for the native seabird population, the Contractor must be limited to 2-3 light towers positioned low to the ground and turned off when not in use. Construction lighting must be shielded to shine downward towards the pavement and not upward.

PART 3 - EXECUTION

A. All temporary items must be maintained in good working order throughout the duration of their use. Lighted equipment must be checked daily for proper operation and repaired or replaced immediately if found to be inoperable.

B. All work must be in accordance with FAA AC 150/5370-2G, Operational Safety on Airports During Construction.

   a. All marking of vehicles and construction equipment must conform to FAA AC 150/5210-5B, Painting, Marking and Lighting of Vehicles Used on an Airport.

C. Placement of low-profile barricades and portable lighted runway closure markers must be in accordance with the appropriate construction phase listed in the Construction Safety and Phasing Plan.

D. At the end of construction, all materials must be restored to near-new condition and turned over to DOT-A at the end of the project.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work specified in this Section related to construction area illumination, safety equipment, training, and facilities will not be measured nor paid for separately but must be considered incidental to and included in the bid prices for the various items of work in this project.

B. Payment for “Portable Lighted RCM” shall be made at the contract unit price per each. The contract price paid must be full compensation for all labor, materials, tools equipment, and all other incidentals necessary to procure and utilize the Runway Closure Markers.

C. Payment for “Temporary Low-Profile Barricades” shall be made at the contract lump sum price. The contract price paid must be full compensation for all labor, materials, tools equipment, and all other incidentals necessary to procure and utilize temporary low-profile barricades.

Payment will be made under:

Item No.	**Item**	**Unit**
01533.1	Portable Lighted RCM	Each (E.A.)
01533.2	Temporary Low-Profile Barricades	Lump Sum (L.S.)

END OF SECTION 01533

SECTION 01560 - ENVIRONMENTAL CONTROLS

PART I – GENERAL

1.1 RELATED DOCUMENTS

A. The General Provisions, Special Provisions, and Technical Provisions, apply to the work specified in this section. Special attention is directed to the following Articles:

1. State of Hawaii, Air and Water Transportation Facilities Division, General Provisions for Construction Projects, Article VI, Control of Materials, Paragraph 6.8 Non-Conforming Materials.

2. State of Hawaii, Air and Water Transportation Facilities Division, General Provisions for Construction Projects, Article VII, Legal Relations and Responsibility to Public, Paragraph 7.14 Pollution Control and Protection of Archeological Historical, and Burial Sites.

3. State of Hawaii, Air and Water Transportation Facilities Division, General Provisions for Construction Projects, Article VII, Legal Relations and Responsibility to Public, Paragraph 7.17 Contaminated or Hazardous Items and Material; Regulated Items and Material; Waste.

4. Section 01561 Construction Site Runoff Control Program.

5. Section 01562 Management of Contaminated Media.

B. The latest version of the State of Hawaii, Department of Transportation, Airports Division (DOTA) Construction Activities BMP Field Manual.

1.2 ENVIRONMENTAL PROTECTION

With the exception of those measures set forth elsewhere in these specifications, environmental protection shall consist of the prevention of environmental pollution as the result of construction operations under this contract. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utilization of the environment for aesthetic and recreational purposes.

1.3 APPLICABLE REGULATIONS

In order to provide abatement and control of environmental pollution arising from the construction activities of the Contractor and their Subcontractors in the performance of this contract, the work performed shall comply with the intent of all applicable Federal, State, and Local laws and regulations concerning environmental pollution control and abatement, including, but not limited to, the following regulations:

A. State of Hawaii, Department of Health, Administrative Rules, Chapter 55, WATER POLLUTION CONTROL; Chapter 54, WATER QUALITY STANDARDS.

B. United States, Environmental Protection Agency, CLEAN WATER ACT; 33 United States Code §1251 et seq.

C. State of Hawaii, Department of Health, Administrative Rules, Chapter 59, AMBIENT AIR QUALITY, Chapter 60.1, AIR POLLUTION CONTROL.

D. United States, Environmental Protection Agency, CLEAN AIR ACT; 42 United States Code §7401 et seq.

E. State of Hawaii, Department of Health, Administrative Rules, Chapter 42, VEHICULAR NOISE CONTROL.

F. State of Hawaii, Department of Health, Administrative Rules, Chapter 46, COMMUNITY NOISE CONTROL.

G. State of Hawaii, Occupational Safety and Health Standards, Title 12, Department of Labor and Industrial Relations, Subtitle 8, Division of Occupational Safety and Health, Part 3 Construction Standards, Chapter 145 Asbestos.

H. Environmental Protection Agency, Code of Federal Regulations Title 40, Part 61, Subpart M (Revised Subpart B), NATIONAL EMISSION STANDARDS FOR AIR POLLUTANTS and Subpart B, NATIONAL EMISSION STANDARDS FOR ASBESTOS; Final Rule dated November 20, 1990.

I. State of Hawaii, Department of Health, Title 11, Chapter 501, Asbestos Requirements.

J. U.S. Department of Labor - Occupational Safety and Health Administration (OSHA) Asbestos Regulations, Code of Federal Regulations Title 29, Parts 1910, 1915 and 1926, Occupational Exposure to Asbestos, Final Rule dated August 10, 1994.

1.4 SUBMITTALS

The Contractor shall submit the following items within 30 calendar days after the Notice to Proceed Date:

A. Submit proposed means, methods, techniques and procedures to be used for environmental control.

B. Submit a State of Hawaii Department of Health Asbestos Notification of Demolition and Renovation Form for all demolition projects (including facilities which no asbestos is present) and renovation projects per HAR 11-501.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 AIR POLLUTION CONTROL

A. Emission: The Contractor shall not be allowed to operate equipment and vehicles that show excessive emissions of exhaust gases until corrective repairs or adjustments are made, as determined by the Engineer.

B. Dust: The Contractor, for the duration of the contract, shall maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, and all other work areas within or without the project limits free from dust which would cause a hazard to the work or operations of other Contractors, or to persons or property. Industry-accepted methods of stabilization suitable for the area involved, such as sprinkling or similar methods, will be permitted. Chemical or oil treating shall not be used.

C. Burning on Airport property shall not be permitted.

3.2 WATER POLLUTION CONTROL

A. Wastes: The Contractor shall not deposit, at the airport site or in its vicinity, solid waste or discharge liquid waste, such as fuels, lubricants, bituminous waste, untreated sewage, and other pollutants which may contaminate the body of ground water.

B. Spillages: No petroleum products, bituminous materials, or other deleterious substances, including debris, are allowed to fall, flow, leach, or otherwise enter the sewage systems or storm drains. All spills shall be immediately reported by following the instructions found on the Spill Reporting Fact Sheet for the appropriate airport and completing the Spill Reporting Form. The Spill Reporting Fact Sheet and Form can be found at:

http://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program

Any fines assessed to DOTA, as a result of Contractor's spillages or the Contractor's failure to report spillages, shall be paid by the Contractor.

Reference Specification Section 01562, Paragraph 3.3(C) Release Reporting for additional information and requirements.

C. Erosion: The Contractor shall provide any necessary temporary drainage, dikes, and similar facilities to prevent erosion damage to the site. Run-off shall be controlled to prevent damage to the surrounding area.

3.3 NOISE CONTROL

A. At all times keep objectionable noise generation to a minimum by:

1. Equipping air compressors with silencing packages.

2. Equipping jackhammers with silencers on the air outlet.

3. Equipment that can be electrically driven instead of gas or diesel is preferred. If noise levels on equipment cannot reasonably be brought down to criteria, listed as follows, either the equipment will not be allowed on the job or use time will have to be scheduled subject to approval of the Engineer.

4. All construction vehicles and equipment on the project operating between 10:00 p.m. and 7:00 a.m. shall be equipped with an ambient noise sensing variable volume backup alarm system. The system shall be in compliance with Title 29 of the Code of Federal Regulations, Part 1926.601(b)(4)(i).

B. Objectionable noise received on neighboring properties is defined as any noise exceeding the noise limits of State Regulations (Title 11, Hawaii Administrative Regulations, Department of Health, Chapter 46 – Community Noise Control) or City and County of Honolulu ordinance, as stated below, or as any noise causing a public nuisance in a residential area, as determined by the State and community representatives, or by the nuisance provisions of local ordinances.

1. The noise limitations established are as set forth in the following table after any applicable adjustments provided for herein are applied:

RECEIVING PROPERTY

Noise Source	Residential	Commercial	Industrial
Airport	50 dBA	65 dBA	70 dBA

2. Between the hours of 6:00 pm to 5:00 am on weekdays and weekends, the noise limitations above may be exceeded for any receiving property by no more than:

a. Five dBA for a total of 15 minutes in any one hour period; or

b. Ten dBA for a total of 5 minutes in any one hour period; or

c. 15 dBA for a total of 1.5 minutes in any one hour period.

C. In addition to the noise controls specified, demolition and construction activities conducted within 1,000 feet of residential areas may have additional noise controls

required.

D. The Contractor and its subcontractor operations shall, at all times, comply with all State of Hawaii and City and County of Honolulu requirements.

E. For work conducted within Airport buildings, noise levels from work activities shall not exceed 85 dBA on the slow scale at the project boundary.

3.4 DISPOSAL

Construction waste, such as crates, boxes, building materials, pipes, and other rubbish shall be properly disposed of at a licensed landfill. Please consult with the local landfill to ensure that objects meet the specific landfill's requirements for size, type, etc. Other areas or methods proposed by the Contractor will be approved only if the Engineer determines that their effect on the environment is equal to or less than those described herein.

3.5 HAZARDOUS MATERIALS CONTROL

A. The use of hazardous materials, i.e., asbestos and PCB, in the construction of this project shall be strictly prohibited. Any corrective action to remove and replace the hazardous material and contaminated work shall be at the sole expense of the Contractor.

B. DEFINITIONS

1. HAZARDOUS SUBSTANCE – Any substance designated pursuant to Section 311(b)(2)(A) of the Clean Water Act; any element, compound, mixture, solution, or substance designated pursuant to Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act; any toxic pollutant listed under Section 307(a) of the Clean Water Act; any hazardous air pollutant listed under Section 112 of the Clean Air Act, as amended (42 U.S.C. §§7401-7626); any imminently hazardous chemical substance or mixture regulated under Section 7 of the Toxic Substances Control Act, as amended (15 U.S.C. §§2601-2671), oil, trichloro propane, and any other substance or pollutant or contaminant designated by rules adopted pursuant to this chapter (Chapter 128D, Hawaii Revised Statutes)

2. OIL – Oil Waste of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, oil mixed with waste, crude oil or any faction or residue.

3. POLLUTANT OR CONTAMINANT – Any element, substance, compound, or mixture, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism either directly from

the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformation, in such organism or their offspring.

PART 4 – MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT AND PAYMENT

All work specified in this Section shall not be measured nor paid for separately but shall be considered incidental to item 01561, Construction Site Runoff Control Program.

END OF SECTION

SECTION 01561 – CONSTRUCTION SITE RUNOFF CONTROL PROGRAM

PART 1 – GENERAL

1.1 DESCRIPTION

This Section describes the following:

(A) The Contractor shall comply with the following referenced documents:

- State of Hawaii, Department of Transportation, Airports Division (DOTA) Construction Activities Best Management Practices (BMP) Field Manual, in developing, installing, and maintaining Site-Specific BMPs for all projects.
- DOTA's Storm Water Programs (SWMPP) for the Daniel K. Inouye International Airport (HNL) and Kahului Airport (OGG), as applicable.
- Hawaii Administrative Rules (HAR) Chapters 11-54, 11-55, and 11-60.
- Honolulu's City and County "Rules Relating to Water Quality" for all projects on Oahu. Use respective Soil Erosion Guidelines for Maui, Kauai and Hawaii projects.
- Applicable Federal, State and Local Permit Conditions.
- All other documents referenced in this Section.

For any conflicting requirements between the referenced documents and applicable bid documents, the stricter requirement will prevail and govern. Should a requirement not be clearly described within the applicable bid documents, notify the Engineer immediately for interpretation. For the purposes of clarification, "applicable bid documents" include the construction plans, specifications, and Permits.

(B) Detailed plans, diagrams, and written Site-Specific Best Management Practices (BMPs); construction, maintenance, and repair of temporary water pollution, dust, and erosion control measures at the project site, including local material sources, work areas, and haul roads; removal and disposal of hazardous wastes; control of fugitive dust (defined as uncontrolled emission of solid airborne particulate matter from any source other than combustion).

(C) Work associated with construction stormwater, dewatering, and hydrotesting activities and compliance with conditions of the Notice of General Permit Coverage (NGPC) or National Pollutant Discharge Elimination System (NPDES) permit(s) authorizing discharges associated with construction stormwater, dewatering, and hydrotesting activities.

(D) Potential pollutant identification and mitigation measures, listed in Appendix A for use in the development of the Contractor's Site-Specific BMP.

Requirements of this Section also apply to construction support activities including: concrete or asphalt batch plants, rock crushing plants, equipment staging yards/areas,

material storage areas, excavated material disposal areas, and borrow areas located both inside and outside of the Airport Property and State Right-of-Way. For areas serving multiple construction projects or operating beyond the completion of the construction project in which it supports, the Contractor shall be responsible for securing the necessary permits, clearances, and documents, and following the conditions of the permits and clearances, at no cost to the State.

The Contractor shall be responsible for all applicable subcontractors, suppliers and vendors, and shall ensure that the means and methods of construction activities of applicable subcontractors, suppliers and vendors are in full compliance with this Section.

PART 2 PRODUCTS

2.1 MATERIALS

Comply with applicable materials described in the current DOTA "Construction Activities BMP Field Manual" and Section 3 and 4 of the current City and County of Honolulu "Storm Water Best Management Practice Manual." Refer to FAA Advisory Circulars and DOTA District, including Wildlife Hazard Management Plan, for additional guidance and conditions.

In addition, materials shall comply with the following:

(A) Grass. The FAA and USDA recommend the following grass species when requiring grass: "No-Mow" bermudagrass ("Green Velvet") (Cynodon dactylon) or Seashore paspalum (Paspalum vaginatum). These species both possess higher than average drought resistance, saline soil tolerances, and, most importantly, do not produce seed heads attractive to the majority of hazardous avian species. It is recommended that stolons, sprigs, or plugs be used to avoid providing hazardous species with a readily available food source. The use of seeds shall not be allowed.

Alternative grass species shall only be applied with the approval of the DOTA Environmental Section. This includes, but not limited to, sodding, cuttings, and planting. Grass shall be a quick-growing species. Grass shall be suitable to the area and provide a temporary cover that will not compete later with permanent cover. The grass label or tag shall be provided to the DOTA Environmental Section.

Irrigation of these grass shall be done during the hours of darkness to avoid providing another hazardous wildlife attractant.

(B) Fertilizer and Soil Conditioners. Fertilizer and soil conditioners shall conform to Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Subsection 619.02(H)(1) – Commercial Fertilizer. Fertilizers shall not be applied during inclement weather or rain events.

The use of alternative types of fertilizer and soil conditioners shall be subject to the approval of the DOTA Environmental Section.

(C) Hydro-mulching. Hydro-mulching used as a temporary stabilization measure shall consist of specially processed fiber which shall form a homogeneous slurry after addition and agitation in hydro-mulch applicator equipment.

1. Mulches shall be recycled materials including bagasse, hay, straw, wood cellulose bark, wood chips, or other material acceptable to the DOTA Environmental Section. Mulches shall be clean and free of noxious weeds and deleterious materials.

2. Potable water shall meet the requirements of Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Subsection 712.01 – Water. Submit alternate sources of irrigation water to the Engineer for acceptance by the DOTA Environmental Section if deviating from 712.01 – Water.

3. Soil and Mulch Tackifier shall meet the requirements and installation in accordance with portions of Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Section 641 – Hydro-Mulch Seeding, including 641.02(D) – Soil and Mulch Tackifier. The use of seeds in the hydro-mulch mixtures shall not be allowed.

Alternative materials or methods to control, prevent, remove, and dispose pollution are allowable if acceptable to the DOTA Environmental Section.

PART 3 EXECUTION

3.1 PRECONSTRUCTION REQUIREMENTS

(A) Water Pollution, Dust, and Erosion Control Meeting.
Schedule a water pollution, dust, and erosion control meeting with the Engineer after the Site-Specific BMP Plan is submitted to the Engineer and accepted in writing by the DOTA Environmental Section. The meeting shall be scheduled a minimum of 14 calendar days prior to the Start Work Date. At a minimum, the meeting shall be attended by the Contractor, applicable subcontractors, Engineer, DOTA Environmental Section and/or any authorized representatives of the designated attendees. The meeting will discuss the sequence of work, and plans and proposals for water pollution, dust, and erosion controls.

(B) Water Pollution, Dust, and Erosion Control Submittals.
Submit a Site-Specific BMP Plan within 30 calendar days of Contract Execution to the Engineer for acceptance by the DOTA Environmental Section. Submission of the complete and acceptable Site-Specific BMP Plan is the sole responsibility of

the Contractor, and additional contract time will not be issued for delays due to incompleteness.

Include the following:

1. Written description of activities to minimize water pollution and soil erosion into drainage systems, sewer systems, and State waters. Include proposed means, methods, techniques, and procedures to be used for environmental control. BMP shall include, but not limited to, the following:

    a. An identification of potential pollutants and their sources.

    b. A list of all materials and heavy equipment to be used during construction.

    c. Descriptions of the methods and devices used to minimize the discharge of pollutants into drainage systems, sewer system, and State waters.

    d. Details of the procedures used for the maintenance and subsequent removal of any erosion or siltation control devices.

    e. Methods of removing and disposing hazardous wastes encountered or generated during construction.

    f. Methods of removing and disposing concrete and asphalt pavement cutting slurry, concrete curing water, and hydro-demolition water.

    g. Spill Control and Prevention, and Emergency Spill Response Plan.

    h. Fugitive dust control, including dust from earth-disturbing, hauling, grinding, sweeping, or brooming off operations, or combination thereof.

    i. Methods of storing and handling of oils, paints, and other products used for the project.

    j. Material storage and handling areas, and other staging areas, including storage of reinforcing steel and building material.

    k. Concrete truck washouts.

    l. Concrete waste and asphalt concrete waste control.

    m. Fueling and maintenance of vehicles and other equipment.

    n. Tracking of sediment offsite from project entries and exits.

o. Litter management. Prevention of Foreign Object Debris (FOD) is essential.

p. Sanitary/Septic Waste Management and Facilities.

q. Stockpiles of Aggregates, Soils, Asphalt Concrete Material, Concrete Waste, and Asphalt Concrete Waste.

r. Methods of Handling and Removal of Contaminated Soils and Groundwater encountered or generated during construction.

s. Methods and Procedures for Dewatering.

t. Methods and Procedures for Hydro-Testing.

u. Methods and Practices for proper Housekeeping, including excessive sawdust; concrete spill prevention and removal; and collection and removal of building materials waste, such as tie wires, reinforcing steel, and lumber.

v. Other factors that may cause water pollution, dust, and erosion control.

2. Plans indicating location of water pollution, dust and erosion control devices; plans and details of BMP measures and devices to be installed or utilized; identify areas of soil disturbance in cut and fill; indicate areas used for construction staging and storage, including items (1) through (22) above, storage of aggregate (indicate type of aggregate), asphalt cold mix, soil or solid waste, equipment and vehicle parking, and areas where vegetative practices are to be implemented. Indicate intended drainage pattern on plans. Include flow arrows. Include separate drawing for each phase of construction that alters drainage patterns.

3. Dates when BMP measures will be installed and removed.

4. Name(s) of specific individual(s) designated responsible for the Contractor's Construction Site Runoff Control Program. Include cellular and business telephone numbers, fax numbers, and e-mail addresses. These individuals shall be available 24 hours a day, 7 days a week.

5. Description of fill material to be used.

6. For projects with an NGPC or NPDES Permit for Construction Activities, submit information to address all sections in the Storm Water Pollution Prevention Plan (SWPPP), as described in HAR Chapter 11-55, Appendix C, Section 7.

7. For projects with an NGPC or NPDES Permit, submit information required for compliance with the conditions of the Notice of General Permit Coverage (NGPC)/NPDES Permit.

8. Date and sign the Site-Specific BMP Plan.

Modify, as necessary, and resubmit amended Site-Specific BMP plans and construction schedules to the Engineer for acceptance by DOTA Environmental Section. Modify the Site-Specific BMP Plan to address, but not limited to, the following.

1. To correct conditions that develop during construction which were unforeseen during the design and pre-construction stages.

2. Changes to the Contractor's Means and Method of Construction.

3. Omitted conditions that should have been allowed for in the accepted Site-Specific BMP Plan.

4. A Site-Specific BMP measure that replaces an accepted Site-Specific BMP measure that was not satisfactorily performing.

5. Revised dates of installation and/or removal of Site-Specific BMP measures.

The modifications shall be submitted to the Engineer and accepted in writing by DOTA Environmental Section before implementing the revised Site-Specific BMPs in the field. Amendments to the Site-Specific BMP Plan shall be included with the original Site-Specific BMP Plan.

A copy of the accepted original Site-Specific BMP Plan and all accepted amended Site-Specific BMP Plans, with the signed certification by the authorized representative listed in the NGPC or NPDES Permit, shall be kept on site or at an accessible location so that it can be made available at the time of an on-site inspection, or upon request by the Engineer, DOTA Environmental Section, DOTA's Third Party Inspector, and/or DOH/EPA Representative.

(C) Discharges of Stormwater Associated with Construction Activities. If the project scope consists of ground disturbing activities and the total work area, including all construction support activity areas (i.e. storage and/or staging areas), is one acre or more, an NPDES Permit authorizing Discharges of Storm Water Associated with Construction Activity (CWB-NOI Form C) or Individual Permit authorizing stormwater discharges associated with construction activity is required from the Department of Health Clean Water Branch (DOH-CWB).

Do not begin construction activities until all required conditions of the permit are met and submittals detailed in Subsection 01561.3.1(B) – Water Pollution, Dust, and Erosion Control Submittals are completed, submitted to the Engineer and accepted in writing by the DOTA Environmental Section.

(D) Discharges Associated with Hydrotesting Activities. If hydrotesting activities require effluent discharge into State waters or drainage systems, an NPDES Hydrotesting Waters Permit (CWB-NOI Form F) or Individual Permit authorizing discharges associated with hydrotesting is required from the DOH-CWB.

Do not begin hydrotesting activities until the DOH-CWB has issued an Individual NPDES Permit or Notice of General Permit Coverage (NGPC). Conduct Hydrotesting operations in accordance with the conditions of the permit or NGPC.

(E) Discharges Associated with Dewatering Activities. If dewatering activities require effluent discharge into State waters or drainage systems, an NPDES Dewatering Permit (CWB-NOI Form G) or Individual Permit authorizing discharges associated with dewatering is required from the DOH-CWB.

Do not begin dewatering activities until the DOH-CWB has issued an Individual NPDES Permit or Notice of General Permit Coverage (NGPC). Conduct dewatering operations in accordance with the conditions of the permit or NGPC.

(F) Solid Waste Disclosure. Submit the Solid Waste Disclosure Form for Construction Sites, if applicable, to the Engineer within 30 calendar days of Contract Execution or upon the discovery of the solid waste. Provide a copy of all the disposal receipts from the facility permitted by the Department of Health to receive solid waste to the Engineer. This should also include documentation from any intermediary facility where solid waste is handled or processed.

(G) Construction BMP Training. The Contractor's representative(s), identified in Section 01561.3.1(B)(4), responsible for the Contractor's Construction Site Runoff Control Program, site managers, and appropriate subcontractors' personnel shall be properly trained on environmental compliance by attending a designated DOTA training seminar (e.g. HDOT's Protect Our Water Conference) or viewing the DOTA construction and post-construction training available at:

http://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program

Submit completed Training Roster and Construction Training Quizzes to the DOTA Environmental Section (fax: 808-838-8017 or email to dot.air.environmental@hawaii.gov) prior to the start of construction activities.

Individual workers must be trained on their site-specific BMPs by the Contractor's representative(s) and managers who are knowledgeable in the proper

manufacturer's installation, maintenance, and repair of the BMP product, or the manufacturer's authorized instructor. The Contractor shall keep training logs updated and readily available.

(H) Health and Safety Plan. A site-specific Health and Safety Plan for excavation work conducted in the known or suspected area of contamination shall be prepared and submitted at least 15 calendar days prior to initiating any excavation work. The Plan shall be applicable to Federal and State regulations.

The Contractor shall retain and pay for the services of a Certified Industrial Hygienist (CIH), certified by the American Board of Industrial Hygiene, to certify training, and review and approve the Health and Safety Plan, excavation procedures, including the determination of the need for personal protective equipment.

The Health and Safety Plan shall describe methods, techniques, and phases for handling the contaminated soil and groundwater, if present, including:

1. A sequence of operations.

2. Method of excavation, transporting, and disposal.

3. Soil Stockpiling and Groundwater Storage procedures.

4. Proposed equipment.

5. Provisions to ensure that chemical and petroleum constituent concentrations, both airborne and in the soil, are below the Department of Health Environmental Action Level (EAL), Permissible Exposure Limit (PEL) and below the Lower Explosive Limit (LEL). Provide soil testing, air monitoring, personnel monitoring, and air sampling to ensure worker safety as determined by CIH. If airborne concentrations exceed the PEL or the LEL at the control area boundary, then, work must stop immediately and the Engineer and DOTA Environmental Section notified.

3.2 CONSTRUCTION REQUIREMENTS

Do not begin work until submittals detailed in Subsection 01561.3.1(B) – Water Pollution, Dust, and Erosion Control Submittals are completed, submitted to the Engineer and accepted in writing by the DOTA Environmental Section, and required conditions of the NPDES Permit and other applicable permits are met.

Do not expose or disturb surface area of earth material, or initiate any ground-disturbing activities (including clearing and grubbing) until BMPs are installed, functional and accepted in writing by DOTA Environmental Section and/or their designated authorized representative. Only the soil, to the extent that is required to install the BMP measures and devices, shall be disturbed and minimized to the extent possible.

Install, maintain, monitor, repair and replace BMPs, such as for water pollution, dust, and erosion control; installation, monitoring, and operation of hydrotesting activities; removal and disposal of hazardous waste indicated on plans, concrete cutting slurry, concrete curing water; or hydro-demolition water. Address all comments received from the Engineer, DOTA Environmental Section and/or DOTA's Third-party inspector.

Coordinate temporary control provisions with permanent control features throughout the construction and post-construction period.

Protect temporarily or permanently disturbed soil surface from rainfall impact, runoff, and wind before the end of each work day. Coordinate and schedule the work to the maximum extent possible to minimize the amount of exposed or disturbed surface area of earth material.

Immediately ***initiate*** stabilizing exposed soil areas upon completion of earth disturbing activities for areas permanently or temporarily ceased on any portion of the site. Earth-disturbing activities have permanently ceased when clearing and excavation within any area of the construction site that will not include permanent structures has been completed. Earth-disturbing activities have temporarily ceased when clearing, grading, or excavation within any area of the site will not resume for a period of 14 or more calendar days, but such activities will resume in the future. The term "immediately" is used in this section to define the deadline for ***initiating*** stabilization measures. "Immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased.

Any of the following types of activities constitutes ***initiation of stabilization***:

1. Prepping the soil for vegetative or non-vegetative stabilization;

2. Applying mulch or other non-vegetative product to the exposed area;

3. Planting the exposed area;

4. Starting any of the activities in items (1) – (3) above on a portion of the area to be stabilized, but not on the entire area; and

5. Finalizing arrangements to have stabilization product fully installed in compliance with the deadline for completing initial stabilization activities.

After the initiation of stabilization, *stabilization activities shall be completed by the following deadline*.

1. For projects with an NGPC or NPDES Permit for Construction activities:

   (a) For construction areas discharging into waters not impaired for nutrients or sediments, complete stabilization within 14 calendar days after the temporary or permanent cessation of earth-disturbing activities.

   (b) For construction areas discharging into nutrient or sediment impaired waters, complete stabilization within 7 calendar days after the temporary or permanent cessation of earth-disturbing activities.

2. For projects without an NGPC or NPDES Permit for Construction activities, complete stabilization within 14 calendar days after the temporary or permanent cessation of earth-disturbing activities.

Any of the following types of activities constitutes *completion of stabilization activities*:

1. For vegetative stabilization, all activities necessary to initially plant the area to be stabilized; and/or

2. For non-vegetative stabilization, the installation or application of all such non-vegetative measures.

If the Contractor is using vegetative cover for temporary or permanent stabilization and is unable to meet the deadlines above due to circumstances beyond the Contractor's control, the Contractor shall notify and provide documentation of the circumstances to the Engineer for acceptance by DOTA Environmental Section. The Contractor shall include in their documentation the schedule that the Contractor will follow for initiating and completing stabilization. If agreed to by DOTA Environmental Section, the Contractor may, instead, comply with the following stabilization deadlines:

1. Immediately initiate, and complete within the timeframe shown above, the installation of temporary non-vegetative stabilization measures to prevent erosion;

2. Complete all soil conditioning, planting, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on the site.

Follow the applicable requirements of the contract documents including Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Section 619 and Section 641, as amended.

Where necessary to prevent erosion on the planted area, immediately install non-vegetative erosion controls that provide cover (e.g., mulch, rolled erosion control products) to the area while vegetation is becoming established.

Protect exposed or disturbed surface area with mulches or hydro-mulch with no seeds. Spray mulches at a rate of 2,000 pounds per acre. Add tackifier to mix at a rate of 85 pounds per acre. For hydro-mulch, use the ingredients and rates required for mulches. Apply fertilizer, if applicable, per the manufacturer's recommendations. Mulches, hydro mulch, and/or fertilizers shall not be applied during inclement weather or rain events. Submit recommendations from a licensed Landscape Architect when deviating from the application rates above or manufacturer's recommendations.

Install velocity dissipation measures when exposing erodible surfaces greater than 15 feet in height.

BMP measures shall be in place and operational at the end of each work day or as required by Section 01561.3.1(B).

Install and maintain stabilized construction entrances, including any wheel washes, to minimize tracking of dirt and mud onto roadways, sidewalks, and other paved areas. Restrict traffic to stabilized construction entrance areas only. Clean dirt, mud, or other material tracked onto the road, sidewalk, or other paved area by the end of the same day in which the track-out occurs. If tracking is excessive or sediment is being transported farther along the pavement or sidewalk by other vehicles traveling outside of the construction site, then, conduct cleaning and sweeping immediately. Modify stabilized construction entrances, as needed, to prevent mud from being tracked onto road. Stabilize entire access roads if necessary.

Maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, and all other work areas within the project limits free from dust which would cause a hazard to the work, airport operations, operations of other contractors, or to persons or property. Chemicals may be used as soil stabilizers for erosion and dust control. Submit the manufacturer's product data sheets of the chemicals to the Engineer for acceptance by the DOTA Environmental Section. Oil treating shall not be used. When using water for dust control, only potable water, that conform to Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Subsection 712.01 – Water, shall be used. Dust screens and fabrics are not allowed on, or inhibit the view of, the TSA and AOA Security Fences.

Cover exposed surface of materials completely with tarpaulin or a similar device when transporting aggregate, soil, excavated material, or other materials that may be a source of fugitive dust.

Provide temporary slope drains of rigid or flexible conduits to carry runoff from cuts and embankments. Provide portable flume at the entrance. Shorten or extend temporary slope drains to ensure proper function.

Protect ditches, channels, and other drainageways leading away from cuts and fills at all times by either:

1. Hydro-mulching the lower region of embankments in the immediate area.

2. Installing check dams and siltation control devices.

3. Other methods acceptable to the DOTA Environmental Section.

Provide for controlled discharge of waters impounded, directed, or controlled by project activities or erosion control measures.

Cleanup and remove any pollutant that is attributed to the Contractor. Deposit of solid waste or the discharge of liquid waste, such as fuels, lubricants, bituminous waste, untreated sewage and other pollutants which may contaminate the body of ground water shall not be permitted. Care shall be taken to ensure that no petroleum products, bituminous materials, or other deleterious substances, including debris, are allowed to fall, flow, leach, or otherwise enter the sewage systems or storm drains.

Burning of matter or waste material on Airport property shall not be permitted.

The use of hazardous materials is prohibited without the approval of the Engineer. Any corrective actions to remove and replace the hazardous material and contaminated work shall be at the sole expense of the Contractor. Hazardous materials shall be properly stored and handled.

3.3 INSPECTIONS

For all projects with earth-disturbing activities, including construction support activity areas, the following inspections shall be conducted:

(A) Initial Inspection of BMPs. Prior to the start of construction activities, the DOTA Environmental Section, or their designated authorized representative, will conduct an initial site inspection of the BMPs.

The Contractor shall submit their request for this inspection in writing to the Engineer. The inspection is subject to the availability of the DOTA Environmental Section or their designated authorized representative.

Prior to this inspection, only the soil, to the extent that is required to install the BMP measures and devices, shall be disturbed. During the inspection, the inspector will note any deficiencies in the BMP measures and devices, including identifying any site conditions that have the potential to result in the discharge of pollutants. The

Contractor is responsible for the correction of the deficiencies. Corrective Action shall be documented and submitted to the Engineer for acceptance by the DOTA Environmental Section and/or their designated authorized representative. The deficiencies must be corrected and accepted before construction activities are allowed to commence.

Initial Inspections shall be conducted separately for each new construction phase, new work areas, and additional construction support areas that occur during the construction period.

(B) Contractor's Inspection of BMPs. Commencing immediately after the Initial BMP Inspection and until the acceptance of the Final BMP Inspection, the Contractor shall conduct inspections of the sites to ensure that BMPs are effective and activities do not have the potential of causing a polluted discharge.

The Contractor's Inspections shall be conducted at the following intervals:

1. Weekly.

2. Within 24 hours of any rainfall of 0.25 inch or greater which occurs in a 24-hour period.

   The Contractor shall use on-line rainfall measurements data sources and providers. Rainfall measurements shall be taken from the same airport as the location of the project or within one (1) mile distance from the disturbed areas. Submit the identity of the provider, with the location of their measuring device, to the Engineer for approval by DOTA Environmental Section.

   In lieu of using any on-line rainfall provider or if there are no measuring device of an on-line provider on the airport or within one (1) mile from the disturbed area, the Contractor shall furnish and install a rain gauge in a secure location prior to field work including installation of site-specific BMPs. Provide a rain gauge with a tolerance of at least 0.05 inches of rainfall. Install the rain gauge on the project site in an area that will not deter rainfall from entering the gauge opening. Do not install in a location where rain water may splash into the rain gauge. The rain gauge installation shall be stable and plumbed. Maintain rain gauge and replace any rain gauge that is stolen, does not function properly or accurately, is worn out, or needs to be relocated. Do not begin field work until the rain gauge is installed and Site-Specific BMPs are in place. Rain gauge data logs shall be readily available.

   Submit rain gage data logs weekly with the Contractor's BMP Inspection Report to the Engineer for acceptance by the DOTA Environmental Section.

3. When existing erosion control measures are damaged or not operating properly as required by Site-Specific BMP.

Prepare a written report of the inspection and submit a copy of the report within 24-hours to the Engineer for acceptance by the DOTA Environmental Section. The report must include any deficiencies of the Site-Specific BMPs observed and the correction of these deficiencies. Corrective actions can be documented in a separate report and submitted upon completion of the corrective actions. Submit the report(s) to the Engineer for acceptance by DOTA Environmental Section.

The initiation of the work to repair or correct the deficiency shall begin immediately. However, except for those deficiencies that pose an immediate threat for the discharge of pollutants to the drainage system, surface waters, or receiving water, if the deficiency is identified at a time in the day in which it is too late to initiate the work, the initiation of the work shall begin on the following day.

After the initiation of the work to repair or correct the deficiency, the work shall be completed as follows:

1. If the deficiency poses an immediate threat for the discharge of pollutants to the drainage system, surface waters, or receiving waters, the work to fix the deficiency shall be completed by the close of the same day of discovery of the deficiency. Examples of these deficiencies included, but not limited to, illicit discharge, absence of perimeter controls in an area with evidence of sediment transporting off-site, and spills near a drain or waterway that have not been cleaned.

2. If the deficiency poses a significant threat for the discharge of pollutants to the drainage system, surface waters, or receiving waters, the work to fix the deficiency shall be completed by five (5) calendar days or before the next forecasted rain event, whichever is sooner. Examples of these deficiencies include, but not limited to, perimeter controls that are not functional or require maintenance, drain inlet protections that are not functional or require maintenance, installation of a new pollution prevention control, and deficiencies requiring significant repair for the correction of the deficiency.

3. If the deficiency does not pose a threat for the discharge of pollutants to the drainage system, surface waters, or receiving waters, but are not in strict conformance with the SWPPP, SSBMP Plan, or DOTA's Construction Activities BMP Field Manual, the work to correct the deficiency shall be completed by ten (10) calendar days or within the time specified by the Engineer, whichever is sooner. These deficiencies include all deficiencies except those deficiencies included in (1) and (2), above.

4. If it is infeasible to complete the correction of the deficiency or installation of a new pollution prevention control within the respective timeframe above,

notify the Engineer who will consult with DOTA Environmental Section. Document why it is infeasible to complete the work within the required timeframe. Complete the work as soon as practicable and as agreed to by both the Engineer and DOTA Environmental Section.

Retain copies of these inspection reports on-site or at an accessible location for the duration of the project so that they can be made available at the time of an on-site inspection, or upon request by the Engineer, DOTA Environmental Section, DOTA's Third Party Inspector, and/or DOH/EPA Representative. Present these inspection reports to the DOTA's Third-Party Inspectors at the time of their inspection for review.

(C) Final Inspection / Post-construction BMP Initial Inspection. The DOTA Environmental Section, or their designated authorized representative, shall conduct a Final Inspection / Post-Construction BMP initial inspection when the Contractor has completed construction, including installing permanent BMPs and stabilizing exposed soil.

The Contractor shall submit the request for this inspection in writing to the Engineer. The inspection is subject to the availability of the DOTA Environmental Section or their designated authorized representative.

All deficiencies noted must be addressed before the Contractor can remove temporary BMPs and close the site. The Contractor is responsible for correction of the deficiencies. Corrective Action shall be documented and submitted to the Engineer for acceptance by the DOTA Environmental Section. Any deficiencies noted during the final inspection must be corrected before the State will issue the project final acceptance and make final payment.

Partial Final Inspection of construction phases or partial areas of the project shall be conducted during the construction of the project for areas that are to be transferred for DOTA's use.

(D) Routine Inspections Conducted by DOTA. The Contractor's designated representative specified in Subsection 01561.3.1(B)(4) shall address any Site-Specific BMP deficiencies brought up by the Engineer or their authorized representative (i.e. Quality Control Engineer, Project Inspector, etc.) taking all reasonable measures to minimize or prevent discharge of pollutants until a permanent solution is installed and made operational.

The initiation of the work to repair and correction of the deficiency shall be completed within the same timelines as required in Subsection 01561.3.3(B).

(E) DOTA's SWMPP Inspections. *For Projects located at the Daniel K. Inouye International Airport (HNL) or the Kahului Airport (OGG)* that have a NGPC or NPDES Permit, or disturb one acre or more, including the construction support activity areas, the following additional inspections shall be conducted:

1. Third-Party Inspections. The DOTA Environmental Section's Third-Party inspector will conduct routine inspections. Third-party inspections shall be conducted monthly. The frequency of the inspections may increase if deficiencies are identified as determined by the inspector. Deficiencies must be corrected within the timeline defined in DOTA's SWMPP, Section C, Construction Site Runoff Control Program, which can be downloaded from the website:

   http://hidot.hawaii.gov/airports/doingbusiness/engineering/environmental/construction-site-runoff-control-program/

The Contractor shall be responsible for the correction of ALL deficiencies identified during any of the above inspections. Corrective Action shall be documented and submitted to the Engineer for acceptance by the DOTA Environmental Section or their designated authorized representative.

If the Contractor fails to satisfactorily address Site-Specific BMP deficiencies, the DOTA reserves the right to employ outside assistance or use the State's own labor forces to provide necessary corrective measures. The Contractor will be fully responsible for all cost and time. The State will charge the Contractor such incurred costs plus any associated project engineering costs and will make appropriate deductions from the Contractor's monthly progress payment.

Failure to apply or maintain Site-Specific BMP measures may result in the assessment of liquidated damages (Appendix B). Depending on the severity of the deficiencies, additional enforcement actions, such as, suspension of work and/or termination of the contract (with the Contractor's Surety being fully responsible for all additional costs incurred by the State) can be conducted and assessed against the Contractor.

For all citations or fines received by the DOTA for non-compliance, including non-compliance with NGPC/NPDES Permit conditions, the Contractor shall reimburse the State within 30 calendar days for the full amount of outstanding cost that the State has incurred, or the State shall deduct all incurred costs from the Contractor's monthly progress payments.

The Contractor shall be responsible for all citations, fines and penalties levied by DOH or EPA against the State due to the Contractor's failure to satisfactorily address Site-Specific BMP deficiencies and/or any Contractor's illicit discharges. The State will make the appropriate deductions from the Contractor's monthly progress payment.

PART 4 MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT AND PAYMENT

The work specified in this Section will be paid for at the contract lump sum price. Payment shall be full compensation for work prescribed in this Section and contract documents,

including but not limited to, all labor, materials, tools, equipment, and all incidentals necessary to install, maintain, monitor, repair, replace, modify, and remove Site-Specific BMP measures.

Item No.	Item	Unit
01561.1	Construction Site Runoff Control Program	Lump Sum

Partial payments shall be paid in the Monthly Progress Payment as follows:

1. 20% of the line item price shall be paid upon DOTA Environmental Section's acceptance in writing of the Site-Specific BMP Plan and the satisfactory completion of the Initial Inspection of BMPs defined in Section 01561.3.3(A), above.

2. 60% of the line item price shall be paid in equal monthly payments over the duration of the contract. Failure to satisfactorily apply, maintain, or modify BMP measures and devices, and/or submittals shall result in the withholding of monthly progress payments for this line item.

   For projects located at the Daniel K. Inouye International Airport (HNL) or the Kahului Airport (OGG) that have a NGPC or NPDES Permit, or disturb one (1) acre or more, including construction support activity areas, payments shall be made only after the DOTA's Third-Party Inspection defined in Section 01561.3.3(E), above, have been satisfactorily completed and accepted by the DOTA Environmental Section. Any deficiencies classified as Major or above will result in the withholding of monthly progress payments for this line item.

3. The remaining 20% of the line item price shall be paid after all BMP measures have been satisfactorily removed.

   Payment will be made only after the satisfactory completion of the Final Inspection / Post-Construction BMP Initial Inspection defined in Section 01561.3.3(C), above, and acceptance of the Post-Construction BMPs by the DOTA Environmental Section.

Liquidated Damages, up to $25,000 per day (Appendix B), shall be assessed for each non-compliance of the BMP requirements described in this Section. The Contractor shall not be entitled to recover any Liquidated Damages assessed, even after the deficiencies have been corrected.

Appendix A

The current DOTA's Construction Activities Best Management Practices (BMP) Field Manual can be found on DOTA's Environmental Website at

https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/

The manual is periodically updated and should be downloaded via the website to ensure that the latest version is applied. The manual identifies potential pollutant sources and BMPs that should be used to mitigate pollutants.

Additional information and requirements for stormwater programs at all airports can also be found at the above website, including additional requirements for Daniel K. Inouye International Airport (HNL) and Kahului Airport (OGG).

Appendix B Liquidated Damages Schedule for Non-Compliances.

Non-Compliance	Amount
Failure to submit a Notice of Intent or otherwise obtain a permit for Staging and/or Storage Area beyond the project limits.	$1,000 per calendar day per violation.
Failure to comply with the conditions specified in the Notice of General Permit Coverage (NGPC) or Individual NPDES Permit, or any other applicable permit.	$1,000 per calendar day per violation.
Failure to have the accepted SSBMP Plan and Amendments or the accepted SWPPP and Amendments available at a project construction site.	$1,000 per calendar day per violation.
Failure to install a BMP specified by the SSBMP Plan or SWPPP, or permit.	$2,000 per calendar day per violation.
Failure to properly install or maintain appropriate Site-Specific BMPs in accordance with applicable plans, permits, and guidance documents.	$2,000 per calendar day per violation.
Failure to have an accepted Amendment to the SSBMP Plan or an accepted Amendment to the SWPPP prior to implementation of the proposed BMPs. Note: Advance review and acceptance can be provided via email which will satisfy this non-compliance. However, the written Amendment must still be formally submitted for certification and signature by the authorized representative identified in the NGPC or NDPES Permit.	$2,000 per calendar day per violation.
Failure to conduct required inspections.	$1,000 for each of the first ten violations, $2,500 for each of the next ten violations, $5,000 for each subsequent violation.
Failure to submit required reports such as BMP inspection reports, rain gauge data logs, etc.	$500 per calendar day for the first ten days of each violation, $1,000 per calendar day for the next ten days of each violation, $2,500 per calendar day for each subsequent day of violation.

Non-Compliance	Amount
Any “major” or “critical” non-compliance violation with the applicable plans, permits, and guidance documents.	Up to $25,000 per calendar day per violation.
Any violation resulting in a polluted discharge.	Up to $25,000 per calendar day per violation.

Note: Liquidated Damages shown in the Table shall be assessed at the discretion of the DOTA.

Assessment of Liquidated Damages for Non-Compliance:

The Contractor may be assessed liquidated damages by issuance of an Enforcement Letter. The Enforcement Letter shall indicate the amount of liquidated damages that are assessed for the non-compliances which shall be deducted from the Contractor’s next progress payment. The Enforcement Letter will be sent electronically via e-mail and a hard copy to the Contractor’s designated representative(s), identified in Section 01561.3.01(2)(d), responsible for the Contractor’s Construction Site Runoff Control Program. An Enforcement Letter may be issued with or without a previous Verbal Notification, Warning Letter, or Notice of Apparent Violation (NAV).

Liquidated Damages may be assessed for the following:

- Non-compliances listed in the Table, herein, included in Appendix B.
- Non-compliances have not been corrected in the timeframes noted.
- Corrective actions are not completed after a Verbal Notification, Warning Letter, or Notice of Apparent Violation is issued.
- Contractors are non-responsive to DOTA’s directives.
- Repeated non-compliance.
- A polluted discharge has occurred.

The number of days used for the liquidated damages calculations shall start on the day that the non-compliance was required to be corrected and shall end on the day that the non-compliance is corrected and accepted. If DOTA’s personnel are not able to go out in the field to verify that the BMP deficiencies are corrected in the timeframe specified, the Contractor can send photographs showing the corrected deficiency via e-mail to the Engineer and DOTA Environmental Section along with documentation on how the deficiency was corrected. The Engineer and DOTA Environmental Section may visit the site to verify the corrective actions are acceptable. If the

corrective actions are acceptable, then the clock stops on the day that the documentation was received.

END OF SECTION

SECTION 01561 – CONSTRUCTION SITE RUNOFF CONTROL PROGRAM; APPENDIX C

The following is the HDOTA Construction Connection, Discharge, and Surface Runoff Permit associated with the project. The Contractor must sign the attached permit once awarded the project and submit the signed permit to HDOTA AIR-EE.

Discharge Permit No.: **Issuance Date:**

Construction Connection, Discharge, and Surface Runoff Permit

Pursuant to Hawaii Administrative Rules, Chapter 11-55, application is hereby made to connect or discharge into the Airport drainage system at the location(s) specified below and at no other location. The permit shall expire within 5 years of issuance date.

Airport: ITO	PMID/TMK: 3-5-001-012-9	Basin ID:
Tenant Company Name or DOTA Project Name and No.: Drainage & Windcone Improvements		
Tenant Contact Name or DOTA State Engineer: Greg Garcia		
Contact Email: greg.garcia@hawaii.gov		Contact Number: 808-838-8829

Type of Connection and/or Discharge (check all that apply):

■ Stormwater runoff from construction site ☐ Construction Dewatering ☐ Hydrotesting
☐ Alteration or removal of Drainage ■ New Drainage Connection ☐ Other_____

I, the Designer, have included the following as attachments to this application:

■ Plans showing the changes/connection to the drainage system, if applicable

■ Quantity of stormwater and site process water entering drain system

Please check the boxes below to indicate which items have been submitted to AIR-EE for review and acceptance:

■ DOH NOI-C Application for Stormwater Discharge from Construction Activities for Projects that disturb one (1) acre or more, if applicable.

■ Designer's Stormwater Pollution Prevention Plan (SWPPP) or Site-Specific BMP Plan for projects that disturb less than one (1) acre, including a project location map, discharge locations, and runoff flow patterns.

Name of Designer: Neal Fukumoto Design Company: Wesley R. Segawa & Associates, Inc.

Designer Signature: Neal S. Fukumoto Digitally signed by Neal S. Fukumoto DN: cn=Neal S. Fukumoto, o=WRSA, ou, email=neal@wrsasolutions.com, c=US Date: 2021.06.15 15:17:09 -10'00' Date: 6/16/2021

To be completed by the Contractor:

Please check the boxes below to indicate which items have been submitted to AIR-EE for review and acceptance:

☐ Contractor's Site-Specific Construction Best Management Practices (BMP) Plan, including a detailed summary of Erosion Control BMPs, project location map, and construction schedule

☐ Copy of the DOH NPDES Permit for Dewatering or Hydrotesting, if applicable.

Licensee Information and Agreement

The Licensee shall be the owner or authorized representative of the tenant's company for Tenant Improvement Projects, or construction company authorized representative for DOTA Projects.

Licensee, the undersigned, hereby agree to the following:

1. That the Licensee shall indemnify and hold the State free and harmless from all suits and actions resulting from the licensee's discharge operations.

2. That the Licensee will comply with all requirements of the DOTA construction specifications for DOTA projects and the DOTA Construction Activities BMP Field Manual and other DOTA construction requirements as included on the AIR-EE Construction Site Runoff webpage https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/.

3. This permit/approval shall obligate the activity to implement BMPs as required in Hawaii Administrative Rules, Chapter 11-55, Appendices C, F, and/or G.

4. The Licensee will promptly correct any deficiencies identified by DOH or DOTA.

5. That the Licensee shall provide appropriate best management practices and treatment devices for the removal of soil particles and other pollutant(s) in the discharge. Such discharge shall meet the basic water quality criteria applicable to all waters, as identified in Hawaii Administrative Rules, Chapter 11-54, Section 4 and any other applicable sections, at the point of discharge into State waters.

6. That the Licensee shall make all restoration to any State Airport or Airport tenant property damaged during the Licensee's discharge operations in accordance with DOTA.

7. That the Licensee shall discontinue the discharge should DOH determine that the receiving waters are being polluted, or the discharge does not meet the effluent requirements of the NPDES permit, or the Licensee's operations are not in the best interest of the general public. In addition, the Licensee shall be liable for any and all penalties as a result of discharges from the Licensee's operation.

8. That a copy of any effluent monitoring required by the NPDES permit shall be furnished to DOTA.

9. That the Licensee shall inspect and clean the inlets to the State Airport drainage system prior to discharging. If DOTA determines that any materials or substances from the Licensee's discharge operations have settled into any storm sewer, the Licensee shall immediately remove and clear any material and substance to the satisfaction of DOTA.

10. That the Licensee shall notify the DOTA Engineering Branch, Environmental Section (AIR-EE) of dewatering operations or hydrotesting operations at least 72 hours before commencing discharge.

Signature of Licensee	Print Name and Title	Date
Company Name	Company Address	Zipcode
Phone Number	Fax Number	

Approved by:

Environmental Section Supervisor	Date

SECTION 01562 – MANAGEMENT OF CONTAMINATED MEDIAS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

The General Provisions, Special Provisions, and General Requirements of the Specifications apply to the work specified in this section.

1.2 DESCRIPTION AND SCOPE OF WORK

A. This Section describes procedures for the management of contaminated media (soil, groundwater, and soil vapor) that may be disturbed during excavation activities associated with this project.

B. The Contractor shall supply all labor, materials, and equipment necessary for the removal, temporary storage, testing, handling, soil backfilling and management of contaminated media to carry out the work in accordance with these specifications, and all applicable Federal, State, and local regulations and latest amendments.

C. The Contractor shall examine the State of Hawaii, Department of Transportation, Airports Division (DOTA) Programmatic Environmental Hazard Evaluation and Environmental Hazard Management Plan (DOTA EHE-EHMP) and, if included as part of these specifications, the Environmental Site Assessment (ESA) Phase II, to understand the conditions that may affect work and performance. Should the Contractor deviate from the DOTA EHE-EHMP or ESA, the Contractor shall be responsible to prepare a DOH required Construction EHMP (C-EHMP) utilizing the C-EHMP Addendum Template or most recent version provided by DOH, also known as a Site-Specific EHMP. Any deviation will require approval by the State of Hawaii, Department of Health (HDOH) and DOTA Environmental Section (DOTA AIR-EE) prior to implementation, using the forms provided in Appendix B of the DOTA EHE-EHMP. The forms should detail deviations from standard practices in the text and explain how those deviations will be protective of human health and the environment. The forms should be submitted to HDOH and DOTA AIR-EE for review and approval if deviations are requested or if notifying of a release.

D. It should be noted that the DOTA EHE-EHMP is for Contaminants of Potential Concern (COPCs) which include, but not limited to, the following:

- Petroleum Substances, e.g., TPH, TPH-g, TPH-d, TPH-o, BTEX, and PAHs.
- Chlorinated Solvents, e.g., VOCs
- Polychlorinated Biphenyls (PCBs)
- Pesticides, e.g., chlordane
- Heavy Metals, e.g., Arsenic, Barium, Cadmium, Total Chromium, Lead, Mercury, Selenium, and Silver.

In addition, free product (e.g., gasoline, diesel fuel, fuel oils, lubricating oils, benzene, toluene, xylenes) may be encountered in areas of previous petroleum releases.

Should the ESA Phase II identify contaminants other than those listed above or there is a risk to human health and/or the environment (such as indoor air quality in an occupied building), the Contractor shall be responsible to revise, update, and finalize the C-EHMP Addendum. The Contractor shall coordinate with, as well as have their C-EHMP approved by HDOH prior to the start of any ground disturbing activities.

1.3 REFERENCES

A. Programmatic Environmental Hazard Evaluation and Environmental Hazard Management Plan dated July 2019, or its latest edition.

B. DOTA's Storm Water Management Program Plan (SWMPP) for the Daniel K. Inouye International Airport (HNL) and Kahului Airport (OGG), including DOTA's Construction Activities BMP Field Manual dated August 2019, or its latest edition.

C. All work under this contract shall be performed in strict accordance with all applicable Federal, State, and local regulations, standards, and codes governing contaminated media.

D. The most recent editions of any relevant regulations, standards, documents, or codes shall be in effect, including, but not limited to, the following. Where conflicts among the requirements or with these specifications exists, the most stringent requirements shall apply.

1. 29 CFR 1910, "Occupational Safety and Health Standards".

2. 29 CFR 1926, "Safety and Health Regulations for Construction".

3. 40 CFR 50, "National Primary and Secondary Ambient Air Quality Standards A".

4. 40 CFR 122, "EPA Administered Permit Program: The National Pollutant Discharge Elimination System".

5. 40 CFR 261, "Identification and Listing of Hazardous Waste".

6. 40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste".

7. 40 CFR 302, "Designation, Reportable Quantities, and Notification".

8. 49 CFR 172, Subpart E, "Labeling".

9. 49 CFR 172, Subpart F, "Placarding".

10. The Hawaii Environmental Response Law (Hawaii Revised Statutes [HRS] Chapter 128D) and the State Contingency Plan (Hawaii Administrative Rules [HAR] Title 11, Chapters 451-1–451-24).

11. The Hazard Evaluation and Emergency Response Office Technical Guidance Manual (TGM) for Implementation of the State Contingency Plan (Interim Final, June 21, 2009).

12. Hawaii Hazardous Waste Laws and Regulations (HRS Chapter 342J, HAR Title

11, Chapters 260.1–279.1).

13. Hawaii Solid Waste Laws and Regulations (HRS Chapters 342H and I, HAR Title 11, Chapter 58.1).

14. Hawaii Underground Storage Tank Laws and Regulations (HRS Chapter 342L; HAR Title 11, Chapter 280.1).

15. Hawaii Water Quality Standards (HAR Title 11, Chapter 54).

16. Hawaii Ambient Air Quality Standards (HAR Title 11, Chapter 59).

17. Hawaii Occupational Safety and Health Standards (HAR Title 12, Subtitle 8).

18. Hawaii Department of Health, Office of Hazard Evaluation and Emergency Response. Screening for Environmental Hazards at Sites with Contaminated Soil and Groundwater. Website URL: http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/EALs. Fall 2011 (and updates).

19. Hawaii Department of Health, Office of Hazard Evaluation and Emergency Response. Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material. Website URL: http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/technical-guidance-and-fact-sheets. October 8, 2017 (and updates).

20. Hawaii Department of Health, Office of Hazard Evaluation and Emergency Response. Construction EHMP Addendum Template, available from AIR-EE.

21. U.S. Environmental Protection Agency (EPA): Comprehensive Environmental Restoration, Compensation, and Liability Act, Section 107(1), 1980, exemption for cleanup of legally applied pesticide products.

PART 2 – PRODUCTS

2.1 PERSONAL PROTECTIVE EQUIPMENT & SIGNAGE

A. Provide workers with Personal Protective Equipment (PPE) according to the Contractor's PPE Assessment.

B. Provide warning signs and labels to protect the workers and the public.

2.2 POLYETHYLENE SHEETING

Sheet plastic shall be new, and clear or black with at least 20-mil thickness. A 6-mil plastic sheet can be used to cover the stockpiles.

PART 3 – EXECUTION

3.1 GENERAL WORK PROCEDURES

A. Prior to beginning work, the Contractor, the Contractor's Qualified Environmental Professional, and DOTA Engineer or its representative shall discuss the approved Work Plan, as described in Paragraph 3.2 below, including work procedures and safety precautions.

B. Communicate any existing, potential, or new hazards to workers before a job begins or as necessary. The workers shall be aware of the need for proper safety procedures and be familiar with the Contractor's Work Plan.

C. Boundaries shall be established at each area where soil excavation is to be performed. The area shall be clearly identified to prevent unauthorized entry. Establish a control area by completely enclosing/roping-off the area where contaminated soil excavation, removal, stockpiling and disposal operations will be performed.

D. Provide physical boundaries around the control area by roping-off the area to ensure that airborne concentrations of COPC will not exceed permissible exposure limits outside the control area.

E. Where applicable, caution signs shall be placed at the entrances to each work area, located such that approaching personnel may read the signs and take necessary precautions before entering the work area. No one will be permitted in the work area unless the person is provided with appropriate training and protective equipment.

F. It should be noted that, in some cases, the contamination may not be identifiable through visual and/or olfactory observation (e.g., soil contaminated with metals, PCBs, pesticides, etc.) and contaminant-specific field screening techniques may need to be implemented.

G. Measure, monitor, and record worker exposure to toxic materials or harmful agents as necessary.

H. Follow Decontamination regulations and procedures as necessary.

I. Soil excavation activities, grading, and any disturbance of impacted soil may cause a potential exposure to Contractor's employees and the general public due to fugitive dust. The routes of exposure of dusts are by inhalation, ingestion, and dermal contact. The Contractor shall use engineering controls such as water spraying and wind barriers to control fugitive dust.

J. The Contractor shall test residual soils not used as backfill for COPC. Soils with concentrations above regulatory and/or unrestricted use environmental action levels shall be disposed of in accordance with regulatory requirements.

K. Report construction activities in areas with contaminated soil or groundwater by completing the appropriate forms in the DOTA EHE-EHMP, Appendix B.3 Construction Activities Release Response Plan. Submit the forms to the HDOH Office of Hazard Evaluation and Emergency Response (HEER Office) and provide a copy of the forms to the DOTA Engineer and DOTA AIR-EE.

3.2 PRECONSTRUCTION REQUIREMENTS

A. Submit the following a minimum of 30 calendar days prior to beginning any ground disturbing activities, for approval by DOTA AIR-EE.

1. Contractor's Work Plan for Known or Suspected Areas of Contaminated Media:

a. The Contractor shall submit their work plan which shall include, but not limited to, a Site-Specific Health and Safety Plan (HASP) or if needed, a C-EHMP. The work plan shall describe the procedures, engineering controls, and methods the Contractor will use during the excavation, temporary storage, handling, treatment, backfilling, and disposal of soil and/or water at the project site. The plan shall also include soil stockpiling and segregation, testing, contaminated soil and water quality testing, contaminated soil and water disposal procedures, backfilling procedures, personal protection requirements, work area isolation, construction barriers, wetting methods, decontamination procedures, and emergency procedures. The work plan shall be in accordance to all applicable Federal, State, and local regulations and latest amendments.

For locations within the airport which DOTA has already established a Site-Specific EHMP from previous projects, the DOTA's Site-Specific EHMP, shall govern, where applicable.

b. The plan shall include the names of the Contractor's and their subcontractor's qualified personnel who will be supervising or managing the management of contaminated materials at the site. Include the personnel's phone number and qualifications.

c. The plan shall include the name(s) of the Contractor's Qualified Environmental Professional, including their qualifications.

d. Proposed schedule of work.

e. A sketch identifying the location of temporary soil stockpiling and water storage devices, including pipes and appurtenances, if applicable.

f. A map showing the location of the work and nearest medical facilities and hospitals.

g. A copy of this Work Plan must be on the construction site and available at all times.

h. The Work Plan shall be amended to reflect changes to the site or work conditions, as needed.

B. QUALIFIED ENVIRONMENTAL PROFESSIONAL

The Contractor shall employ a Qualified Environmental Professional who possesses five (5) years, minimum, experience providing environmental oversight for the

management of contaminated media during construction activities. The Environmental Professional shall assist in the preparation of the Contractor's Work Plan by reviewing the work procedures, including the determination of the need for PPE, and to provide environmental oversight during construction. The Environmental Professional shall be identified in the Work Plan, including a list of their environmental qualifications, for approval by DOTA AIR-EE.

C. CONTRACTOR TRAINING

The Contractor and its subcontractors shall implement safe work places and practices by eliminating, mitigating, or protecting against existing or potential hazards to the workers who may be exposed to harmful, hazardous, and toxic materials and substances, including contaminated water and soil.

3.3 CONSTRUCTION REQUIREMENTS

A. SOIL EXCAVATION AND STOCKPILING

1. Notify the HDOH Clean Water Branch (CWB) at least 90 calendar days prior to disturbing contaminated soil from known areas of contamination. Notify the HDOH HEER Office at least seven (7) calendar days prior to construction activities that could disturb known contaminated soil.

2. The HDOH HEER Office shall be immediately notified if contaminated soils are encountered. The disturbance of contaminated soil shall be performed in accordance with the Contractor's approved Work Plan, the DOTA EHE-EHMP, or a C- EHMP Addendum where applicable. HDOH HEER Office will determine whether additional sampling is required. Provide a location map with Global Positioning System (GPS) coordinates and approximate depth (bgs) at which the contaminated soils were encountered to the DOTA Engineer and DOTA AIR-EE.

3. During excavation and disturbance of impacted soil, all workers, supervisory personnel, subcontractors, and consultants must take precautionary measures as necessary to prevent exposure of the workers and the general public to chemicals of concern (COCs) by contaminated soil dust and inhalation of associated vapors.

4. The Contractor's Qualified Environmental Professional shall direct the segregation of the soil into three (3) separate soil piles: Pile No. 1 will consist of clean soil; Pile No. 2 will consist of soil excavated from areas found to be contaminated or suspected to be contaminated; and Pile No. 3 will consist of soil that is grossly contaminated. Contaminated soil stockpiles, suspected contaminated soil stockpiles, and grossly contaminated soil stockpiles shall be placed onto 20-mil plastic sheeting. Underlay edges of the plastic sheeting with bermed soil. Ensure that the height of the bermed soil will be sufficient to prevent stormwater runoff from breaching it. Place the excavated soil inside the bermed area on top of the plastic sheeting. Cover the stockpiles with 6-mil plastic sheeting in the bermed area to mitigate dust concerns caused by wind and prevent contact with rainwater and stormwater runoff. Secure the plastic cover with sufficient ballast and place sediment control devices along the entire toe of each stockpile.

5. Each stockpile shall not exceed 100 cubic yards and shall be located away from drainage features, surface waters, and stormwater drainage paths. Or, the soils can be placed in watertight containers, such as 20-yard steel roll-off bins, drums, etc. These containers shall be covered.

6. The Contractor shall have representative soil samples taken from each stockpile (Pile No. 1, 2, and 3) and tested in accordance with HDOH guidelines, standards, and regulations, such that the soil sample report, prepared by the Contractor's Qualified Environmental Professional, can specifically state one of the following:

    a. "The soil is not a regulated hazardous waste and is acceptable for disposal at a HDOH permitted facility."; or

    b. "The soil is acceptable for unrestricted reuse."

    Sampling and testing of the stockpiles shall be, at a minimum, in accordance to the latest edition of the HDOH's *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material*. The Contractor's Qualified Environmental Professional shall direct the soil sampling collection and testing methods in accordance with the most current guidelines. Stockpiles shall be tested using multi-increment (MI) sampling approaches. Appropriate decision unit (DU) volumes for larger stockpiles of soil should be discussed with the HDOH HEER Office on a case-by-case basis.

    The Contractor shall also confirm, with the HDOH permitted facility, the facility's sampling requirements, as well as their standards for disposal.

7. Any liquid-phase oil or free product associated with the contaminated soil shall be drained prior to stockpiling. If feasible, the free product should be separated from the soil, properly stored, profiled, and disposed of at an approved recycling/disposal facility.

8. For any soils hauled off Airport property, the Contractor shall be responsible for the legal disposal of any soil. The Contractor shall implement and maintain the following:

    a. A form, signed by the Contractor and haul truck driver. The form shall contain the following information:

        i. The date the material is being taken off Airport property.
        ii. The name of the haul trucking company.
        iii. The haul truck number and license plate number.
        iv. The quantity of material being loaded into the haul truck.
        v. The disposal facility or location of where the material is to be taken.
        vi. The time the truck left the project site.

    b. The form and waste manifest from the HDOH permitted facility shall be provided to the Engineer or its representative by the close of the next working day. The Contractor shall verify that the quantity of material loaded into the truck, as indicated on the form, exactly matches the quantity of material disposed at the HDOH permitted facility, as indicated on the waste

manifest.

c. The Contractor shall maintain a log that summarizes each form and waste manifest for ease of tracking and monitoring.

d. **All forms, waste manifest, and summary log shall be a condition of payment being made to the Contractor and shall be submitted with each progress payment. Failure to submit the above and/or should any quantity of material loaded into the truck, as indicated on the form, not exactly match the quantity of material disposed at the HDOH permitted facility, as indicated on the waste manifest, shall be reason for the State to withhold payment to the Contractor.**

9. Excavated soils can be reused onsite (within the construction site boundaries) with the prior approval of the DOTA AIR-EE, HDOH HEER Office, and subject to the following conditions:

   a. Representative soil samples have been taken and tested in accordance with HDOH standards and regulations.

   b. The contaminated soil can only be reused within proximity of its original excavation.

   c. The contaminated soil is placed within areas more than 150 meters from surface water and drainage features.

   d. The contaminated soil cannot be placed beneath or within the footprint of a planned building structure.

   e. The contaminated soil can only be placed at an elevation above the tidally influenced high water table and at least 1-foot below the finish surface grade. The more highly impacted soil should be placed at the bottom of the excavation and the cleanest soil at the top of the excavation. At least 1-foot of clean soil must be placed as the final backfill layer at the top. The excavation shall then be capped with an impervious layer, such as concrete and asphalt.

   f. The contaminated soil cannot contain any free oil, oil sheens, oil stains, or total petroleum hydrocarbon (TPH) concentrations exceeding 5,000 parts per million (ppm).

   g. The contaminated soil is not considered a hazardous waste pursuant to Federal and State laws.

   h. Contaminated soil shall not be reused in areas that are uncontaminated.

10. Excavated soils can be reused offsite (off Airports property) with the prior approval of the DOTA AIR-EE, HDOH HEER Office, and subject to the following conditions:

a. Representative soil samples have been taken and tested in accordance with HDOH standards and regulations.

b. The work shall be performed in accordance to the latest edition of the HDOH's *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material*.

c. A signed agreement with the receiving facility acknowledging the test results of the soil samples and acceptance of the soil is required to be submitted to the DOTA Engineer and DOTA AIR-EE ten (10) calendar days prior to hauling of the soil to the receiving facility.

d. The contaminated soil shall not contain any free oil, oil sheens, oil stains, or total petroleum hydrocarbon (TPH) concentrations exceeding 5,000 parts per million (ppm).

e. The contaminated soil is not considered a hazardous waste pursuant to Federal and State laws.

11. All soil that is reused onsite or offsite shall be included in the Closeout Report. The report shall include, at a minimum, a copy of the signed agreement from the receiving facility accepting the soil, a copy of the soil test results, the quantity of soil received by the facility, a location map of the reused soil including GPS coordinates of its limits, the depth and thickness of the soil's placement, a brief description of the purpose of the soil's re-use, and photos of the site conditions after placement has been completed.

B. GROUNDWATER MANAGEMENT

Soil and groundwater may be impacted by petroleum hydrocarbons, dissolved metals, and/or pesticides, and may be encountered during soil excavation.

1. The disturbance of contaminated groundwater shall be performed in accordance with the approved Work Plan, DOTA EHE-EHMP, or Site-Specific EHMP, where applicable. HDOH HEER Office will determine whether additional sampling is required.

2. If contaminated groundwater is uncovered at a previously unknown source or site on the project, the Contractor shall immediately notify the DOTA Engineer, DOTA AIR-EE, and HDOH HEER Office of its discovery. Provide a location map with GPS coordinates and approximate depth of the groundwater (bgs) at which the discovery was encountered.

3. During excavation and disturbance of impacted groundwater, all workers, supervisory personnel, subcontractors and consultants must take precautionary measures as necessary to prevent exposure of the workers and the general public to COCs and inhalation of associated vapors. Free product, sheen, and impacted groundwater must be managed properly.

4. Groundwater that exhibits evidence of possible contamination, i.e., odor, visual sheen, free product, coloration, and PID measurement, shall be properly stored

when removed from the ground. Storage devices shall be watertight and leak-free to prevent discharge of the water into the surrounding ground, drainage system, and surface waters.

When disconnecting pipes and hoses from storage devices and equipment, residual waters contained in the pipes and hoses shall also be prevented from discharging into the surrounding ground, drainage system, and surface waters.

5. Representative water samples shall be taken and tested in accordance with Federal and State guidelines, standards, and regulations.

6. If free product is present in the extracted groundwater, it must be separated from the groundwater, profiled, and disposed of at an HDOH approved recycling/disposal facility. Free product shall not be moved from one excavation to another. Engineering measures shall be taken to prevent the transfer of the free product during dewatering. Under no circumstances shall water contaminated with free product be discharged from a dewatering pit.

7. At least once daily, remove oil observed floating on the groundwater during excavation activities using a vacuum truck, absorbent pad, or other methods approved by HDOH HEER Office. Excavations shall not be backfilled until the floating oil is removed to the maximum extent practicable, which is when further use of vacuum trucks, absorbent pads, or other approved methods do not result in further floating oil removal. Backfilling of any excavation shall not occur without concurrence from DOTA AIR-EE and HDOH HEER Office.

8. Avoid any releases of contaminated groundwater to surface water bodies or areas beyond the work area.

9. Groundwater shall only be re-infiltrated in the ground with the prior approval of DOTA AIR-EE and HDOH HEER Office, and subject to the following conditions:

    a. Within 200-feet of its original location or source and returned to the same aquifer which is not a current or potential drinking water source. Re-infiltration shall not contaminate uncontaminated areas.

    b. More than 150 meters from surface waters, drainage features, and drainage structures.

    c. Groundwater does not contain any gross contaminants.

    d. If petroleum free product is present in the groundwater, the free product shall be removed prior to transfer of the groundwater to the re-infiltration site. Free product shall be removed at least once daily until no free product is observed after 24 hours. The free product shall be disposed at an HDOH-approved facility.

    e. Groundwater is not considered a hazardous waste pursuant to Federal and State law.

    f. Re-infiltration shall be conducted at a slow enough rate so that it does not

flow past the designated infiltration area, enter storm drains, or impact surface water in the area.

g. If discharging to a re-infiltration trench, the trench must not be an underground injection control (UIC) well by HDOH's Safe Drinking Water Branch (SDWB) definitions. If some part of the trench system is deemed to be a UIC well, then the whole system shall be considered an injection well.

h. Advance clearance from HDOH SDWB is required if a re-infiltration trench is deeper than 10 feet.

i. If a UIC well is used for re-infiltration, the Contractor is responsible to obtain the necessary permits, including, but not limited to, HDOH's UIC Permit. The Contractor shall meet and comply with all permit requirements, including, but not limited to, well construction, placement, use, and closure.

10. Under circumstances where contaminated groundwater cannot be re-infiltrated, proper disposal must be conducted with the prior approval of the DOTA AIR-EE, HDOH SDWB, HDOH Solid and Hazardous Waste Branch (SHWB), and HDOH HEER Office. This is also subject to the following conditions:

    a. Discharge to the local or municipal sanitary sewer system after acquiring appropriate permit(s) from City and County (if applicable and if allowable by the receiving governmental agency) prior to discharge. If discharge water was generated within contaminated areas, additional coordination with HDOH HEER Office is required, and Aquatic Habitat Criteria (Chronic Toxicity) shall apply to discharge within these areas, in addition to any criteria applicable to the National Pollutant Discharge Elimination System (NPDES) permit or pretreatment facility. Water discharged to a sanitary sewer may be required to meet Water Quality Standards.

    b. Notification to the appropriate agencies and other pertinent information related to the discharge must be provided upon request.

    c. The Contractor is responsible for the legal disposal or discharge of any groundwater that is not re-infiltrated, and shall provide the DOTA AIR-EE with copies of waste manifests.

    d. For any groundwater hauled off Airport property, the Contractor shall have representative samples taken and tested in accordance with HDOH guidelines, standards, and regulations. A copy of the groundwater test result shall be submitted to DOTA AIR-EE. The groundwater shall not be disposed offsite without the approval of DOTA AIR-EE and the HDOH permitted facility that is receiving the groundwater. Furnish documentation from the receiving facility indicating that they acknowledge the groundwater test results, including their approval to dispose the groundwater at their facility.

C. RELEASE REPORTING

Encountering previously unknown, suspected, or confirmed contaminated soil or

groundwater during subsurface construction activities is considered a release and shall be reported to HDOH HEER Office (phone: 808-586-4249, or after hours at 808-236-8200). Copies of the HDOH Release Report, HDOH issued Release Number, and email correspondence (if applicable), shall be furnished to the DOTA Engineer and DOTA AIR-EE.

1. Upon the discovery of contaminated soil and/or groundwater, the Contractor shall immediately notify the DOTA Engineer, DOTA AIR-EE, and HDOH HEER Office.

2. A reportable release of hazardous substances or contaminated soil or groundwater may be indicated by, but not limited to, any of the following:

    - A petroleum sheen on the groundwater in an excavation.
    - Any free product that appears on groundwater.
    - Visual or olfactory evidence of contamination (e.g., unusual discoloration, buried containers, fumes, unknown liquids).

3. Comply with DOTA and HDOH HEER Office requirements. A written report shall be provided to the HDOH HEER Office. The *Hawaii Hazardous Substance Written Follow-up Notification Form* is provided in the DOTA EHE-EHMP, Appendix B.1. Photos shall be included to document the incident. The Contractor shall keep a copy of the completed Form B.1 and provide copies of the written report to the DOTA Engineer and DOTA AIR-EE.

4. If free product is encountered, report the release in accordance with HAR § 11-451.

<u>Releases that occur during construction activities or releases due to unforeseen events (spill) shall also be reported.</u>

1. Report all spills to immediately to AIR-EE,State Engineer, and appropriate airport personnel and regulatory agencies (if applicable) following the DOTA Spill Reporting Fact Sheets for each airport. Spill Reporting Fact Sheets can be found on DOTA's Environmental Webpage for Construction site Runoff at https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/.

2. In the event of a release of a hazardous substance that causes an imminent threat to human health or the environment, the first call shall be to 911.

3. Small spills of petroleum or hazardous substances (less than 25 gallons) which are capable of being cleaned up within 72 hours and do not threaten ground or surface waters shall be cleaned up immediately.

4. Report spills of a certain size (e.g., volume of greater than 25 gallons or not contained within 72 hours), per HAR § 11-451, to HDOH HEER Office and the National Response Center immediately. Comply with the HDOH HEER Office requirements. A written report shall be provided to the HDOH HEER Office within 30 calendar days of a Reportable Quantity spill cleanup. The *Hawaii Hazardous Substance Written Follow-up Notification Form* is provided in the DOTA EHE-EHMP, Appendix B.1. Photos shall be included to document the incident. The

Contractor shall keep a copy of the completed Form B.1, and provide copies of the written report, the HDOH issued Release Number, and email correspondence (if applicable) to the DOTA Engineer and DOTA AIR-EE.

5. Any spill that enters a body of water, onto an adjoining shoreline, or discharges into the storm drain system, HDOH CWB must also be immediately notified and the National Response Center notified within 24 hours. Report significant spills to the U.S. Coast Guard.

D. FINAL CLEANUP

1. When work which disturbs contaminated soil has been completed, the State will visually inspect the work area for evidence of contaminated materials and direct the Contractor to clean and remove remaining contaminated materials. The Contractor shall not dismantle the work area boundaries prior to authorization by the State.

2. Any equipment which contacts contaminated materials shall be cleaned with a water spray immediately upon completion of work. The wash location shall be located immediately adjacent to the contaminated area. All wash water and solid waste shall be disposed of in accordance with the Work Plan. The wash water shall not be allowed to discharge into the drainage system and surface waters.

E. AIR MONITORING

1. Air monitoring shall be conducted when petroleum-contaminated soil (PCS), contaminated groundwater, free product, or chlorinated solvents (e.g., PCE, TCE, etc.) is present in an excavated area. The monitoring shall include both work area and perimeter measurements of volatile organic compound (VOC) vapors. Appropriate response actions shall be taken in conformance to Federal and State regulatory requirements and guidelines. The response actions shall include ensuring that on-site workers have the appropriate level of PPE and the general public is not affected adversely.

2. Air monitoring shall be conducted with a conventional photoionization detector (PID) to measure total VOC vapor concentrations. If high levels of benzene are anticipated, an Ultra-Rae PID, which is benzene-specific, shall also be used.

3. If toxic gases are a potential concern, air monitoring of the lower explosive limit (LEL) shall be conducted using a multi-gas meter to determine if a hazardous atmosphere exists.

4. Air monitoring shall be conducted for at least three (3) full 8-hour shifts to establish a negative exposure assessment for worker's exposure to airborne contaminants. After the establishment of the negative worker's exposure, periodic monitoring shall be conducted once every seven (7) calendar days to document worker exposure for the duration of the contaminated soil work.

5. Work area and perimeter air monitoring shall be conducted throughout the entire duration of the contaminated soil work to ensure unprotected personnel are not exposed above permissible exposure limits at all times. If the outside boundary levels are at or exceed permissible exposure limits, work shall be stopped, and

the Contractor's Qualified Environmental Professional and DOTA Engineer shall be immediately contacted to address the situation causing the increased levels.

6. Submit air sampling results to the DOTA Engineer within five (5) calendar days after the samples are collected, signed by the testing laboratory employee performing the air monitoring.

F. UNDERGROUND STORAGE TANKS (UST) AND UTILITY PIPES

1. For any UST or pipeline discovered or planned removal, the nature of the UST or pipeline, and whether they are inactive, shall be determined prior to removal. Immediately notify the DOTA Engineer and DOTA AIR-EE of the discovery.

   If unanticipated petroleum pipelines are discovered, contact HDOH HEER Office within 24 hours after encountering them.

2. The Contractor shall record field observations of the UST and pipelines. These observations shall include, but are not limited to, the following:

   a. Location relative to fixed landmarks, including GPS coordinates. Provide a location map that shows the UST and pipelines that were encountered. The map must include a North arrow and a scale.

   b. Depth, diameter, length, and type of pipe, if applicable. Describe the condition of the pipe.

   c. Type of fuel or product, including analytical laboratory reports for the product that is recovered.

   d. Beginning and ending fluid levels, if applicable.

   e. Volume of each type of product removed.

   f. Flow rates, if applicable.

   g. Direction of flow.

   h. Detailed photographs.

   i. Detailed description of actions taken following the discovery, such as, cutting, product removal, and disposal.

   Provide records of the field observations to the DOTA Engineer, DOTA AIR-EE, and HDOH HEER Office.

3. Prior to removal of a UST, the Contractor shall prepare and submit to the DOTA Engineer, for review by DOTA AIR-EE, a Site-Specific plan. All work associated with USTs shall be in compliance with HAR § 11-280.1 requirements, and HDOH HEER Office and HDOH SHWB requirements.

   The contractor shall also complete the HDOH *Notice of Intent to Close*

Underground Storage Tanks form and submit it to the DOTA Engineer for submission to HDOH SHWB (UST Section) by DOTA AIR-EE.

Prior to the removal of the UST, the Contractor shall receive approval from DOTA AIR-EE and HDOH HEER Office.

4. The UST or pipeline segment must be drained of its content or determined that it is empty of liquids or flammable vapors prior to the removal. Any petroleum fluids recovered must be representatively sampled and tested to determine how they can be recycled or disposed in full accordance with HAR § 11-58.1 and § 11-260–279, and any other Federal and State regulations.

5. Only personnel knowledgeable and trained in pipeline and UST removal shall cut, drain, and remove USTs and pipelines. Prior to cutting, plastic sheeting and absorbent material shall be placed below and adjacent to the cutting location. Any residual fluid in the UST or pipeline must be properly contained on the sheeting and prevented from discharging into the surrounding soil or entering any drainage system and surface waters.

6. The cut-off ends of the pipeline segments, that remain in-place, must be filled with concrete and appropriately sealed to prevent any potential leakage and contact with groundwater.

7. If the waste pipe or UST are to be stored onsite prior to disposal, the area shall be lined with polyethylene plastic sheeting, 10 mil or thicker, and bermed to contain any free product. Some viscous products may appear to be immobile, however, after exposed to atmosphere heating, can liquefy. The waste pipe segment shall be stored on appropriate dunnage with the ends of the pipe sealed or covered to protect the interior of the pipe from contact with rainwater and wind.

8. All removed pipelines and USTs shall be properly disposed or recycled.

9. For USTs, a UST Removal Report including all sampling activities required under HAR § 11-280.1 shall be prepared and submitted to the DOTA Engineer, DOTA AIR-EE, and HDOH SHWB (UST Section).

3.4 POST-CONSTRUCTION REQUIREMENTS

A. Submit the following within 30 calendar days after work is completed.

1. Close-out Report

a. A signed certificate stating that the removal and disposal of all contaminated materials were completed in accordance with the Contractor's approved Work Plan or C-EHMP Addendum, and all applicable Federal, State, and local rules and regulations.

b. All approved DOTA EHE-EHMP deviation request forms. (Reference Appendix B of the DOTA EHE-EHMP.)

c. All Site-Specific EHMP, if applicable.

d. All testing, laboratory results, and reports for any soil, groundwater, soil vapor, UST, pipeline, and other samplings taken.

e. All disposal forms, waste manifests, and summary logs.

f. Any results from project air monitoring.

g. Record of Field Observations, including location map with GPS coordinates, limits, and depths of any contaminated media (soil, groundwater, etc.) that were encountered at previously unknown source or sites on the project. Include a copy of the completed *Hawaii Hazardous Substance Written Follow-up Notification* form that was submitted to HDOH and all other associated documents.

h. If any contaminated soil was removed offsite (off of Airport Property), at a minimum, include the following:

- A copy of the signed agreement from the receiving facility acknowledging the test result of the soil samples and indicating acceptance of the soil for reuse.
- Copies of the test results of the soil sampling.

i. If any contaminated soil was re-used onsite (within the construction site boundaries), at a minimum, include the following:

- Copies of the test results of the soil sampling.
- The quantity of soil that is re-used on-site.
- Location map of the re-used soil. Include GPS coordinates of its limits, if the area is accessible.
- A brief description of the purpose of the re-used soil (e.g., general fill, utility trench backfill material, etc.). Include the depth and thickness of its placement.
- Photos of the site after placement of the re-use soil has been completed.

j. Record of Field Observation of any unanticipated UST or pipeline discovered during construction activities, including a copy of the completed HDOH *Notice of Intent to Close Underground Storage Tanks* form and all other associated documents.

The Close-out Report shall be by each individual contaminated media and shall include all appropriate documentations. The Close-out Reports for each contaminated media can be submitted separately or combined in a 3-ring binder with divider tabs.

PART 4 – MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will be paid for under the various contract items as shown below.

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.

Item No.	Item	Unit
01562.1	Management of Contaminated Medias	Allowance

Should the DOTA receive reports of any illegal dumping of material, and if illegal dumping is confirmed to have occurred, the DOTA will assess a Liquated Damage amount of $5,000 per truck per day, until the illegal dumped material has been cleaned up or the incident has been remedied to the HDOH's concurrence. The Contractor shall not be entitled to recover any Liquidated Damages assessed, even after the non-compliance has been corrected.

The Contractor shall also be responsible for all citations, fines, and penalties levied by HDOH or EPA against the State due to the Contractor's failure to properly manage contaminated medias, including non-compliance with the DOTA EHE-EHMP, DOTA Site-Specific EHMP, or C-EHMP Addendum. The Contractor shall reimburse the State within 30 calendar days for the full amount of outstanding cost that the State has incurred, or the State shall deduct all incurred costs from the Contractor's monthly progress payments.

If the Contractor fails to satisfactorily address the non-compliance item, DOTA reserves the right to employ outside assistance or use the State's own labor forces to provide necessary corrective measures. The Contractor shall be fully responsible for all cost and time. The State shall charge the Contractor such incurred costs plus any associated project engineering costs and shall make appropriate deductions from the Contractor's monthly progress payment.

END OF SECTION

SECTION 01562 – CONSTRUCTION ENVIRONMENTAL HAZARD MANAGEMENT PLAN (C-EHMP); APPENDIX A

The following is the prepared C-EHMP associated with the project. Upon award of the contract the Contractor must fill in and complete the C-EHMP prior to the start of construction activities. Throughout the duration of the project the Contractor shall carry out the work in accordance with the C-EHMP.

Cover Sheet

The purpose of this project-specific Construction Environmental Hazard Management Plan (C-EHMP) Addendum is to provide the construction/project-specific information that may not be detailed in the State of Hawaii Department of Transportation – Airports Division (DOTA) Programmatic Environmental Hazard Evaluation (EHE)-Environmental Hazard Management Plan (EHMP) (*herein referred to as the DOTA EHE-EHMP*). This is a State of Hawaii Department of Health (HDOH) Hazard Evaluation and Emergency Response (HEER) requirement to be able to conduct any construction & demolition activities (including grading, grubbing etc.) at a site with known or potential contamination.

Preparation and adherence to the project-specific C-EHMP Addendum and associated DOTA EHE-EHMP will help prevent unforeseen delays in construction schedules during construction and demolition activities (grading, grubbing, etc.) at sites with known contamination and helps to avoid costly fines. The pre-construction evaluation of environmental issues are listed in the table below:

Yes	No	
✓		Are concentrations of contaminants above the lowest unrestricted HDOH Tier 1 EAL?
✓		Has the release been reported to the HDOH HEER Office?[2]
	✓	Are concentrations of contaminants in soil above the construction worker EAL?
	✓	Has the extent of contamination been fully delineated (both vertically and laterally)?
	✓	Have sufficient soil vapor samples been collected in areas where a future building will be present?
	✓	Is there an ongoing release at the site that must be mitigated prior to construction?
	✓	Does contaminated media need to be removed or remediated prior to construction?
	✓	Are COPC concentrations and contaminated media unknown but presumed or suspected to be present at the site at potentially hazardous levels based on historic site activities or other evidence?[1]
	✓	Will demolition of structures be conducted at the site prior to redevelopment?
	✓	If demolition will occur, has asbestos and lead-paint abatement been completed prior to demolition in accordance with all State and Federal regulations?

EAL= Environmental Action Level
HDOH = State of Hawaii Department of Health
HEER = Hazard Evaluation and Emergency Response
COPC = Chemical of potential concern

[1]If no contaminants are present or suspected to be present at the site at concentrations greater than the lowest unrestricted Tier 1 EAL then a C-EHMP is not required. The lowest Tier 1 EAL is defined as the EAL for unrestricted land use where groundwater is a potential drinking water resource and the nearest surface water body is less than 150 meters away.

[2]All releases must be reported to the HEER Office Emergency Preparedness and Response Section by calling (808) 586-4249 and following up with a written Release Notification

Following construction, contact the HDOH HEER Office to confirm that all contamination was managed in accordance with the approved C-EHMP Addendum and DOTA EHE-EHMP. At a minimum, please submit all appropriate manifests, tracking logs, and photos. If contaminated media will be left on-site following the completion of construction, then the DOTA EHE-EHMP may need to be updated following redevelopment to incorporate changes to the site. EHEs and EHMPs must be submitted to the HDOH for review and approval following the completion of construction activities detailed in this C-EHMP Addendum.

Project-Specific Construction EHMP Addendum for an Existing Programmatic EHMP

for
State of Hawaii Department of Transportation
Airports Division (DOTA)

Hilo International Airport (ITO)
Drainage and Wind Cone Improvements
State Project No. AH1021-20
South Hilo, Hawaii, Hawaii
Tax Map Key (TMK): (3) 2-1-012:009

Written By:

Element Environmental, LLC
98-030 Hekana Street, Unit 9
Aiea, Hawaii 96701

Under Contract to:

Wesley R. Segawa & Associates, Inc.
736 South Street, Suite 203
Honolulu, HI 96813

For:

State of Hawaii
Department of Transportation
Airports Division – Hawaii District
Hilo International Airport
Managers Office, Suite 215
2450 Kekuanaoa Street
Hilo, Hawaii 96720

July 2022

Signatures

This document is not finalized until it is signed. A signed copy will be present on-site at all times.

I certify that as property owner, I am responsible for ensuring all parties who work or reside at my site are aware of the contamination at my property, and the associated hazards, and that the information in this document is true and accurate to the best of my knowledge. I am responsible for ensuring compliance with all land use controls as well as advance notifications to the Hawaii Department of Health (HDOH) of anticipated land use changes or groundbreaking activity at my property.

Property Owner or Representative of Property Owner

I certify that I am a qualified environmental professional, capable of ensuring compliance with the requirements of this Construction Environmental Hazard Management Plan (C-EHMP) Addendum and DOTA EHE-EHMP. It is my duty on this project to understand the requirements of this document and be on-site during groundbreaking activities. I will communicate hazards, management protocols, and other EHMP requirements to construction professionals at the site. I will document such activities, and communicate with HDOH, as needed.

Qualified Environmental Professional

As Construction Manager, I am responsible for understanding the requirements of this C-EHMP Addendum and DOTA EHE-EHMP, effectively communicating the requirements and hazards to my crews and subcontractors and providing the required training and personal protective equipment to site workers. I will work with the qualified environmental professional to ensure compliance with this C-EHMP Addendum and DOTA EHE-EHMP during work at this property.

Construction Manager

Table of Contents

Tables

Appendices

List of Acronyms and Abbreviations

%	*percent*
AC	*asphaltic concrete*
ACM	*asbestos-containing material*
bgs	*below ground surface*
BMP	*Best Management Practices*
C-EHMP	*Construction Environmental Hazard Management Plan*
COPC	*chemicals of potential concern*
CWB	*Clean Water Branch*
DOTA	*State of Hawaii Department of Transportation – Airports Division*
DOTA AIR-EE	*State of Hawaii Department of Transportation Airports Division Environmental Section*
DRO	*diesel range organics*
DU	*decision unit*
EAL	*environmental action level*
EE	*Environmental Section*
EHE	*Environmental Hazard Evaluation*
EHMP	*Environmental Hazard Management Plan*
EPA	*United States Environmental Protection Agency*
FAA	*Federal Aviation Administration*
ft	*feet*
GRO	*gasoline range organics*
HASP	*Health and Safety Plan*
HDOH	*State of Hawaii Department of Health*
HEER	*Hazard Evaluation and Emergency Response*
ITO	*Hilo International Airport*
LBP	*lead-based paint*
mg/kg	*milligrams per kilogram*
N/A	*Not Applicable*
OCP	*organochlorine pesticides*
PAH	*polynuclear aromatic hydrocarbons*
PCB	*polychlorinated biphenyls*
PID	*photoionization detector*
PM	*Project Manager*
ppm	*parts per million*

QEP	*qualified environmental professional*
RCRA	*Resource Conservation and Recovery Act*
RRO	*residual range organics*
SPLP	*synthetic precipitation leaching procedure*
TCLP	*toxicity characteristic leaching procedure*
TPH	*total petroleum hydrocarbons*
VOC	*volatile organic compounds*

Section 1 Introduction and Purpose

1.1 Project Purpose

This project-specific Construction Environmental Hazard Management Plan (C-EHMP) Addendum provides construction-specific guidance and details in conjunction with the existing State of Hawaii Department of Transportation – Airports Division (DOTA) Programmatic Environmental Hazard Evaluation (EHE)-Environmental Hazard Management Plan (EHMP) (*herein referred to as the DOTA EHE-EHMP*) to environmental consultants, owners, operator, tenants, and construction/utility workers, who are proposing construction-related and ground-disturbing activities that change building configuration and property use at sites with known or presumed contamination (renovation/redevelopment). Examples of such activities include, but are not limited to demolition, grading, excavation, trenching, or drilling at sites with identified or potential contamination. These guidelines should be used by all who may be hired to assist any of the activities described above to keep workers, site users, the environment, and the general public safe from contact with contamination on-site and prevent chemicals of potential concern (COPCs) from leaving the site without proper management. Not adhering to these plans may have serious consequences including, but not limited to stopping construction and being liable for any damage or harm caused by on-site contamination.

This guidance document is specific to the ground-disturbing construction phase of the DOTA, Drainage and Wind Cone Improvements at Hilo International Airport (ITO), South Hilo, Hawaii, Hawaii (State Project AH1021-20) (Figure 1 included in Appendix A) only and does not address the ongoing operations subsequent to construction. *Once 100 percent (%) of the design is complete, this plan shall be updated*. The Relevant Plans and Specifications are included in Appendix B.

If contaminated media will be left on-site following the completion of construction, then the DOTA EHE-EHMP may need to be updated following redevelopment to incorporate changes to the site. EHE and EHMPs must be submitted to the State of Hawaii Department of Health (HDOH) for review and approval following the completion of construction activities detailed in this C-EHMP.

1.2 Chemicals of Potential Concern

A limited pre-construction soil assessment was performed at ITO in July and August 2021 to characterize *in situ* soil for on-site reuse and/or off-site disposal in support of the drainage and wind cone improvements project and to obviate the need for on-site stockpiled soil sampling as construction activities ensue (E2 2022). Soil assessment objectives included characterizing COPCs in soil slated for removal during planned construction and evaluating potential environmental hazards posed by the presence of COPCs. The assessment was limited to no closer than 5 feet (ft) around existing ITO signage and lighting, underground utilities, and other on-site structures, and the presence of shallow basalt within the project areas.

Eleven incremental surface and subsurface soil samples (i.e., 10 primary samples and one duplicate sample) were collected from five on-site decision units (DUs). Incremental soil sample depths per DU are described below and ranged from 0 to 5 ft below ground surface (bgs).

- DU-1: Three soil samples from 0 to 0.5 ft bgs, three soil samples from 0.5 to 1 ft bgs, and one field duplicate sample from an area where grading is to occur from 1 foot to 4 ft bgs
- DU-2: One soil sample from 0 to 5 ft bgs at eight dry well locations (5 new locations for dry wells 1, 2, 3, 7, and 8 and 3 existing locations of dry wells 4, 5, and 6)
- DU-3: One soil sample from 0 to 3 ft bgs from an area where grading is to occur to 3 ft bgs
- DU-5: One soil sample from 0 to 3 ft bgs from an electrical conduit trench to 3 ft bgs
- DU-6: One soil sample from 0 to 3 ft bgs from an electrical conduit trench to 3 ft bgs

The collected incremental soil samples were subjected to laboratory analysis to quantify the following COPCs:

- Total petroleum hydrocarbons (TPH) as gasoline range organics (GRO) (C6-C12) by U.S. Environmental Protection Agency (EPA) Method 3546/8015B
- TPH as diesel range organics (DRO) (C9-C25) EPA Method 5035/8015B
- TPH as residual range organics (RRO) (C24-C40) by EPA Method 5035/8015B
- Volatile organic compounds (VOCs) by EPA Method 5035/8260B
- Polynuclear aromatic hydrocarbons (PAHs) by EPA Method 3546/8270C-SIM
- Polychlorinated biphenyls (PCBs) by EPA Method 3546/8082
- Organochlorine pesticides (OCPs) by EPA Method 3546/8081B
- Resource Conservation and Recovery Act (RCRA) metals (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) by EPA Methods 3050B/6020B and 7471A
- Synthetic precipitation leaching procedure (SPLP) for TPH-RRO by EPA Method 1313
- Toxicity characteristic leaching procedure (TCLP) for chromium by EPA Method 1311
- Ignitability by EPA Method 1030

Incremental soil sample results were compared to the following action levels:

- HDOH unrestricted land use environmental action levels (EALs) for sites where groundwater is a current or potential source of drinking water and the site is less than 150 meters to a surface water body (*herein referred to as Tier 1 EALs*) (HDOH HEER Office 2017a).
- HDOH site-specific Commercial/Industrial land use EALs for sites where groundwater is not a current or potential source of drinking water and the site is less than 150 meters to a surface water body (*herein referred to as C/I EALs*) (HDOH HEER Office 2017a).
- EPA Maximum Concentration of Contaminants for Toxicity Characteristics.

The following COPC in soil was the sole contaminant detected at concentrations above its Tier 1 EAL is listed in Table 1-1.

Table 1-1: Soil Contamination

COPC(Depth)	Concentration Range (mg/kg)	EAL* (mg/kg)
TPH-RRO (0.5 to 1.5 ft bgs)	790 to 2,300	**500**

Note: mg/kg = milligrams per kilogram
* EAL for Unrestricted Use; < 150m from surface water; above drinking water.

TPH-RRO were detected in eight incremental soil samples—seven in the Phase I construction area (DU-1-1A, DU-1-1B, DU-1-2A, DU-1-2G [field duplicate of DU-1-2A], DU-1-2B, and DU-1-3A) and the one representing the eight dry wells in Phases 1, 2, and 3 (DU-2A)—at concentrations exceeding the HDOH Tier 1 EAL. One of the Phase I construction area samples was collected from a depth of 0.5 to 1-ft bgs while the remainder were collected from the 0 to 0.5-ft bgs. Soil collected from surface DUs was taken from beneath the asphalt layer but did not include the asphalt layer; care was taken to minimize asphalt fragments from being included within the incremental soil samples.

Groundwater at the site is estimated to be located at 20 to 30 ft bgs. There are no known COPCs in groundwater and soil vapor that exceed EALs at the project site.

1.2.1 Contaminants of Potential Concern and Construction Materials

As the COPC was identified in the soil at a concentration above the most restrictive HDOH Tier 1 EAL for unrestricted land use and Table 1-2, had a "yes" answer, the construction materials planned need to be assessed to determine whether they are compatible with the COPCs at the site-specific concentrations and/or if the soil is planned to be exported from the site, the soil will be considered a waste.

Table 1-2: Construction Material Questions

Question	Yes	No
Are storm drains (including interceptors), or will storm drains be present at the site?	✓	
Will any portion of a storm drain (including interceptors) be present at an elevation that is potentially in contaminated groundwater?		✓
Will any portion of a utility corridor be present at an elevation that is potentially in contaminated groundwater?		✓
Will a portion of any other utility or subsurface structure (other than foundations) extend potentially into contaminated groundwater?		✓
Are any potentially flammable or explosive COPCs present at the site (e.g., methane, TPH-GRO, etc.)?		✓
Will any electrical lines/utility corridors be subsurface?	✓	
Are any COPCs in vapors present at or below the LEL?		✓
Will any elevator shafts or escalator pits, potentially extend into contaminated groundwater?		✓

1.2.1.1 General Construction Considerations

The Contractor shall examine the DOTA EHE-EHMP, this C-EHMP, and, if included as part of these specifications, the Limited Pre-Construction Soil Assessment Report (E2 2022), to understand the conditions that may affect work and performance. Should the Contractor deviate from the DOTA EHE-EHMP, C-EHMP, or Limited Pre-Construction Soil Assessment Report, the Contractor shall be responsible to prepare a Site-Specific EHMP. Any deviation will require approval by the HDOH and DOTA Environmental Section (DOTA AIR-EE) prior to implementation, using the forms provided in Appendix C. The forms should detail deviations from standard practices in the text and explain how those deviations will be protective of human health and the environment. The forms should be submitted to HDOH and DOTA-EE for review and approval if deviations are requested or if notifying of a release.

All construction activities at the site need to comply with the most updated version of the following:

- Construction Documents for Drainage & Wind Cone Improvements at Hilo International Airport, South Hilo, Hawaii, State Project No. AH1021-20 (Appendix B)
- DOTA Construction Activities Best Management Practices (BMP) Field Manual
- DOTA Hilo International Airport Drainage Wells Permit No. UH-2094
- DOTA Best Management Practice Field Manual for Operations at State of Hawaii Airports
- DOTA Contractor's Training Guide
- Airport Certification Manual
- Federal Aviation Administration (FAA) Regulations
- Applicable Federal, State, and Local Permit Conditions
- Site-specific plans prepared by Contractors:
    - Health and Safety Plans (HASPs)
    - BMP
    - Dust Control and Monitoring Plan
    - Respiratory Protection Program
    - Hazard Communication Program
    - Emergency Planning Procedures

For locations within the airport which DOTA has already established a DOTA EHE-EHMP, the DOTA EHE-EHMP, shall govern, where applicable.

The construction materials assessment for materials that will be in contact with potentially contaminated soil is outlined in Table 1-3. Dry well casing will be installed in the subsurface soil above the groundwater. Based on the limited soil sampling conducted in the project vicinity, the shallow subsurface soil may contain petroleum impacted soil. The dry wells will be constructed of precast concrete that is considered chemically resistant to petroleum impacted soil. If soil containing free product is encountered, this soil will be removed from the dry well excavation. Concrete is compatible with the TPH-RRO, additional information is included in Appendix D. The galvanized grating well cover will not be in contact with contaminated soil. Asphalt is a petroleum-based product; therefore, no material evaluation information is provided.

Table 1-3: Construction Materials Assessment

Construction Material in Contact with Contaminated Media	COPC, Concentration, and Media	Proposed Material to be Used	Material Safe with COPC	
			Yes*	No
Asphalt*	TPH-RRO (2,300) in soil	Asphalt pavement	✓	
		Basecourse	✓	
Dry well casing		Precast concrete frame	✓	
		Hot dipped galvanized grating well cover	✓	
Wind Cone Foundation		Reinforced concrete foundation	✓	
Segmented Circle Block		Concrete	✓	

Notes: COPC = chemical of potential concern
TPH = total petroleum hydrocarbons
RRO = residual range organics

Section 2 Notification Requirements

The effective environmental management of any project requires a coordinated effort from all individuals involved. The following sections outline the need to identify the responsibilities of key personnel involved in project construction.

2.1 Key Project Personnel

The project owner (owner/developer) is expected to maintain a list of project contacts throughout the construction phase of the project. The key project personnel are listed in Table 2-1. An updated key project personnel list needs to be submitted to the HDOH HEER Office in writing whenever a change in key project personnel occurs.

Table 2-1: Key Project Personnel

Role	Company	Name	Phone #	e-mail
Architect / Construction PM	Wesley R. Segawa & Associates, Inc.	Reyn Furushima, P.E.	(808) 723-5655	Reyn@wrsasolutions.com
Construction Foreman:				
Quality Control Technician				
On-site QEP (PM):				
Owner:	DOTA			
DOTA Engineer	DOTA			
DOTA-EE	DOTA-EE	Stacy Paquette Environmental Health Specialist	(808)-838-8656	stacy.a.paquette@hawaii.gov
Civil/Structural Engineer	Wesley R. Segawa & Associates, Inc.	Neal Fukumoto	(808) 536-4495	
Landscape Architect				
Mechanical Engineer / Fire Protection				
Electrical Engineer	Ronald N.S. Ho & Associates, Inc.	Bryce Kanemura	(808) 941-0577	
Signage				
Acoustical				
Airline Consultant				
Aviation Consultant				
Geotechnical Engineer				
Planner				
Land Surveyor				
HDOH Oversight:	HDOH HEER Office PM	Thomas Gilmore	(808) 586-4353	thomas.gilmore@doh.hawaii.gov
Landfill Disposal Contact:	South Hilo Sanitary Landfill		(808) 961-8339	

Role	Company	Name	Phone #	e-mail
Waste Transporter Contact:				
Contact Export Site (if exporting soil):				
Contact Import Sie (if importing soil):				

Note: PM = Project Manager
HEER = Hazard Evaluation and Emergency Response
EE = Airport Division Environmental Section
QEP = qualified environmental professional

In addition, if site conditions or planned building configurations change following submittal and acceptance of this C-EHMP by the HDOH HEER Office, then the following agencies must be notified at least 90 days prior to conducting ground-disturbing activities or as soon as the change has been identified. Please note that if HDOH is notified of a change in site conditions or planned building configuration less than 90 days prior to ground-disturbing activities, there could be delays in construction if additional assessment work may need to be conducted. The initial notification of construction activities and any changes can be submitted through the HDOH e-permitting portal using the website link below.

Agency	Phone	Link/Website
HDOH HEER Office	(808) 586-4249	https://eha-cloud.doh.hawaii.gov/epermit/app/#/formversion/ed9ca916-7863-459b-b5dd-e66f881381d5

Section 3 Requirements for On-site Environmental Oversight

On-site monitoring is a key component of ensuring that the procedures documented in the C-EHMP are implemented properly and function as intended (e.g., appropriate installation and location of erosion and sediment control measures, cleanliness of equipment, the suitability of secondary containment for fuel storage, screening of potential contaminated material, and stockpile segregation). A QEP will be retained as the environmental monitor to provide guidance on implementing the recommended measures and to develop additional mitigation measures if the need arises. The on-site QEP will have at least 5 years of minimum, experience providing environmental oversight for the management of contaminated media during construction activities and will have successfully completed the 40-hour HAZWOPER training and a recent refresher course, as stipulated in 29 CFR 1910.120, within the last year.

Monitoring events should be conducted at an appropriate frequency based on specific work tasks/procedures and the potential for adverse impacts to occur. An appropriate schedule (frequency and duration of site visits) will be established between the QEP and all involved regulatory agencies regarding when the QEP is on-site. In general, the QEP will be familiar with the day-to-day conduct of project activities and be on-site during activities with the potential to impact human health or the environment, when mitigation measures are implemented, or as determined in discussion with the regulatory agencies. Monitoring should be conducted with greater frequency during periods of inclement weather (e.g., heavy precipitation, strong winds) and during critical components/tasks of the project, such as working in areas of known contamination. The QEP should be on-site whenever potentially contaminated soil or groundwater may be disturbed, when hazardous vapors are present, and/or during demolition activities of material involving potential lead-based paint (LBP) and/or asbestos-containing material (ACM). This is

necessary to ensure the protection of construction workers, the general public, and the environment. Key monitoring stages may include, but are not necessarily limited to:

- During activities conducted below the high-water mark of a waterbody;
- During soil exposing (e.g., concrete/asphalt removal) and soil movement activities (e.g., demolition, grading, excavation, pile or caisson installation, utility corridor installation, soil disposal);
- During dewatering activities (not anticipated for this project);
- Prior to and after heavy rain/storm events;
- During engineering control installation and testing; and
- During installation of erosion and sediment control measures.

The primary responsibility of the QEP is to ensure that the environmental and human health protection measures are implemented and are adhered to and that any movement, transport, and disposal of contaminated material (on-site and to an off-site location) is properly documented ***and approved by HDOH HEER Office prior to transporting the soil off-site***.

Responsibilities of the QEP include those identified below:

- Direct the segregation of contaminated soil;
- Communicate the requirements of the C-EHMP to project members during pre-job and tailgate meetings;
- Will be on-site as per the schedule established between parties prior to project start;
- Will remain on-call during non-critical work periods to respond to emerging environmental issues;
- Review the contractor's work procedures to ensure functionality and compliance with the C-EHMP and applicable regulations, standards, and BMPs;
- Provide advice in preparing for work activities in a manner that mitigates adverse environmental or health effects;
- Has the authority to modify and/or halt any construction activity at any time if deemed necessary for the protection of human health and the environment;
- Will advise project members if project activities have caused or are likely to cause an environmental incident and make recommendations for corrective action;
- Monitor compliance with the C-EHMP and relevant permit conditions;
- Will liaise directly with project members and provide technical advice for the purpose of resolving situations that may impact human health and the environment as they arise;
- Will maintain complete records of activities related to the implementation of the C-EHMP. This should include any measurements taken (e.g., pH, turbidity, temperature, conductivity, photoionization detector (PID) screening, air monitoring, equipment calibration, manifests, truck receipts, truck counting spreadsheets), photographs and incident reports; and

- Will complete and submit environmental monitoring reports to the HDOH HEER Office and will report any unanticipated adverse effects on the environment. Such reports should include the nature of the effect, its cause, mitigation and/or remediation implemented, and whether a work stoppage was ordered, as well as photographs, analyses, and measurements, if applicable.

Table 3-1: Project Activities when the QEP Must be Present

Activity	Planned at Site?		QEP Will Be Present?		Monitoring Equipment to be Used by QEP
	Yes	No	Yes	No	
Environmental Sampling		✓			
Geotechnical Sampling		✓			
Silt Fence Installation	✓		✓		None
Demolition	✓		✓		None
Grading	✓			✓	
Excavation	✓		✓		
Pile Installation		✓			
UST Removal		✓			
Dewatering		✓			
Utility Trenching	✓		✓		
Soil Stockpiling	✓		✓		None
Soil Export/Import	✓		✓		None
Vapor Barrier Installation		✓			
Vapor Extraction		✓			
Confined Space Work		✓			
Work Below High-Water Mark		✓			
Engineering Control Installation and Testing		✓			
Pipeline Tapping		✓			
Installation of Erosion/ Sediment Controls	✓		✓		None
Prior to/During Rainstorm Events	✓		✓		None
Other:					

The potential environmental hazards associated with contaminated media at the site include direct exposure, leaching to groundwater, impacts on terrestrial habitats, and gross contamination. Both current and future potential hazards were considered but are limited to the current understanding of the nature and extent of the contamination. This C-EHMP is written in consideration of the exposure to workers who encounter potentially contaminated media during construction.

The hazards associated with contaminated groundwater were not evaluated during the 2021 initial assessment. Groundwater is assumed to be located 20 to 30 ft bgs and is not anticipated to be encountered during construction activities.

The potential environmental hazards listed above were screened for their applicability to the site, and those determined to be of no concern were eliminated from further evaluation. This screening of potential environmental hazards assumes conservatively that no remediation will be performed, and no new institutional or engineering controls will be implemented.

Section 4 Construction Activities

ITO drainage and wind cone improvements will occur in seven construction phases.

Phase 1 construction activities includes:

- Installation of three 20 ft deep dry wells (Dry Wells 1, 2, and 3) and grading of an approximate 20 ft by 20 ft area around the wells to address ponding issues near the Army National Guard Aviation Ramp;
- Repair of asphaltic concrete (AC) pavement at the Civil Air Patrol driveway entrance on Airport Road; and
- Restripe taxi lane in front of Hanger 414.

Phase 2 construction activities includes:

- Demolition of broken AC pavement in front of the Army National Guard Aviation Ramp;
- Installation of one 20 ft deep dry well (Dry Well 7) within the Vehicle Service Road on the west side of Runway 21 to address ponding issues;
- Grading and grassing demolished AC pavement areas; and

Phase 3 construction activities includes:

- Installation of one 20 ft deep dry well (Dry Well 8) and
- Grading and grassing shoulder area grading to a maximum of 3 ft bgs and grassing the surrounding area.

Phase 4 construction activities includes installation of a compass calibration pad. Construction activities are not reported to disturb soil.

Phase 5 construction activities includes:

- Demolition of the segmented circle;
- Demolition and relocation of the Runway 8 supplemental wind cone;
- Demolition and relocation of the Runway 21 supplement wind cone; and
- Installation of new segmented circle.

Plans for soil removal were not reported for any of the Phase 5 demolition activities or installation of the new segmented circle.

Phase 6 construction activities includes demolition and relocation of relocation of the Runway 26 wind cone. The existing wind cone will be removed, and its associated electrical conduit will be abandoned in place. Plans for soil removal were not reported for this construction phase.

Phase 7 construction activities include asphalt pavement mill and replacement.

The number of dry wells may be less then listed above. Relevant Plans and Specifications are included in Appendix B. Planned excavations at the site are outlined in Table 4-1.

Table 4-1: Planned Types of Excavations

Excavation Type	Maximum Depth (ft bgs)
Grading	4 ft bgs (dry well area) 2.1 ft General Aviation Ramp Grass 3.5 ft Army National Guard Aviation Ramp Grass
Drywell	20 ft bgs (36 cy from each well)
Landscaping	1 ft
Utility trench	5 ft

Note: N/A = Not Applicable

4.1 Soil Reuse and Disposal

4.1.1 On-Site Reuse of Known or Suspect Contaminated Soil

On-site or off-site reuse of soil is not anticipated for this project; however, if plans change this C-EHMP will be updated. On-site reuse (within the construction site boundaries) requires prior approval of the DOTA AIR-EE, HDOH HEER Office, and is subject to the following conditions:

- Representative soil samples have been taken and tested in accordance with HDOH standards and regulations.
- The contaminated soil can only be reused within proximity of its original excavation.
- The contaminated soil is placed within areas more than 150 meters from surface water and drainage features.
- The contaminated soil cannot be placed beneath or within the footprint of a planned building structure.
- The contaminated soil can only be placed at an elevation above the tidally influenced high water table and at least 1-ft below the finish surface grade. The more highly impacted soil should be placed at the bottom of the excavation and the cleanest soil at the top of the excavation. At least 1-foot of clean soil must be placed as the final backfill layer at the top. The excavation shall then be capped with an impervious layer, such as concrete and asphalt.
- The contaminated soil cannot contain any free oil, oil sheens, oil stains, or TPH concentrations exceeding 5,000 parts per million (ppm).
- The contaminated soil is not considered a hazardous waste pursuant to Federal and State laws.
- Contaminated soil shall not be reused in areas that are uncontaminated.

Excavated soils can be re-used offsite (off Airports property) with the prior approval of the DOTA AIR-EE, HDOH HEER Office, and subject to the following conditions:

- Representative soil samples have been taken and tested in accordance with HDOH standards and regulations.
- The work shall be performed in accordance to the latest edition of the HDOH's Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material.

- A signed agreement with the receiving facility acknowledging the test results of the soil samples and acceptance of the soil is required to be submitted to the DOTA Engineer and DOTA AIR-EE ten (10) calendar days prior to hauling of the soil to the receiving facility.
- The contaminated soil shall not contain any free oil, oil sheens, oil stains, or TPH concentrations exceeding 5,000 ppm.
- The contaminated soil is not considered a hazardous waste pursuant to Federal and State laws.

All soil that is reused onsite or offsite shall be included in the Closeout Report. The report shall include, at a minimum, a copy of the signed agreement from the receiving facility accepting the soil, a copy of the soil test results, the quantity of soil received by the facility, a location map of the reused soil including GPS coordinates of its limits, the depth and thickness of the soil's placement, a brief description of the purpose of the soil's re-use, and photos of the site conditions after placement has been completed.

4.1.2 Stockpile Sampling for Disposal at a Disposal Facility

Soil COPC data compiled during the July to August 2021 limited pre-construction soil assessment of *in situ* soil in support of the drainage and wind cone improvements project will be used for stockpiled on-site soil profiling and facility acceptance. The Sampling and Analysis Plan for the project was approved by HDOH HEER Office prior to sampling (E2 2021). In the event there is evidence of differing conditions of the soil, the pre-characterization results will not be sufficient for facility acceptance and additional characterization will be required.

Table 4-2 lists the amount of potentially contaminated soil to be excavated from the site and temporarily stockpiled on-site. Stockpiling of excavated soils should be conducted in accordance with the Programmatic EHE/EHMP, Specification Section 01562, and DOTAs Construction Activities Best Management Plans Field Manual dated August 2019, or its latest edition. Relevant Plans and Specifications are included in Appendix B. The soil acceptance documentation when received will be included in Appendix E and soil tracking form is included in Appendix F.

Table 4-2: Stockpile Sampling for Disposal at Disposal Facility

	Disposal Facility
Total Estimated Soil Volume for Disposal:	*12,339 cy*
Proposed Sampling for disposal:	*In situ sampling previously conducted.*
# of increments per MULTI INCREMENT sample:	
Preliminary list of analytes (subject to landfill discretion):	*TPH-GRO, TPH-DRO, TPH-RRO, VOCs, PAHs, PCBs, OCPs, RCRA-8 metals, TCLP Metals, SPLP metals, and Ignitability*
Permitted Disposal Facility:	West Hawaii Sanitary Landfill 71-111 Queen Kaahumanu Highway Waikoloa, HI 96738
Transporter Name:	To be determined
Transporter Address:	To be determined

4.1.3 Record Keeping

The QEP will maintain a log of all soil that leaves the site and its final disposition. All waste manifests, truckload counts at source and receiving site, weigh tickets, and soil profiles will be included in a final

report documenting the environmental oversight conducted during construction. The report will be submitted to the HDOH HEER Office at the conclusion of the project. In addition, whenever soil is exported from the site, summary reports of the disposal records, including copies of documents, will be submitted to the HDOH HEER Office on a weekly or monthly basis, unless waived in writing by the HDOH HEER Office project manager. For all soil disposed of at a disposal facility, a manifest with all required signatures will be submitted.

If soil will be imported to the site, then the QEP must collect and maintain similar records and provide them to the HDOH HEER Office for review and approval. The soil generator must provide documentation that the import material is clean, and a soil agreement must be signed between the generator and the site owner. If contaminated soil will be brought onto the site and used for fill, then the QEP must document where the contaminated soil will be used, the volume of soil, and COPC concentrations. This information must be incorporated into an EHE/EHMP for the site following the completion of the project, and the contaminated soil must be managed for as long as it remains present at the site.

4.2 Groundwater

The site is located within the Hilo Aquifer System of the Northeast Mauna Loa Aquifer Sector, an unconfined, basal aquifer occurring in flank lavas (Mink, John F.; Lau, Stephen L.; 1993). However, because the site is located below (makai or seaward of) the Underground Injection Control line, the underlying groundwater is not considered a drinking water source. The salinity of the aquifer is considered fresh (less than 250 milligrams per liter chloride). The aquifer also has a high vulnerability to contamination.

Groundwater is not anticipated to be encountered by construction activities in the ITO project areas. The groundwater management questions are shown in Table 4-3.

Table 4-3: Groundwater Management

Questions			
Estimated Depth to Groundwater at the Site (ft bgs):	20 to 30		
Proposed Maximum Excavation Depth (ft bgs):	4		
Estimated Direction of Groundwater Flow:	Northward		
	Yes	**No**	**Unknown**
Will Contaminated Groundwater be Encountered During this Project:		✓	
Will Groundwater from the Site be Dewatered into the Sanitary Sewer System?		✓	
Will Groundwater from the Site be Dewatered into the Storm Sewer System?		✓	
Does the Contractor have a Dewatering Permit Issued by the County of Hawaii and/or HDOH CWB?			✓
Is Free Product Known or Suspected to be Present at the Site?		✓	
Is Groundwater Known or Suspected to be Contaminated?		✓	
Will Groundwater be Dewatered into a Container (e.g., frac tank) Prior to Re-infiltration or Disposal?		✓	

Note: CWB = Clean Water Branch

If plans change, this C-EHMP Addendum will be revised and re-submitted to the HEER Office for review and approval at least 90 days prior to conducting groundwater disturbing activities or as soon as the change has been identified.

4.2.1 Disposal of Groundwater

Groundwater is not anticipated to be encountered by construction activities in the ITO project areas, so disposal is unnecessary.

Section 5 References

Element Environmental, LLC [E2]. 2021. “Limited Pre-Construction Assessment Sampling and Analysis Plan, Hilo International Airport Drainage & Wind Cone Improvements, South Hilo, Hawaii, Hawaii.” July.

—. 2022. “Limited Pre-Construction Assessment Report, Hilo International Airport Drainage & Wind Cone Improvements, South Hilo, Hawaii, Hawaii.” March.

Mink, John F.; Lau, Stephen L.;. 1993. "Aquifer Identification and Classification for the island of Hawaii: Groundwater Protection Strategy for Hawaii, Technical Report No. 191." Water Resources Research Center, University of Hawaii at Manoa, May.

State of Hawaii Department of Transportation Airports Division [DOTA]. 2019. "Construction Activities BMP Field Manual." August.

State of Hawaii Department of Health [HDOH] Hazard Evaluation and Emergency Response [HEER] Office. 2011. "Technical Guidance Manual Notes: Decision Unit and Multi-increment Sample Investigations." March 25.

—. 2017a. "Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater, Volume 1: User's Guide, Hawaii Edition." State of Hawaii Department of Health, Hazard Evaluation and Emergency Response Office, Fall.

—. 2017b. "Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material." October.

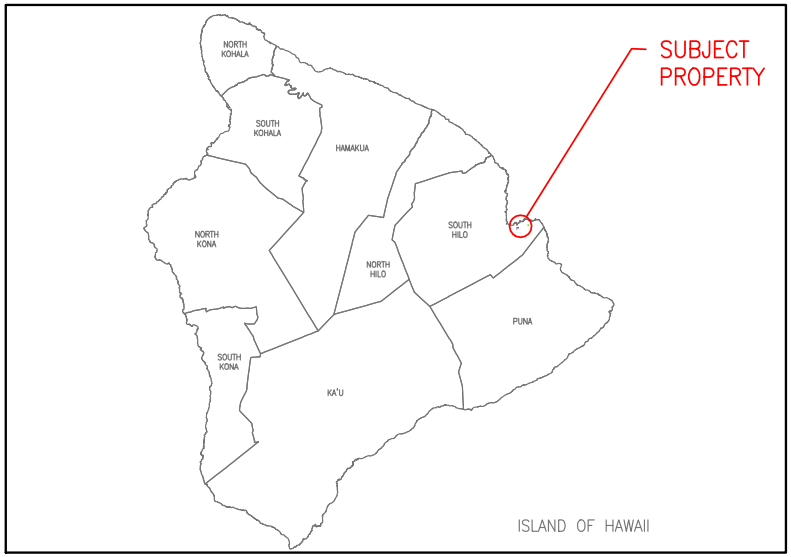
—. 2018 and updates. "Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan." http://www.hawaiidoh.org/tgm.aspx.

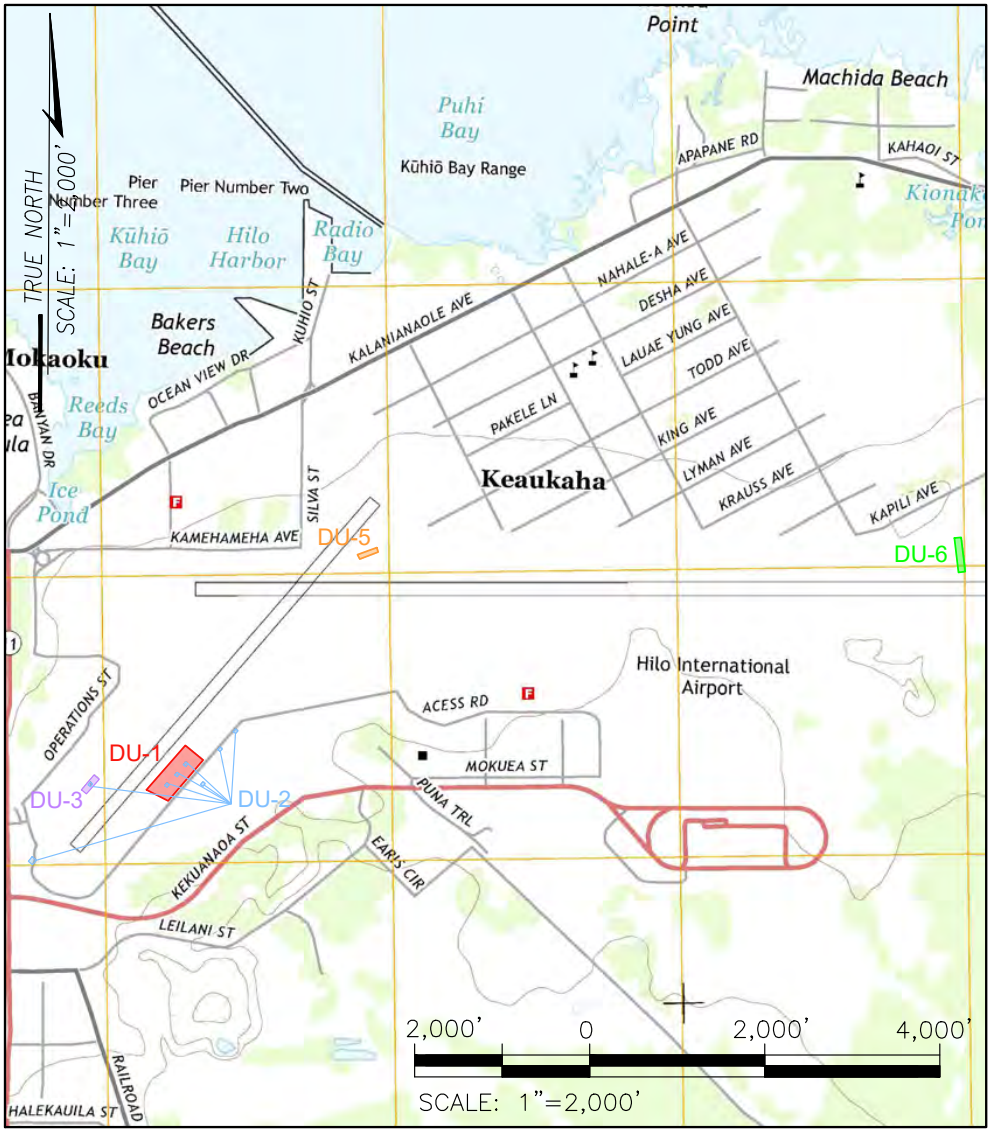
—. 2019. *Hawaii Administrative Rules.* Accessed 15 2019, May. https://ltgov.hawaii.gov/the-office/administrative-rules/.

U.S. Environmental Protection Agency [EPA]. n.d. "29 CFR Title 40 Part 1910, Occupational Safety and Health Standards - General Industry." https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910TableofContents.

Appendix A

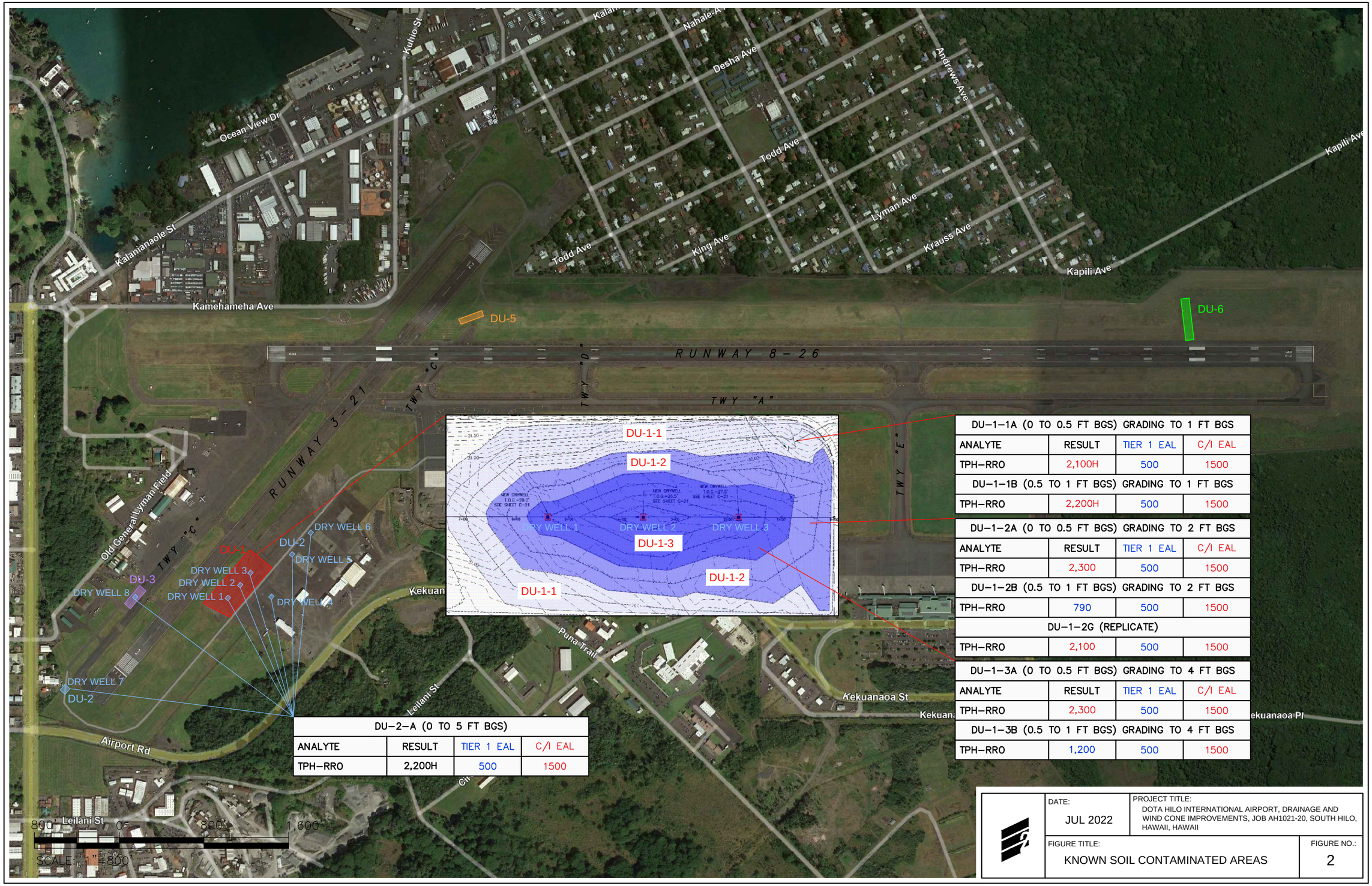
Figures





	DATE: JUN 2022	PROJECT TITLE: DOTA HILO INTERNATIONAL AIRPORT, DRAINAGE AND WIND CONE IMPROVEMENTS, JOB AH1021-20, SOUTH HILO, HAWAII, HAWAII
	FIGURE TITLE: SITE VICINITY AND LOCATION MAP	FIGURE NO.: 1

REFERENCES: STATE OF HAWAII 2017, USGS 2013, AND GOOGLE EARTH 2018



DU-2-A (0 TO 5 FT BGS)			
ANALYTE	RESULT	TIER 1 EAL	C/I EAL
TPH-RRO	2,200H	500	1500

DU-1-1A (0 TO 0.5 FT BGS) GRADING TO 1 FT BGS			
ANALYTE	RESULT	TIER 1 EAL	C/I EAL
TPH-RRO	2,100H	500	1500
DU-1-1B (0.5 TO 1 FT BGS) GRADING TO 1 FT BGS			
TPH-RRO	2,200H	500	1500

DU-1-2A (0 TO 0.5 FT BGS) GRADING TO 2 FT BGS			
ANALYTE	RESULT	TIER 1 EAL	C/I EAL
TPH-RRO	2,300	500	1500
DU-1-2B (0.5 TO 1 FT BGS) GRADING TO 2 FT BGS			
TPH-RRO	790	500	1500
DU-1-2G (REPLICATE)			
TPH-RRO	2,100	500	1500
DU-1-3A (0 TO 0.5 FT BGS) GRADING TO 4 FT BGS			
ANALYTE	RESULT	TIER 1 EAL	C/I EAL
TPH-RRO	2,300	500	1500
DU-1-3B (0.5 TO 1 FT BGS) GRADING TO 4 FT BGS			
TPH-RRO	1,200	500	1500

DATE: JUL 2022

PROJECT TITLE: DOTA HILO INTERNATIONAL AIRPORT, DRAINAGE AND WIND CONE IMPROVEMENTS, JOB AH1021-20, SOUTH HILO, HAWAII, HAWAII

FIGURE TITLE: KNOWN SOIL CONTAMINATED AREAS

FIGURE NO.: 2

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDIA
01562-40
OCTOBER 2022

Appendix B

Plans and Specifications

Airports Division

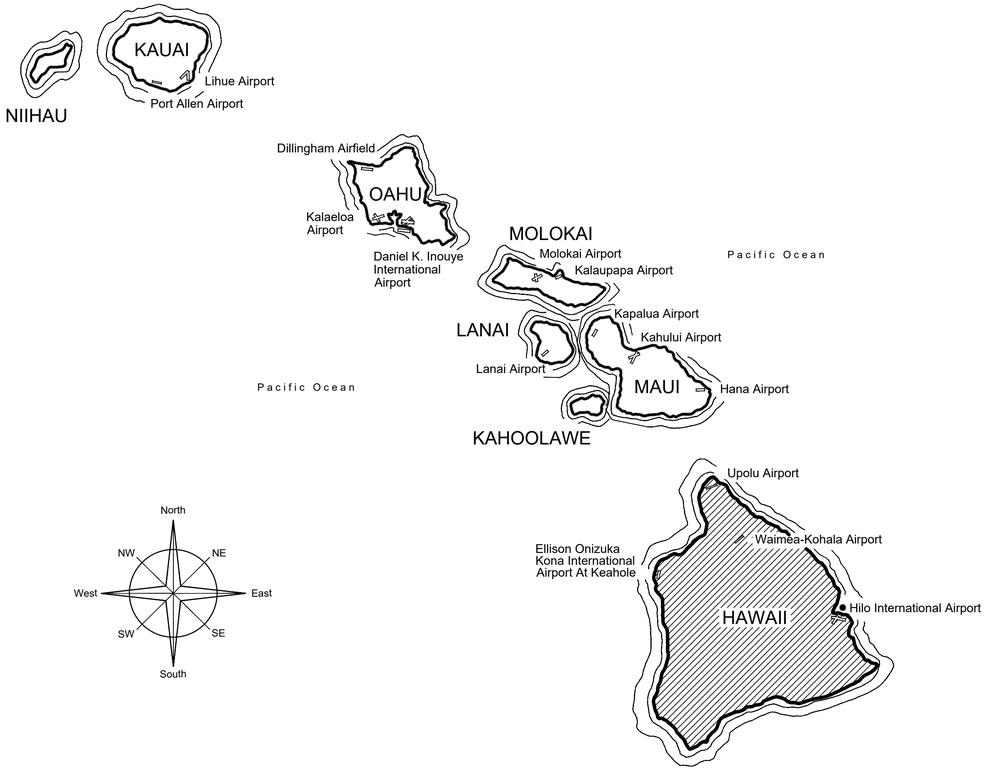
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

PLANS FOR

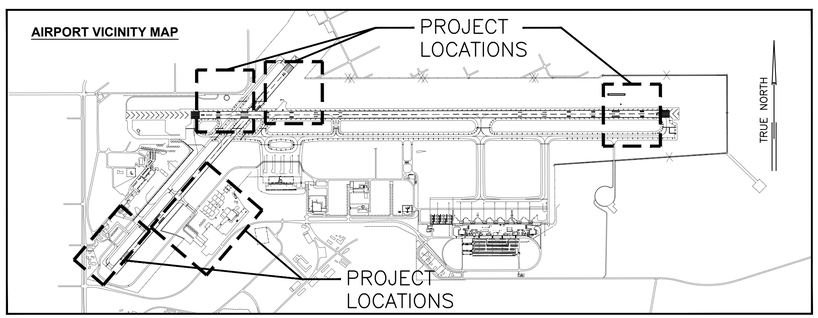
DRAINAGE & WIND CONE IMPROVEMENTS

AT

HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII
PROJECT NO. AH1021-20



AIRPORT VICINITY MAP



DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

APPROVED:

DIRECTOR OF TRANSPORTATION — DATE

PROJECT TEAM

CIVIL:
WESLEY R. SEGAWA & ASSOCIATES, INC.
736 SOUTH STREET,
SUITE 203
HONOLULU, HAWAII 96813
808-536-4495

NEAL FUKUMOTO
CIVIL ENGINEER

ELECTRICAL:
RONALD N.S. HO & ASSOCIATES, INC.
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BRYCE KANEMURA
ELECTRICAL ENGINEER

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:

NO.	DATE	REVISIONS

90% DESIGN SUBMITTAL
OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

TITLE SHEET

DATE :
SEPTEMBER 2021

SHEET :
1 OF 48 SHEETS

DWG. NO.
G-1

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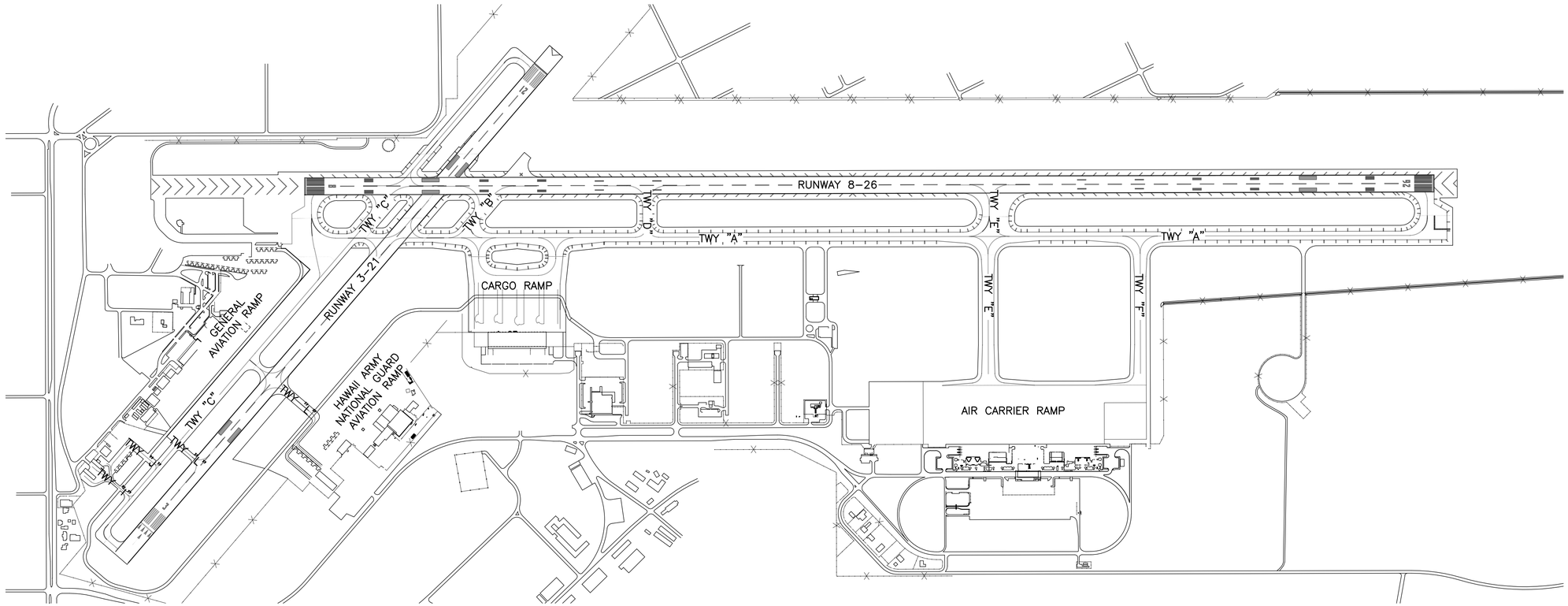

HILO INTERNATIONAL AIRPORT SITE PLAN

SCALE: 1"=500'

ABBREVIATIONS:

@	AT
Δ	ANGLE OF INTERSECTION
AC	ADVISORY CIRCULAR
AIR-EE	DEPARTMENT OF TRANSPORTATION, AIRPORTS DIVISION, ENGINEERING ENVIRONMENTAL SECTION
AOA	AIR OPERATIONS AREA
ARFF	AIRCRAFT RESCUE AND FIREFIGHTING
ASOS	AUTOMATED SURFACE OBSERVING SYSTEM
ATCT	AIR TRAFFIC CONTROL TOWER
AWOS	AUTOMATED WEATHER OBSERVING SYSTEMS
BMP	BEST MANAGEMENT PRACTICE
C.A.P.	CIVIL AIR PATROL
C/L	CENTERLINE
CSPP	CONSTRUCTION SAFETY AND PHASING PLAN
CLR	CLEAR
DME	DISTANCE MEASURING EQUIPMENT
DOH	DEPARTMENT OF HEALTH
GPS	GLOBAL POSITIONING SYSTEM
HDOTA	HAWAII DEPARTMENT OF TRANSPORTATION AIRPORTS DIVISION
ILS	INSTRUMENT LANDING SYSTEM
ITO	HILO INTERNATIONAL AIRPORT
LHA	LIGHT HOUSING ASSEMBLY
MALSR	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS
MAX	MAXIMUM
NAVAID	NAVIGATIONAL AID
OTS	OUT OF SERVICE
PAPI	PRECISION APPROACH PATH INDICATORS
RNAV	AREA NAVIGATION
RRP	RUNWAY REFERENCE POINT
RSA	RUNWAY SAFETY AREA
ROFA	RUNWAY OBJECT FREE AREA
RWY	RUNWAY
TCH	THRESHOLD CROSSING HEIGHT
TSA	TAXIWAY SAFETY AREA
TOFA	TAXIWAY OBJECT FREE AREA
RWY	RUNWAY
SSBMP	SITE SPECIFIC BMP PLAN
SSC	SYSTEM SUPPORT CENTER
SWMPP	STORM WATER MANAGEMENT PROGRAM PLAN
TWY	TAXIWAY
TYP.	TYPICAL
W/	WITH
WEF	WIND EQUIPMENT F-420

INDEX OF DRAWINGS

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
HAWAII U.S.A.

This work was prepared by me or under my supervision.
Exp. 04-30-22

Wesley R. Segawa & Associates, Inc.

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

GENERAL SITE PLAN

DATE :	DWG. NO.
SEPTEMBER 2021	G-2
SHEET :	
2 OF 48 SHEETS	

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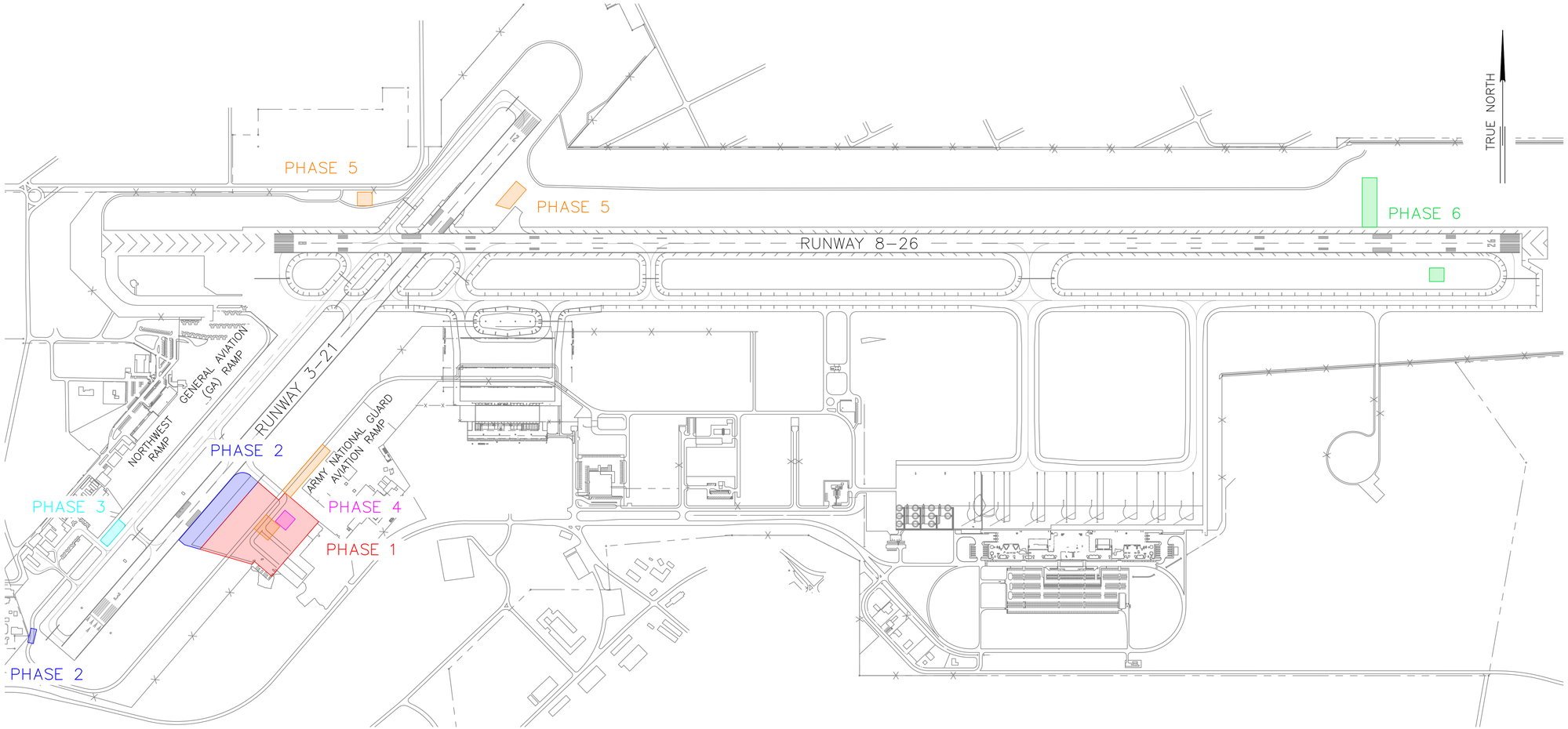

SCOPE OF WORK:

PHASE 1
- INSTALLATION OF DRY WELLS NEAR THE ARMY NATIONAL GUARD AVIATION RAMP.
- REPAIR OF AC PAVEMENT AT THE CIVIL AIR PATROL DRIVEWAY ENTRANCE ON AIRPORT ROAD.

PHASE 2
- DEMOLITION OF BROKEN AC PAVEMENT IN FRONT OF THE ARMY NATIONAL GUARD AVIATION RAMP.
- INSTALLATION OF DRY WELLS.
- GRASS AND GRADE DEMOLISHED AC PAVEMENT AREAS.
- INSTALLATION OF DRY WELLS ALONG THE PERIMETER ROAD BEHIND RUNWAY 3.

PHASE 3
- INSTALLATION OF DRY WELL.
- GRADE AND GRASS SPECIFIED AREAS.

PHASE 4
- INSTALLATION OF COMPASS CALIBRATION PAD.

PHASE 5
- DEMOLITION OF RUNWAY 8 SEGMENTED CIRCLE.
- DEMOLITION AND RELOCATION OF THE RUNWAY 8 WIND CONE.
- DEMOLITION AND RELOCATION OF THE RUNWAY 21 WIND CONE.

PHASE 6
- DEMOLITION AND RELOCATION OF THE RUNWAY 26 WIND CONE.

TENTATIVE CONSTRUCTION SCHEDULE:

PHASE 1: 90 CALENDAR DAYS
PHASE 2: 30 CALENDAR DAYS (RUNWAY 3–21 CLOSED)
PHASE 3: 14 CALENDAR DAYS
PHASE 4: 14 CALENDAR DAYS
PHASE 5: 28 CALENDAR DAYS
PHASE 6: 28 CALENDAR DAYS (RUNWAY 8–26 CLOSED)

TENTATIVE PHASE WORK HOURS:

PHASES 1–5: 0600 TO 1600 HOURS, HST
PHASE 6: 2100 TO 0600 HOURS, HST

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

OVERALL PHASING PLAN

DATE :	DWG. NO.
SEPTEMBER 2021	G-3
SHEET :	
3 OF 48 SHEETS	

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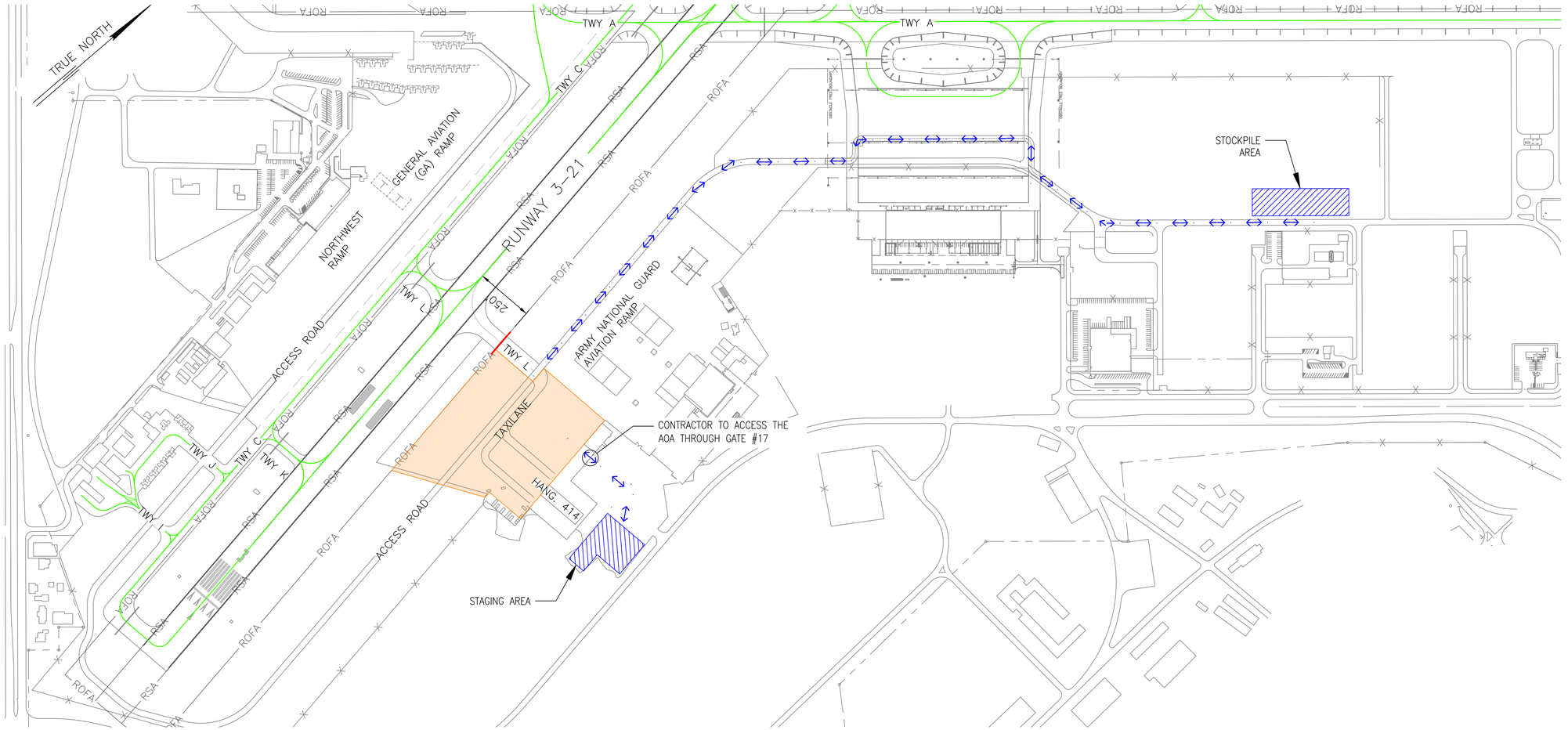

ITO DRAINAGE IMPROVEMENTS – PHASE 1
SCALE: 1"=250'

PHASING AND BARRICADE PLAN – PHASE 1

DESCRIPTION:
1. DEMOLITION OF BROKEN AC PAVEMENT IN FRONT OF THE ARMY NATIONAL GUARD AVIATION RAMP, INSTALLATION OF DRY WELLS TO ADDRESS PONDING ISSUES, AND GRASS AND GRADE DEMOLISHED AC PAVEMENT LOCATED OUTSIDE THE ROFA.
2. RESTRIPE TAXILANE INFRONT OF HANGAR 414.

TYPE:
PARTIAL RAMP CLOSURE

DURATION:
90 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. TAXIWAY L EAST OF RUNWAY 3–21 CLOSED
2. ARMY NATIONAL GUARD AVIATION RAMP PARTIALLY CLOSED
3. HELICOPTER OPERATIONS, CAUTION WORK IN PROGRESS
4. NOTAMs FOR TALL EQUIPMENT (WHEN APPLICABLE)

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. WHEN THE CONTRACTOR IS DIRECTED TO PULLBACK BY THE ATCT, THE CONTRACTOR SHALL BARRICADE OFF THE WORK AREA AND REMOVE ALL LARGE EQUIPMENT FROM THE WORK AREA.
4. THE CONTRACTOR SHALL ENSURE THE ACCESS ROAD REMAINS OPEN THROUGHOUT THE ENTIRETY OF CONSTRUCTION.
5. THE CONTRACTOR SHALL COORDINATE WITH ITO TO RELOCATE HANGAR 414 PARKED AIRCRAFT.
6. HELICOPTER OPERATIONS USUALLY USE THE TAXIWAYS IN THE WORK AREA. THE CONTRACTOR SHALL COORDINATE WITH ITO AND ATCT TO NOTIFY HELICOPTER OPERATIONS OF WORK TIMES AND REROUTE HELICOPTER FLIGHT PATHS WHEN NECESSARY. ARMY NATIONAL GUARD HELICOPTERS COULD POSSIBLY BE DIVERTED TO DEPART TO THE NORTHEAST.

NOTES (CONT.)
7. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460–1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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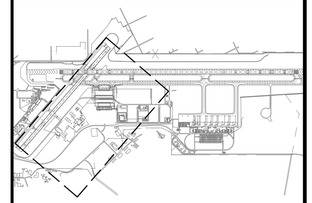
KEY PLAN / NOTES:



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PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

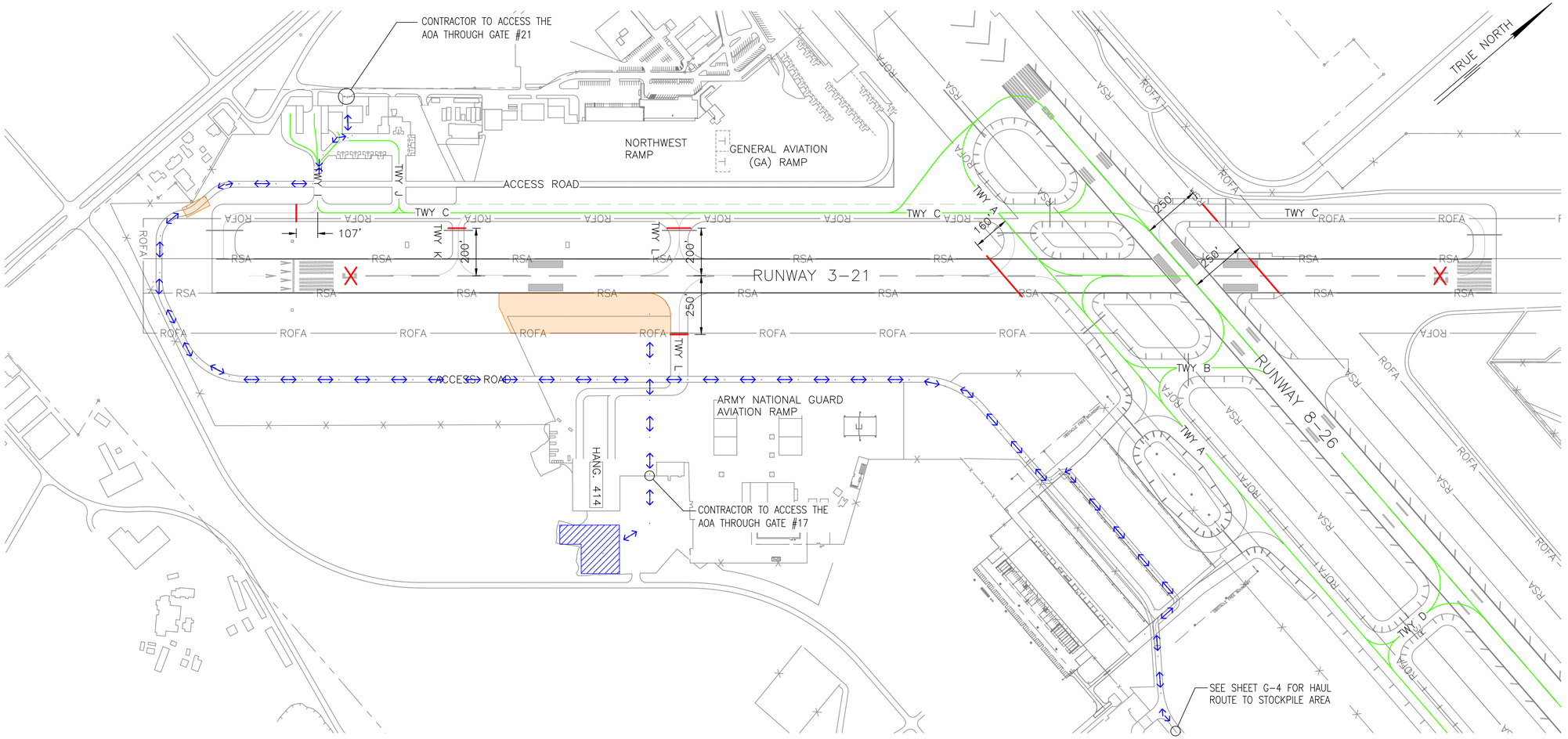
PROJECT NO.:

AH1021-20

SHEET TITLE:

CSPP - PHASE 1

DATE :	DWG. NO.
SEPTEMBER 2021	G-4
SHEET :	
4 OF 48 SHEETS	



ITO DRAINAGE IMPROVEMENTS – PHASE 2
SCALE: 1"=250'

PHASING AND BARRICADE PLAN – PHASE 2

DESCRIPTION:
1. DEMOLITION OF BROKEN AC PAVEMENT IN FRONT OF THE ARMY NATIONAL GUARD AVIATION RAMP, INSTALLATION OF DRY WELLS TO ADDRESS PONDING ISSUES, AND GRASS AND GRADE DEMOLISHED AC PAVEMENT, LOCATED INSIDE THE ROFA.
2. INSTALLATION OF DRY WELLS ALONG THE ACCESS ROAD BEHIND RUNWAY 3–21.

TYPE:
RUNWAY CLOSURE

DURATION:
30 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. RUNWAY 3–21 CLOSED
2. TAXIWAY C CLOSED SOUTH OF TAXIWAY I
3. TAXIWAY C CLOSED NORTH OF RUNWAY 8–26
4. TAXIWAY K CLOSED
5. TAXIWAY L CLOSED
6. ARMY NATIONAL GUARD AVIATION RAMP WORK IN PROGRESS
7. RUNWAY 3–21 VASI OTS (0600–1600 HST)
8. NOTAMs FOR TALL EQUIPMENT (WHEN APPLICABLE)

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. A LIGHTED "X" SHALL BE PLACED AT EACH RUNWAY END AND LOW PROFILE BARRICADES SHALL BE PLACED AT EACH TAXIWAY CONNECTION BEFORE CLOSING THE RUNWAY.
4. THE CONTRACTOR SHALL ENSURE THE ACCESS ROAD REMAINS OPEN THROUGHOUT THE ENTIRETY OF CONSTRUCTION.
5. THE CONTRACTOR SHALL COORDINATE WITH ITO TO RELOCATE HANGAR 414 PARKED AIRCRAFT.

NOTES (CONT.)
6. HELICOPTER OPERATIONS USUALLY USE THE TAXIWAYS IN THE WORK AREA. THE CONTRACTOR SHALL COORDINATE WITH ITO TO NOTIFY HELICOPTER OPERATIONS OF WORK TIMES AND REROUTE HELICOPTER FLIGHT PATHS WHEN NECESSARY. ARMY NATIONAL GUARD HELICOPTERS COULD POSSIBLY DEPART TO THE NORTHEAST.
7. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460–1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.
8. AT THE END OF EACH WORKING PERIOD, THE CONTRACTOR MUST ENSURE THE EDGE OF RUNWAY DOES NOT HAVE MORE THAN A 3" DROP FROM TOP OF RUNWAY TO GRADE.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES
- LIGHTED "X"

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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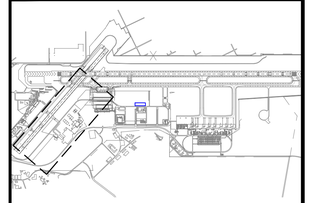
KEY PLAN / NOTES:



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OCTOBER 1, 2021
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PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS
AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:
AH1021-20

SHEET TITLE:
CSPP - PHASE 2

DATE :
SEPTEMBER 2021
SHEET :
5 OF 48 SHEETS

DWG. NO.
G-5

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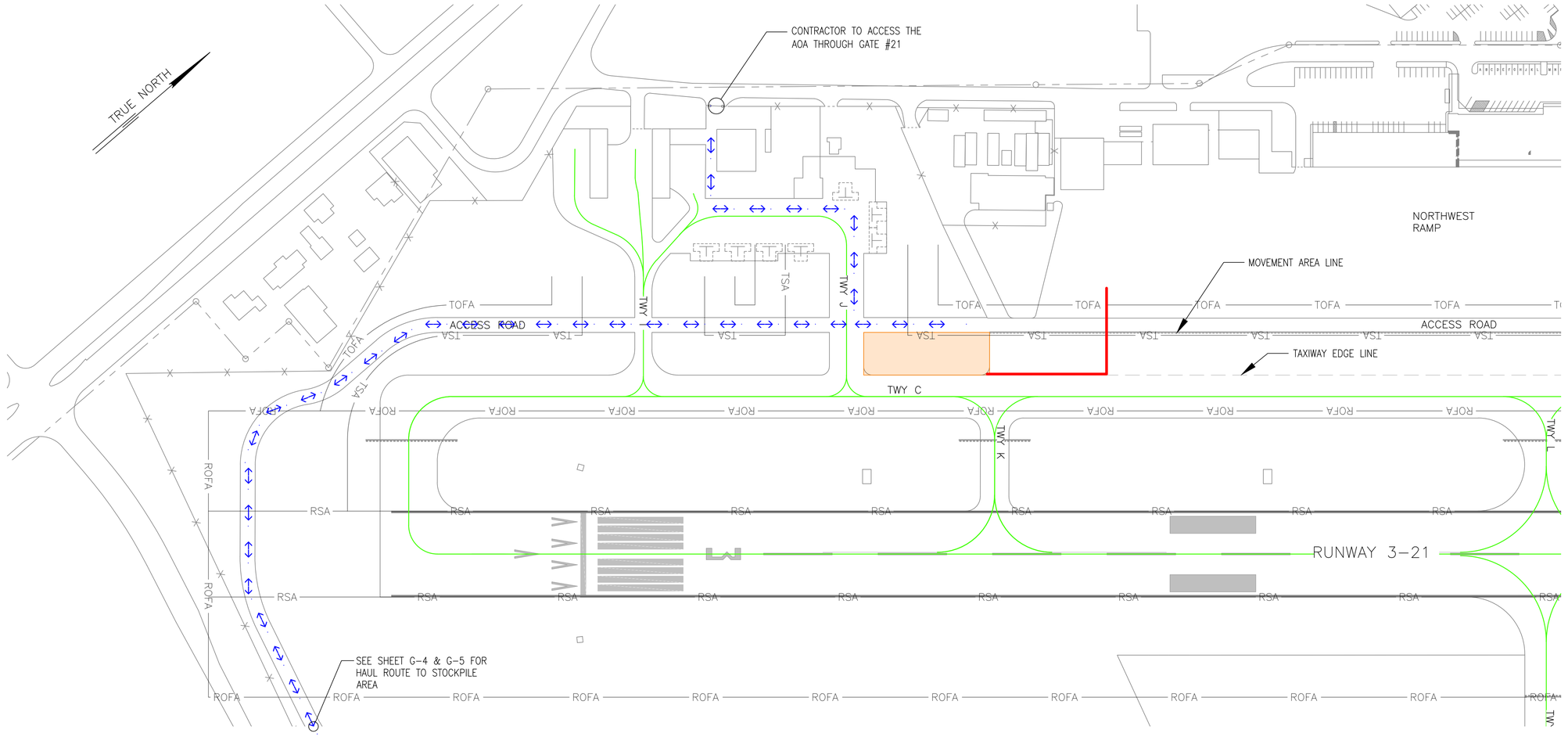
DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDIA
01562-46
OCTOBER 2022



ITO DRAINAGE IMPROVEMENTS – PHASE 3
SCALE: 1"=100'

PHASING AND BARRICADE PLAN – PHASE 3

DESCRIPTION:
1. REGRADE AND REGRASS SHOULDER AREA TO ADDRESS PONDING ISSUES.
2. INSTALL DRY WELL.

TYPE:
WORK IN PROGRESS

DURATION:
14 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. TAXIWAY C WORK IN PROGRESS
2. TAXIWAY C AIRCRAFT WINGSPAN LIMITED TO 70' BETWEEN TAXIWAY J AND 200 FT NORTHEAST OF TAXIWAY K
3. TAXIWAY J WORK IN PROGRESS
4. TAXIWAY J AIRCRAFT WINGSPAN LIMITED TO 70'
5. NORTHWEST RAMP PARTIAL CLOSURE
6. NOTAMs FOR TALL EQUIPMENT (WHEN APPLICABLE)

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. THE CONTRACTOR SHALL SETUP BARRICADES AROUND THE AFFECTED AREAS OF WORK THROUGH OUT THE PHASE.
4. THE CONTRACTOR SHALL ENSURE THE ACCESS ROAD REMAINS OPEN THROUGHOUT THE ENTIRETY OF CONSTRUCTION.
5. THE CONTRACTOR SHALL COORDINATE WITH ITO AND ATC TO IMPLEMENT REQUIRED AIRCRAFT GROUP RESTRICTIONS FOR TAXIWAY C DURING WORK HOURS.
6. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460-1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.

RUNWAY 8-26 & ASSOCIATED TAXIWAYS
RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3-21 & ASSOCIATED TAXIWAYS
RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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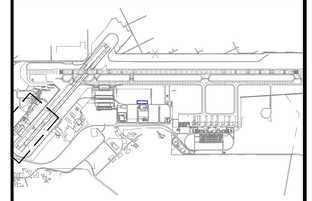
KEY PLAN / NOTES:



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SOUTH HILO, HAWAII

PROJECT NO.:
AH1021-20

SHEET TITLE:
CSPP - PHASE 3

DATE :
SEPTEMBER 2021
SHEET :
6 OF 48 SHEETS

DWG. NO.
G-6

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DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDIA
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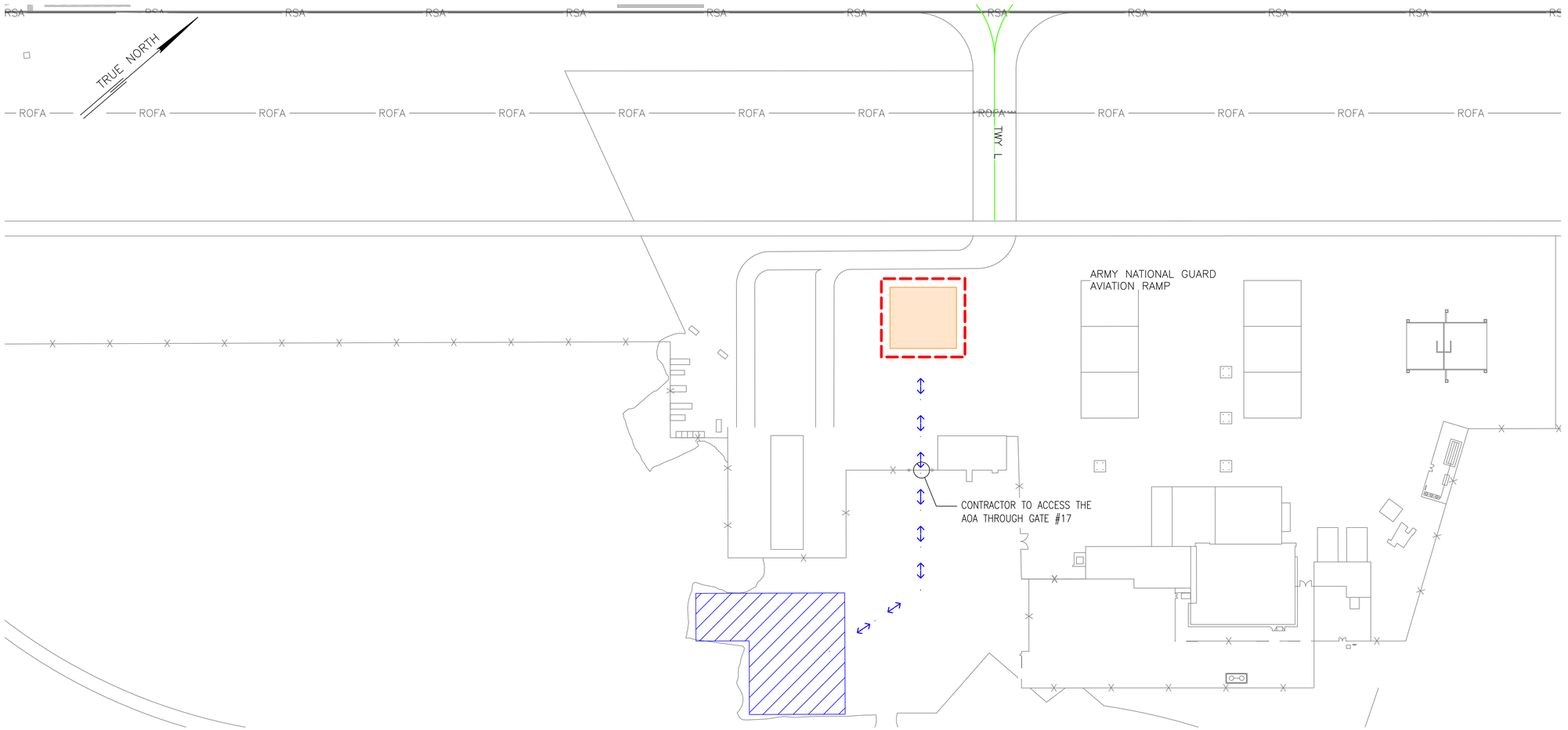
OCTOBER 2022



ITO DRAINAGE IMPROVEMENTS – PHASE 4
SCALE: 1"=100'

PHASING AND BARRICADE PLAN – PHASE 4

DESCRIPTION:
1. INSTALLATION OF COMPASS CALIBRATION PAD.

TYPE:
WORK IN PROGRESS

DURATION:
14 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. ARMY NATIONAL GUARD AVIATION RAMP WORK IN PROGRESS

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. THE CONTRACTOR SHALL SETUP BARRICADES AROUND THE AFFECTED AREAS OF WORK THROUGH OUT THE PHASE.
4. THE CONTRACTOR MUST COORDINATE WITH ITO TO RELOCATE ANY AIRCRAFT THAT USUALLY PARK IN AND AROUND THE WORK AREA.
5. THE CONTRACTOR SHALL ENSURE THE ACCESS ROAD REMAINS OPEN THROUGHOUT THE ENTIRETY OF CONSTRUCTION.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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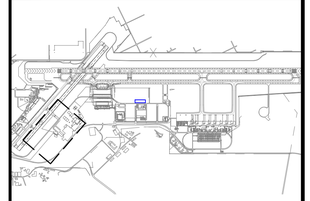
KEY PLAN / NOTES:



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HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

CSPP - PHASE 4

DATE :	DWG. NO.
SEPTEMBER 2021	G-7
SHEET :	
7 OF 48 SHEETS	

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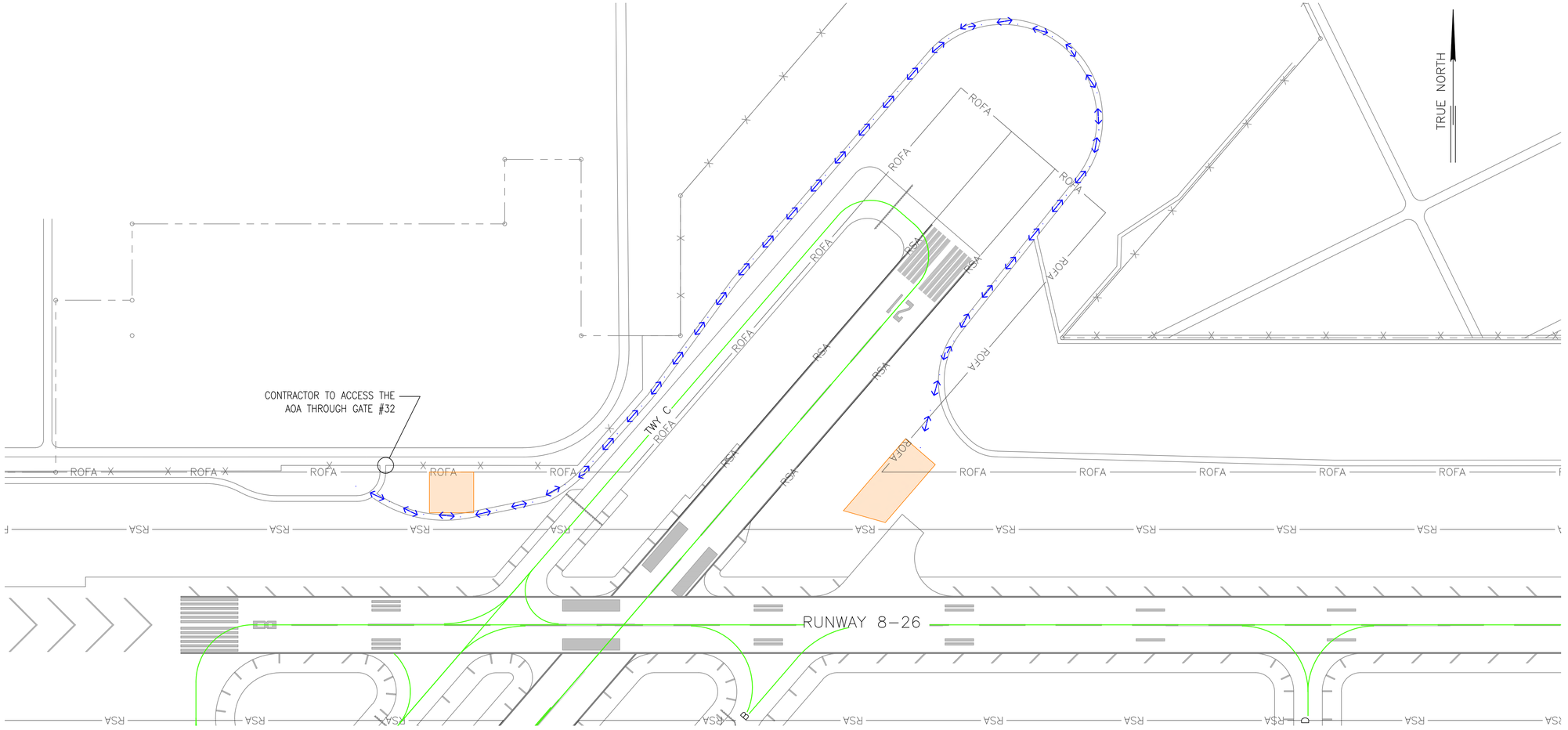

ITO DRAINAGE IMPROVEMENTS – PHASE 5
SCALE: 1"=150'

PHASING AND BARRICADE PLAN – PHASE 5

DESCRIPTION:
1. DEMOLITION AND RELOCATION OF THE RUNWAY 8 SUPPLEMENTAL WIND CONE AND DEMOLITION OF SEGMENTED CIRCLE.
2. DEMOLITION AND RELOCATION OF THE RUNWAY 21 SUPPLEMENTAL WIND CONE AND INSTALLATION OF NEW SEGMENTED CIRCLE.

TYPE:
WORK IN PROGRESS

DURATION:
28 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. RUNWAY 3–21 WORK IN PROGRESS
2. RUNWAY 8–26 WORK IN PROGRESS
3. TAXIWAY C WORK IN PROGRESS
4. NOTAMs FOR TALL EQUIPMENT (WHEN APPLICABLE)

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. THERE SHALL BE AN OPERATIONAL WIND CONE AVAILABLE AT THE RUNWAY 8 AND RUNWAY 21 ENDS AT ALL TIMES.
4. THE CONTRACTOR SHALL COORDINATE WITH ITO, HCF, AND SOC TO VERIFY EXISTING UNDERGROUND UTILITIES AND REQUIRED OUTAGES.
5. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460–1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS
RUNWAY SAFETY AREA (RSA): 500 FT.
RUNWAY OBJECT FREE AREA (ROFA): 800 FT.
TAXIWAY SAFETY AREA (TSA): 214 FT.
TAXIWAY OBJECT FREE AREA (TOFA): 320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS
RUNWAY SAFETY AREA (RSA): 150 FT.
RUNWAY OBJECT FREE AREA (ROFA): 500 FT.
TAXIWAY SAFETY AREA (TSA): 214 FT.
TAXIWAY OBJECT FREE AREA (TOFA): 320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
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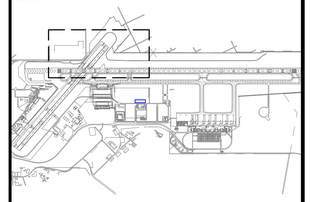
KEY PLAN / NOTES:



NO.	DATE	REVISIONS

90% DESIGN SUBMITTAL
OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

CSPP - PHASE 5

DATE :	DWG. NO.
SEPTEMBER 2021	G-8
SHEET :	
8 OF 48 SHEETS	

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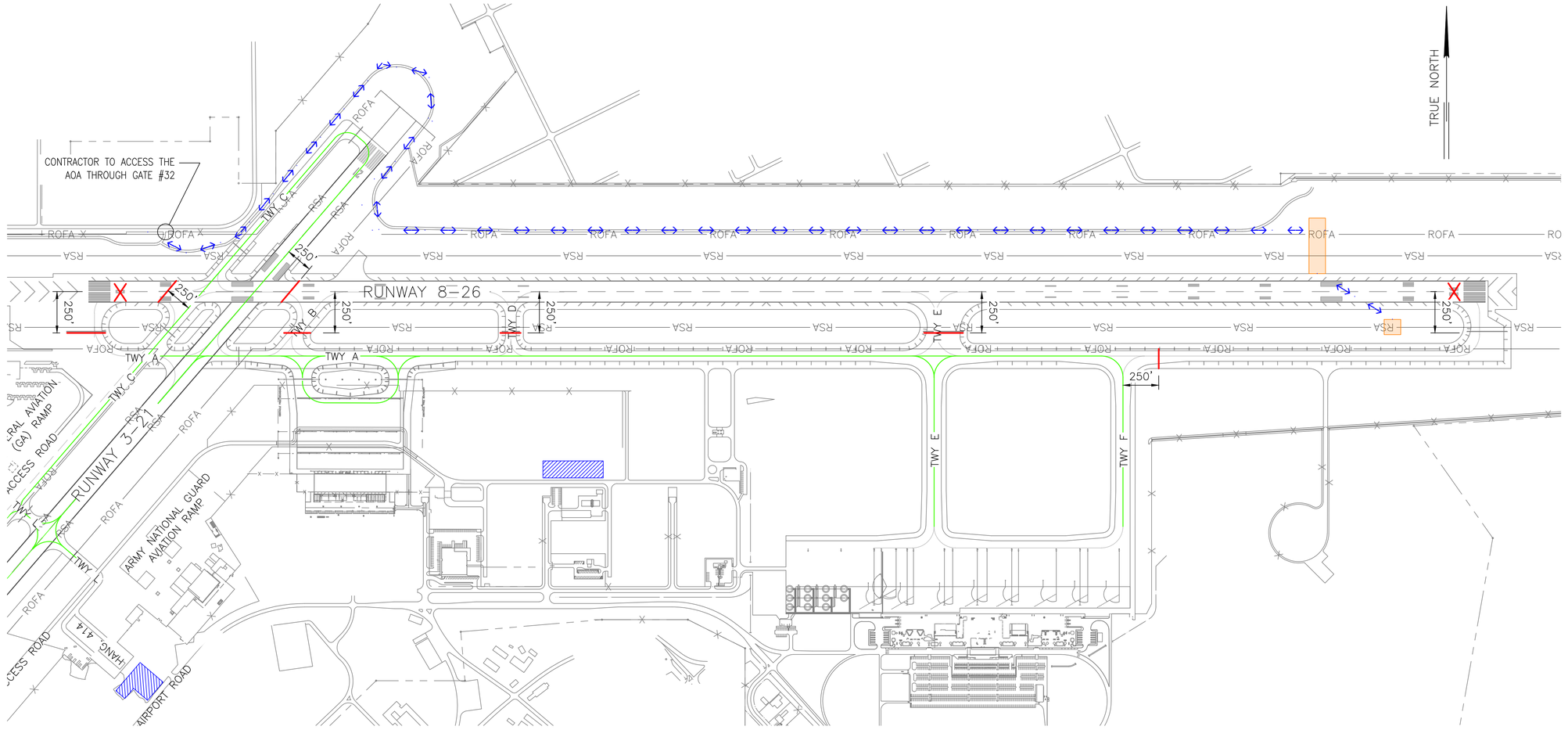

ITO DRAINAGE IMPROVEMENTS – PHASE 6
SCALE: 1"=400'

PHASING AND BARRICADE PLAN – PHASE 6

DESCRIPTION:
1. DEMOLITION AND RELOCATION OF THE RUNWAY 26 SUPPLEMENTAL WIND CONE.

TYPE:
WORK IN PROGRESS

DURATION:
28 CALENDAR DAYS

WORKING HOURS:
2100 TO 0600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. RUNWAY 8–26 CLOSED
2. TAXIWAY A CLOSED EAST OF TAXIWAY F
3. TAXIWAY A CLOSED WEST OF TAXIWAY C
4. TAXIWAY B CLOSED
5. TAXIWAY D CLOSED
6. TAXIWAY E CLOSED NORTH OF TAXIWAY A
7. RUNWAY 8–26 GLIDE SLOPE OTS (2100–0600 HST)
8. RUNWAY 8–26 VASI OTS (2100–0600 HST)
9. RUNWAY 8–26 LOC OTS (2100–0600 HST)
10. RUNWAY 8–26 DME OTS (2100–0600 HST)
11. NOTAMs FOR TALL EQUIPMENT WHEN APPLICABLE

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. THERE SHALL BE AN OPERATIONAL WIND CONE AVAILABLE AT THE RUNWAY 26 END AT ALL TIMES.
4. THE CONTRACTOR SHALL COORDINATE WITH ITO, HCF, AND SOC TO VERIFY EXISTING UNDERGROUND UTILITIES AND REQUIRED OUTAGES.

NOTES (CONT.):
5. PRIOR TO THE CLOSURE OF RUNWAY 8–26 THE CONTRACTOR SHALL COORDINATE WITH ITO TO ENSURE ALL UPDATED POSTINGS FOR RUNWAY 3–21 ARE ISSUED.
6. THE CONTRACTOR SHALL ENSURE ALL APPLICABLE FAA FORM 7460–1 FOR TEMPORARY CONSTRUCTION VEHICLES ARE SUBMITTED AND APPROVED PRIOR TO THE START OF WORK.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

RUNWAY 3–21 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	150 FT.
RUNWAY OBJECT FREE AREA (ROFA):	500 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
TAXIWAY OBJECT FREE AREA (TOFA):	320 FT.

LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES
- X — LIGHTED "X"

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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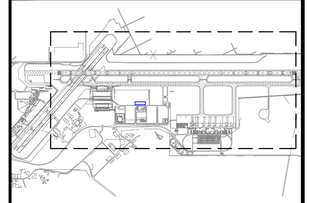
RF	RF	CD	NF

KEY PLAN / NOTES:



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DRAINAGE & WIND CONE IMPROVEMENTS
AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:
AH1021-20

SHEET TITLE:
CSPP - PHASE 6

DATE :
SEPTEMBER 2021
SHEET :
9 OF 48 SHEETS

DWG. NO.
G-9

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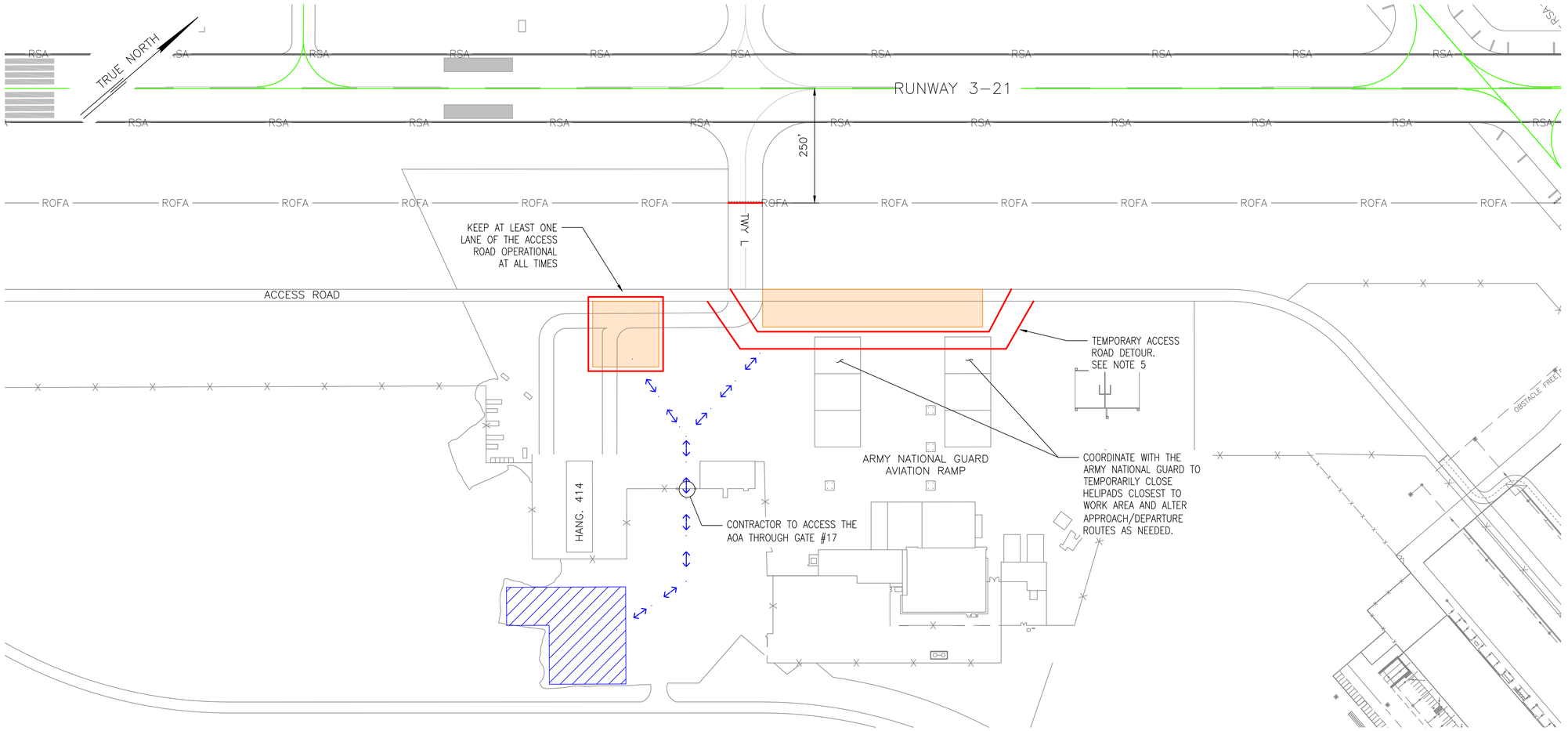

ITO DRAINAGE IMPROVEMENTS – PHASE 7
SCALE: 1"=125'

PHASING AND BARRICADE PLAN – PHASE 7

DESCRIPTION:
1. ASPHALT PAVEMENT MILL AND REPLACEMENT.

TYPE:
TAXIWAY CLOSURE

DURATION:
14 CALENDAR DAYS

WORKING HOURS:
0600 TO 1600 HOURS, HST

SCHEDULED DATES:
TBD

REQUIRED NOTAMS:
1. TAXIWAY L CLOSED
2. ARMY NATIONAL GUARD AVIATION RAMP WORK IN PROGRESS

NOTES:
1. THE CONTRACTOR SHALL NOT DAMAGE, OBSTRUCT, OR ALTER EXISTING NAVAIDS.
2. THE CONTRACTOR SHALL MAINTAIN AN OPEN CHANNEL OF COMMUNICATION WITH THE ATCT AND YIELD TO ANY AIRCRAFT WHEN DIRECTED BY THE ATCT.
3. THE CONTRACTOR SHALL SETUP BARRICADES AROUND THE AFFECTED AREAS OF WORK THROUGH OUT THE PHASE.
4. THE CONTRACTOR MUST COORDINATE WITH ITO TO RELOCATE ANY AIRCRAFT THAT USUALLY PARK IN AND AROUND THE WORK AREA.
5. THE CONTRACTOR SHALL DELINEATE A DETOUR ROUTE FOR THE PORTION OF THE ACCESS ROAD AFFECTED BY CONSTRUCTION.

RUNWAY 8–26 & ASSOCIATED TAXIWAYS

RUNWAY SAFETY AREA (RSA):	500 FT.
RUNWAY OBJECT FREE AREA (ROFA):	800 FT.
TAXIWAY SAFETY AREA (TSA):	214 FT.
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RUNWAY 3–21 & ASSOCIATED TAXIWAYS

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LEGEND:
- PROJECT WORK AREA
- HAUL ROUTE
- STAGING/STOCK PILE AREA
- AIRCRAFT TRAVEL ROUTE
- LOW PROFILE BARRICADES

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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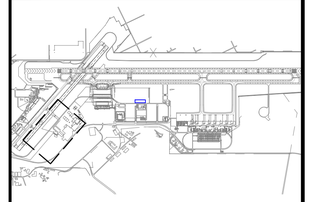

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AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

CSPP - PHASE 7

DATE :	DWG. NO.
SEPTEMBER 2021	G-10
SHEET :	
10 OF 48 SHEETS	

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GENERAL NOTES:

1. THE CONTRACTOR SHALL COMPLETE ALL REQUIREMENTS STATED IN THE CONTRACT.
2. THE CONTRACTOR'S NORMAL WORKING HOURS SHALL BE IN ACCORDANCE WITH TECHNICAL PROVISION SECTION 01000 AND THE HOURS STATED IN THE CONSTRUCTION SAFETY AND PHASING PLAN. NO WORK WILL BE PERFORMED ON STATE HOLIDAYS, AIRPORT EMERGENCIES, OR WHEN POOR WEATHER RESTRICTS CONSTRUCTION.
3. TO ENSURE PUBLIC AND WORKER SAFETY ON THIS PROJECT, THE STATE WILL NOT ALLOW ANY WORK TO COMMENCE UNTIL THE CONTRACTOR'S DETAILED PROJECT WORK SCHEDULE IS APPROVED BY THE STATE PROJECT MANAGER. SAID SCHEDULE SHALL PICTORIALLY SHOW THE WORK AREA(S) FOR EACH WORKDAY. THE CONTRACTOR SHALL KEEP ALL PERSONNEL AND EQUIPMENT UNDER ITS JURISDICTION WITHIN THE WORK AREA(S) AND ASSIGNED AIRPORT OPERATIONS AREA (AOA) TRAVEL ROUTE(S).
4. THE CONTRACTOR SHALL OBTAIN A REVOCABLE PERMIT FOR A STAGING AREA ON AIRPORT PROPERTY PER SPECIFICATION SECTION 01000 – DESCRIPTION OF WORK. THE CONTRACTOR SHALL STAGE THEIR EQUIPMENT ONLY AT STATE DESIGNATED LOCATIONS AND SHALL COMPLY WITH ALL ASSOCIATED REQUIREMENTS. THE STAGING AREA(S) WILL BE DETERMINED BY THE AIRPORT OPERATION DISTRICT OFFICE.
5. THE CONTRACTOR SHALL ONLY ENTER AND EXIT THE AOA THROUGH STATE ASSIGNED GATES AS CALLED OUT IN THE CONSTRUCTION SAFETY AND PHASING PLAN.
6. THE CONTRACTOR MAY NOT USE TEMPORARY AOA BADGES/PERMITS. THESE ITEMS WILL ONLY BE ISSUED BY THE STATE DURING STATE EMERGENCIES.
7. THE CONTRACTOR SHALL CLEAN UP MATERIAL SPILLS BY THE END OF EACH WORK DAY AND/OR WHENEVER THEY OCCUR AND SHALL ONLY DISCARD EXCESS CUT AT AREAS DESIGNATED BY THE STATE.
8. THE CONSTRUCTION STAGING AND MATERIAL STOCKPILING AREAS ARE SHOWN IN THE CONSTRUCTION SAFETY AND PHASING PLAN.
9. THE CONTRACTOR SHALL FILL OUT AND SUBMIT FAA FORM 7460–1 FOR ALL VEHICLES AND EQUIPMENT, 25' OR TALLER, TO BE INSIDE THE AOA. THE FORM 7460–1 SHALL BE APPROVED BEFORE THE START OF CONSTRUCTION.
10. PRIOR TO THE START OF WORK THE CONTRACTOR SHALL SIGN THE HDOTA "PERMIT TO DISCHARGE INTO THE STATE AIRPORT DRAINAGE SYSTEM RELATING TO CONSTRUCTION PROJECTS" FORM. THE PERMIT HAS BEEN PREPARED BY THE DESIGNER, BUT THE CONTRACTOR MAY MAKE REVISIONS PRIOR TO SIGNING. ANY AND ALL REVISIONS MADE TO THE PERMIT BY THE CONTRACTOR SHALL BE REVIEWED AND APPROVED BY THE HDOTA ENVIRONMENTAL SECTION (AIR–EE) PRIOR TO IMPLEMENTATION.
11. THE CONTRACTOR SHALL HAVE AT LEAST TWO (2) PEOPLE IN THE AOA POSSESSING AND CONTINUOUSLY MONITORING THE FOLLOWING FULLY CHARGED COMMUNICATION DEVICES:
    a. A TWO–WAY RADIO CAPABLE OF COMMUNICATING ON FREQUENCIES 121.9 (GROUND) AND 118.1 (TOWER).
    b. A CELLULAR TELEPHONE, WITH A LISTING OF ALL REQUIRED EMERGENCY CONTACT NUMBERS.
12. PER AC 150/5345–27E, THE CONTRACTOR SHALL SUPPLY THE AIRPORT DISTRICT MAINTENANCE DEPARTMENT WITH:
    a. A COMPLETE WIRING DIAGRAM FOR LIGHTED WIND CONES, RUNWAY EDGE LIGHTS, AND TAXIWAY EDGE LIGHTS.
    b. A COMPLETE PARTS LIST WITH THE NAME, PART NUMBER, LOCAL REPRESENTATIVE AND/OR DISTRIBUTOR, AND COMPANY REP CONTACT INFORMATION OF THE ORIGINAL MANUFACTURER.
    c. ASSEMBLY AND INSTALLATION INSTRUCTIONS, INCLUDING MOUNTING FOUNDATION AND ANCHOR BOLT REQUIREMENTS.
    d. MAINTENANCE INSTRUCTIONS
13. THE CONTRACTOR SHALL COMPLY WITH THE HDOTA ITO SWMPP AND HDOTA'S CONSTRUCTION ACTIVITIES BMP FIELD MANUAL FOR THE ENTIRETY OF THE PROJECT.

AOA TRAFFIC CONTROL NOTES:

1. THE CONTRACTOR SHALL FURNISH ALL ESCORTS, FLAG PEOPLE, AND COMMUNICATION DEVICES SPECIFIED IN THE TECHNICAL PROVISION SECTION 01800 AND SECTION 01533; AS WELL AS ALL AOA TRAFFIC CONTROL DEVICES SPECIFIED IN THE TECHNICAL PROVISION SECTION 01800.
2. THE CONTRACTOR'S ESCORTS SHALL CONTINUOUSLY MONITOR RADIO FREQUENCY, INDICATED IN THE TECHNICAL PROVISION SECTION 01800, FOR ALL POTENTIAL AIRCRAFT ACTIVITY THAT IS UNPLANNED AND UNFORESEEN WHEN WORKING WITHIN THE AOA.
3. BEFORE STARTING ANY WORK AT EACH WORKDAY, THE CONTRACTOR SHALL SET UP ALL AOA TRAFFIC CONTROL DEVICES IN THE ORDER REQUIRED BY THE CSPP. AT THE END OF EACH WORKDAY, THE CONTRACTOR SHALL TAKE DOWN ALL AOA TRAFFIC CONTROL DEVICES IN THE REVERSE ORDER.
4. THE CONTRACTOR SHALL NOT TAKE DOWN ANY AOA TRAFFIC CONTROL DEVICES UNTIL WORK IS COMPLETED ON THE AOA OR AS OTHERWISE DIRECTED BY ATCT OR AIRPORT DISTRICT OPERATIONS.
5. THE CONTRACTOR SHALL NOT LEAVE THE AOA UNTIL ALL AOA TRAFFIC CONTROL DEVICES HAVE BEEN TAKEN DOWN.
6. THE CONTRACTOR SHALL NOT LEAVE THE AIRPORT UNTIL ALL STAGING AREAS ARE CLEARED ACCORDING TO TECHNICAL PROVISION SECTION 01800.

INSTRUMENT LANDING SYSTEM (ILS) AND NAVIGATIONAL AID (NAVAID) NOTES:

1. THE CONTRACTOR SHALL NOT PARK IN THE RUNWAY 26 GLIDE SLOPE CRITICAL AREA.
2. THE CONTRACTOR SHALL NOT OBSTRUCT, ALTER, OR DAMAGE EXISTING NAVAIDS ON THE AIRFIELD.
3. THE CONTRACTOR SHALL COORDINATE WITH ITO TO TURN OFF ALL REQUIRED NAVAIDS PRIOR TO THE SHUTDOWN OF THE RUNWAY.

CONSTRUCTION SAFETY AND PHASING PLAN (CSPP) NOTES:

1. THE CSPP IS A SAFETY DOCUMENT APPROVED BY HDOTA, AIRPORT DISTRICT, FAA, ATC, AIRLINES, AND OTHER STAKEHOLDERS.
2. THE CONTRACTOR SHALL ADHEAR TO THE PROJECT PHASING, WORK HOURS, HAUL ROUTES, CLOSURES, AND OTHER PROJECT SPECIFIC SAFETY PROCEDURES LISTED IN THE CSPP.
3. THE CONTRACTOR SHALL CREATE A SAFETY PLAN COMPLIANCE DOCUMENT (SPCD) IN ACCORDANCE WITH THE MOST UP TO DATE FAA AC 150/5370–2 OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION, TO DETAIL HOW THE CONTRACTOR WILL COMPLY WITH THE CSPP.
4. THE CONTRACTOR SHALL BE AWARE OF THE HAZARDS, RISKS, AND MITIGATION MEASURES IDENTIFIED IN THE SAFETY RISK MANAGEMENT DOCUMENT AND CSPP.

WATER POLLUTION AND EROSION CONTROL BEST MANAGEMENT PRACTICES (BMP) NOTES:

1. THE CONTRACTOR SHALL INSTALL DEVICES AND UTILIZE BEST MANAGEMENT PRACTICES (BMP) APPROPRIATE FOR THE PROJECT. THE CONTRACTOR SHALL REFERENCE THE STATE OF HAWAII DEPARTMENT OF TRANSPORTATION, AIRPORTS DIVISION'S STORM WATER MANAGEMENT PROGRAM PLAN (SWMPP) FOR RULES RELATING TO SOIL EROSION STANDARDS AND GUIDELINES.
2. THE CONTRACTOR SHALL ADHERE TO THE BEST MANAGEMENT PRACTICES SPECIFIED IN THE HDOTA CONSTRUCTION ACTIVITIES BMP FIELD MANUAL ATTACHED IN THE PROJECT SPECIFICATIONS, SECTION 01561 – CONSTRUCTION SITE RUNOFF CONTROL PROGRAM.
3. THE CONTRACTOR SHALL CONSIDER AND INSTALL BMP MEASURES WHICH TAKE INTO ACCOUNT HIGH INTENSITY AND PROLONGED RAINFALL, AND TO ADDRESS THE POTENTIAL PROBLEMS THAT MAY RESULT BEFORE THE START OF ANY EXCAVATION OR EMBANKMENT WORK.
4. THE STATE RESERVES THE RIGHT TO DETERMINE THE APPROPRIATENESS AND ADEQUACY OF PROPOSED AND/OR IMPLEMENTED BMP'S. ADDITIONAL BMP MEASURES REQUIRED BY THE STATE SHALL NOT BE PAID FOR BY THE STATE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES, INJURIES AND/OR CLAIMS RESULTING FROM HIS BMP'S.
6. THE CONTRACTOR SHALL DESIGNATE AT LEAST ONE (1) PERSON WHO WILL BE RESPONSIBLE FOR INSPECTION, MAINTENANCE, AND REPAIR ACTIVITIES. PERSONNEL SELECTED FOR THE INSPECTION AND MAINTENANCE RESPONSIBILITIES SHALL RECEIVE TRAINING FROM THE CONTRACTOR, AT THE CONTRACTOR'S EXPENSE. TRAINING SHALL INCLUDE INSPECTION AND MAINTENANCE PRACTICES NECESSARY FOR MINIMIZING EROSION AND SEDIMENT AND FOR RETAINING SEDIMENT ON–SITE.
7. DISCHARGES INTO STATE WATERS DUE TO DEWATERING AND/OR HYDROTESTING ACTIVITIES REQUIRE SEPARATE NPDES PERMIT(S) FROM THE STATE DEPARTMENT OF HEALTH (DOH). IF THE CONTRACTOR CHOOSES TO DISCHARGE DEWATERING AND/OR HYDROTESTING EFFLUENT INTO STATE WATERS, HE SHALL OBTAIN THE NECESSARY PERMIT(S) FROM THE DOH, AND SHALL SUBMIT A COMPLETE SET OF THE PERMIT TO THE DEPARTMENT OF TRANSPORTATION, AIRPORTS DIVISION PRIOR TO COMMENCING THE PERMITTED ACTIVITY. NO DEWATERING AND/OR HYDROTESTING ACTIVITIES WILL BE AUTHORIZED UNTIL THE RECEIPT OF THE NPDES PERMIT(S) FROM THE DOH. THE CONTRACTOR SHALL SUBMIT THE NOTICE OF INTENT TO AIR–EE FOR REVIEW AND APPROVAL PRIOR TO TRANSMITTING TO DOH.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CITATIONS OR FINES THAT MAY BE LEVIED AS RELATED TO THE NPDES PROGRAM ON THIS PERMIT, WHETHER DIRECTLY LEVIED AGAINST THE CONTRACTOR OR THE DEPARTMENT OF TRANSPORTATION.
9. THE CONTRACTOR MAY DISCUSS PROPOSED AND IMPLEMENTED BMP MEASURES AND THE ADEQUACY OF THEM, WITH THE ENGINEER.

NON–STRUCTURAL BEST MANAGEMENT PRACTICES

1. WASTE DISPOSAL:
    a. ALL WASTE MATERIAL SHALL BE COLLECTED AND STORED IN A SECURELY LIDDED, LEAK PROOF METAL DUMPSTER. THE DUMPSTER SHALL MEET ALL COUNTY AND STATE SOLID WASTE MANAGEMENT REGULATIONS. ALL DUMPSTERS AT THE PROJECT SITE SHALL BE EMPTIED A MINIMUM OF ONCE PER WEEK, AND MORE OFTEN, IF NECESSARY. NO CONSTRUCTION WASTE MATERIALS SHALL BE BURIED ONSITE. THE CONTRACTOR, AT HIS EXPENSE, SHALL TRAIN SUPERVISORY PERSONNEL IN THE CORRECT PROCEDURES FOR WASTE DISPOSAL.
    b. ALL HAZARDOUS WASTE MATERIALS SHALL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE OR FEDERAL REGULATIONS.
    c. ALL SANITARY WASTE SHALL BE COLLECTED FROM PORTABLE RESTROOM FACILITIES A MINIMUM OF ONCE PER WEEK, AND MORE OFTEN, AS NECESSARY.
2. EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES:
    a. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY OR PRIOR TO AND AFTER EACH DAY'S CONSTRUCTION.
    b. ALL CONTROL MEASURES PER APPROVED NPDES PLAN, SHALL BE MAINTAINED IN GOOD WORKING ORDER. IF A REPAIR IS NECESSARY, IT SHALL BE INITIATED WITHIN TWENTY FOUR (24) HOURS AFTER THE PROBLEM BEING DISCOVERED.
    c. ANY REVISIONS TO APPROVED NPDES PLANS SHALL BE SUBMITTED TO THE DISTRICT ENGINEER FOR REVIEW AND APPROVAL BEFORE ANY FIELD ADJUSTMENTS ARE MADE. ANY REVISIONS TO APPROVED NPDES PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVED BY AIR–EE BEFORE ANY FIELD ADJUSTMENTS ARE MADE.
3. SPILL PREVENTION:
    a. THE FOLLOWING MANAGEMENT PRACTICES SHALL BE FOLLOWED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIAL AND SUBSTANCES TO STORM WATER RUNOFF AND DISCHARGE.
    i. GOOD HOUSEKEEPING: STORE ENOUGH PRODUCTS AND MATERIAL REQUIRED TO PERFORM THE JOB. MATERIALS THAT MAY BECOME POTENTIAL POLLUTANTS THAT ARE IN A NEAT AND ORDERLY MANNER IN THEIR ORIGINAL CONTAINERS, AND IF POSSIBLE, COVERED OR ENCLOSED. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS, WITH THE ORIGINAL MANUFACTURER'S LABELING. PRODUCTS SHALL NOT BE MIXED, EXCEPT AS RECOMMENDED OR ALLOWED BY THE MANUFACTURERS. APPROPRIATE PRODUCTS SHALL HAVE SECONDARY CONTAINMENT. WHENEVER POSSIBLE, USE UP ALL OF A PRODUCT PRIOR TO DISPOSING OF THE CONTAINER. MANUFACTURER'S DIRECTIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED. MATERIAL SHALL BE DISPOSED OF IN A MANNER PERMITTED BY LOCAL, STATE, OR FEDERAL REGULATIONS. THE CONTRACTOR SHALL CONDUCT DAILY INSPECTIONS TO ENSURE PROPER USE AND DISPOSAL OF MATERIAL. LITTER SHALL BE PICKED UP ON A DAILY BASIS AND DISPOSED OF PROPERLY. DUST SHALL BE CONTROLLED BY WETTING OR BY APPLICATION OF A SOIL BINDER.
    ii. HAZARDOUS PRODUCTS: PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS WITH THE ORIGINAL MANUFACTURER'S LABELING. MATERIAL SAFETY DATA SHEETS (MSDS) SHALL BE RETAINED AND AVAILABLE FOR REVIEW BY USERS. MANUFACTURER'S DIRECTIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED. ALL HAZARDOUS WASTE SHALL BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
4. PRODUCT SPECIFIC PRACTICES THE FOLLOWING PRACTICES SHALL BE FOLLOWED ON–SITE:
    a. VEHICLES: ALL ON–SITE VEHICLES SHALL BE MONITORED FOR LEAKS AND SHALL BE SUBJECT TO REGULAR PREVENTATIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKS OCCURRING. LEAKS THAT CANNOT BE REPAIRED IMMEDIATELY SHALL BE CONTAINED IN SPILL PANS OR OTHER APPROPRIATE CONTAINERS.
    b. PETROLEUM PRODUCTS: PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS THAT SHALL BE CLEARLY LABELED. ASPHALT–CONTAINING MATERIALS (SUCH AS TACK AND PRIME COATS) USED ON–SITE SHALL BE APPLIED ACCORDING TO MANUFACTURER'S DIRECTIONS.
    c. CONCRETE TRUCKS: CONCRETE TRUCKS SHALL DISCHARGE DRUM WASH WATER ONLY AT DESIGNATED SITES. WASH WATER SHALL NOT BE DISCHARGED TO THE STORM DRAIN SYSTEM. THE CONTRACTOR SHALL CONTAIN THE DISCHARGED DRUM WASH AT THE DESIGNATED SITE AND SHALL REMOVE CONCRETE AND OTHER RESIDUE AS REQUIRED BY THE ENGINEER.
5. IN ADDITION TO GOOD HOUSEKEEPING AND MATERIALS FOLLOWING SPILL PREVENTION AND CLEANUP PRACTICES SHALL BE OBSERVED.
    a. FOR ALL SPILLS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE AIRPORT DUTY MANAGER, ENGINEER, AND AIR–EE. THE CONTRACTOR SHALL ALSO NOTIFY DOH HEER OFFICE OF ALL SPILLS GREATER THAN 25 GALLONS OR SPILLS THAT HAVE NOT BEEN CLEANED WITHIN 72 HOURS. THE CONTRACTOR SHALL ALSO NOTIFY DOH CWB OF ANY SPILLS THAT DISCHARGES INTO THE DRAINAGE SYSTEM AND/OR MS4. THE CONTRACTOR SHALL PROVIDE A REPORT THAT INCLUDES, BUT NOT LIMITED TO: THE MEASURES TO PREVENT THIS TYPE OF SPILL, THE CAUSE OF THE SPILL, AND THE CLEAN UP MEASURES UNDERTAKEN FOR THE SPILL.
    b. MANUFACTURER'S RECOMMENDATIONS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED, AND SITE PERSONNEL SHALL BE MADE AWARE OF PROCEDURES AND LOCATION OF CLEANUP SUPPLIES.
    c. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ON–SITE
    d. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY.
    e. ALL SPILL AREAS SHALL BE CONTAINED, WELL VENTILATED, AND CLEANUP PERSONNEL SHALL WEAR APPROPRIATE CLOTHING AND EQUIPMENT.
    f. TOXIC OR HAZARDOUS MATERIAL SPILLS, REGARDLESS OF SIZE, SHALL BE REPORTED TO THE APPROPRIATE GOVERNMENTAL AGENCIES. A REPORT SHALL BE PREPARED TO INCLUDE MEASURES TO PREVENT THIS TYPE OF SPILL, THE CAUSE, AND THE CLEANUP MEASURE UNDERTAKEN SHALL ALSO BE INCLUDED IN THE REPORT.
    g. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SPILL PREVENTION AND CLEANUP. HE SHALL DESIGNATE AT LEAST ONE ON–SITE PERSONNEL TO RECEIVE SPILL PREVENTION AND CLEANUP TRAINING. THE CONTRACTOR, AT HIS EXPENSE SHALL DO TRAINING. THE NAME OF THIS PERSON SHALL BE POSTED IN THE MATERIAL STORAGE AREA AND IN THE ON–SITE OFFICE TRAILER.

STATE OF HAWAII
1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186–C
HAWAII U.S.A.

This work was prepared by me or under my supervision.
Exp. 04–30–22

Wesley R. Segawa & Associates, Inc.

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

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C-1

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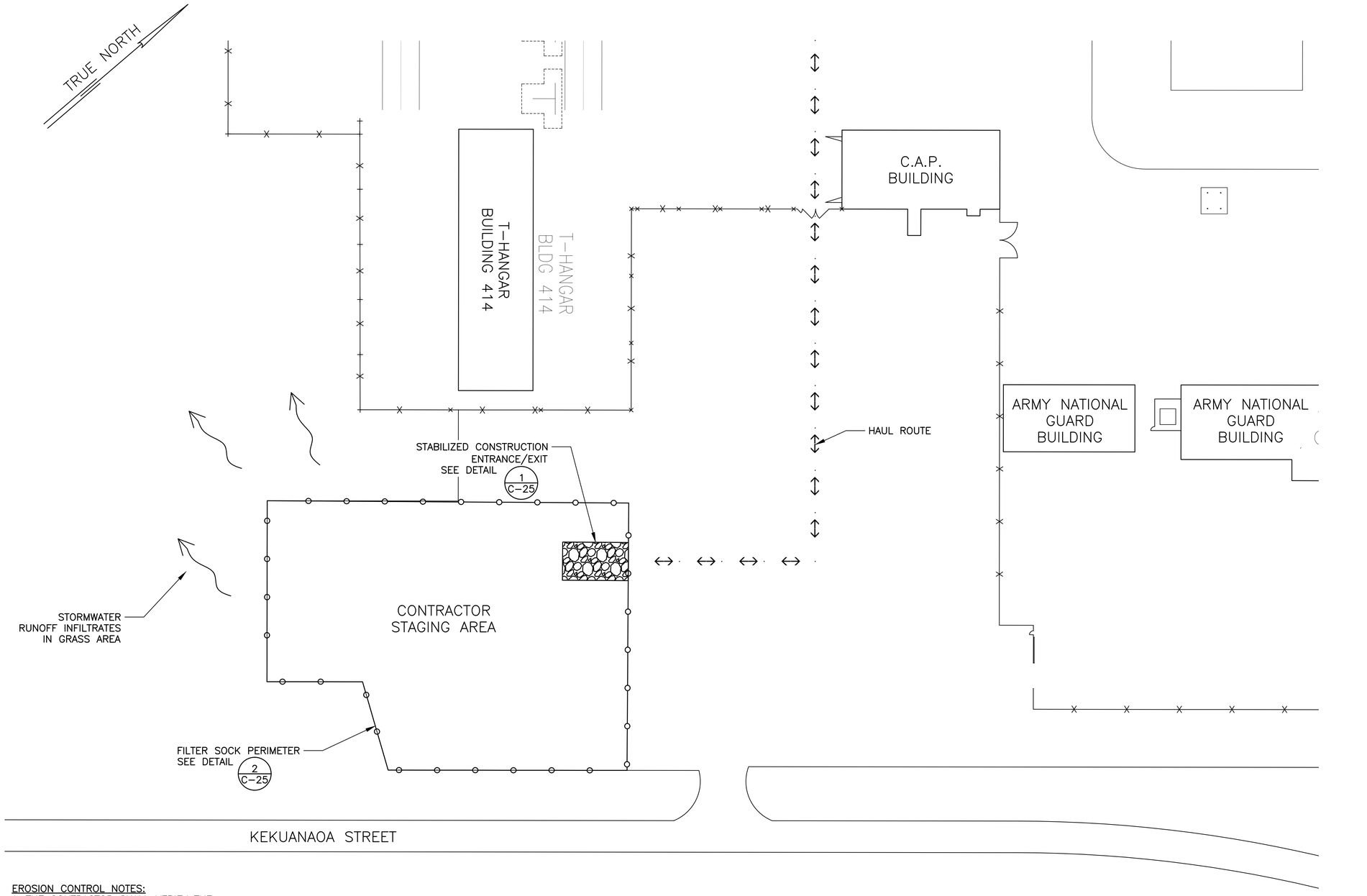


EROSION CONTROL NOTES:

1. THE CONTRACTOR SHALL VERIFY THE DIRECTION OF STORMWATER RUNOFF FROM THE PROJECT SITE, STAGING AREA, AND STOCKPILE AREA. IF STORMWATER RUNOFF DIRECTIONS ARE FOUND TO DIFFER FROM THE PLANS ADDITIONAL APPROPRIATE BMPS SHALL BE INSTALLED TO ADDRESS THE ACTUAL FLOW PATTERN.

EROSION CONTROL – STAGING AREA
SCALE: 1"=40'

LEGEND:

FLOW PATTERN:

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

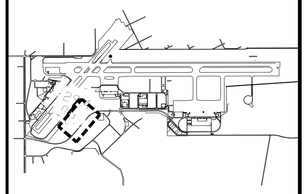
NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
HAWAII U.S.A.

This work was prepared by me or under my supervision.
Exp. 04-30-22

Wesley R. Segawa & Associates, Inc.

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

90% DESIGN SUBMITTAL
OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EROSION CONTROL PLAN 1

DATE :	DWG. NO.
SEPTEMBER 2021	C-2
SHEET :	
12 OF 48 SHEETS	

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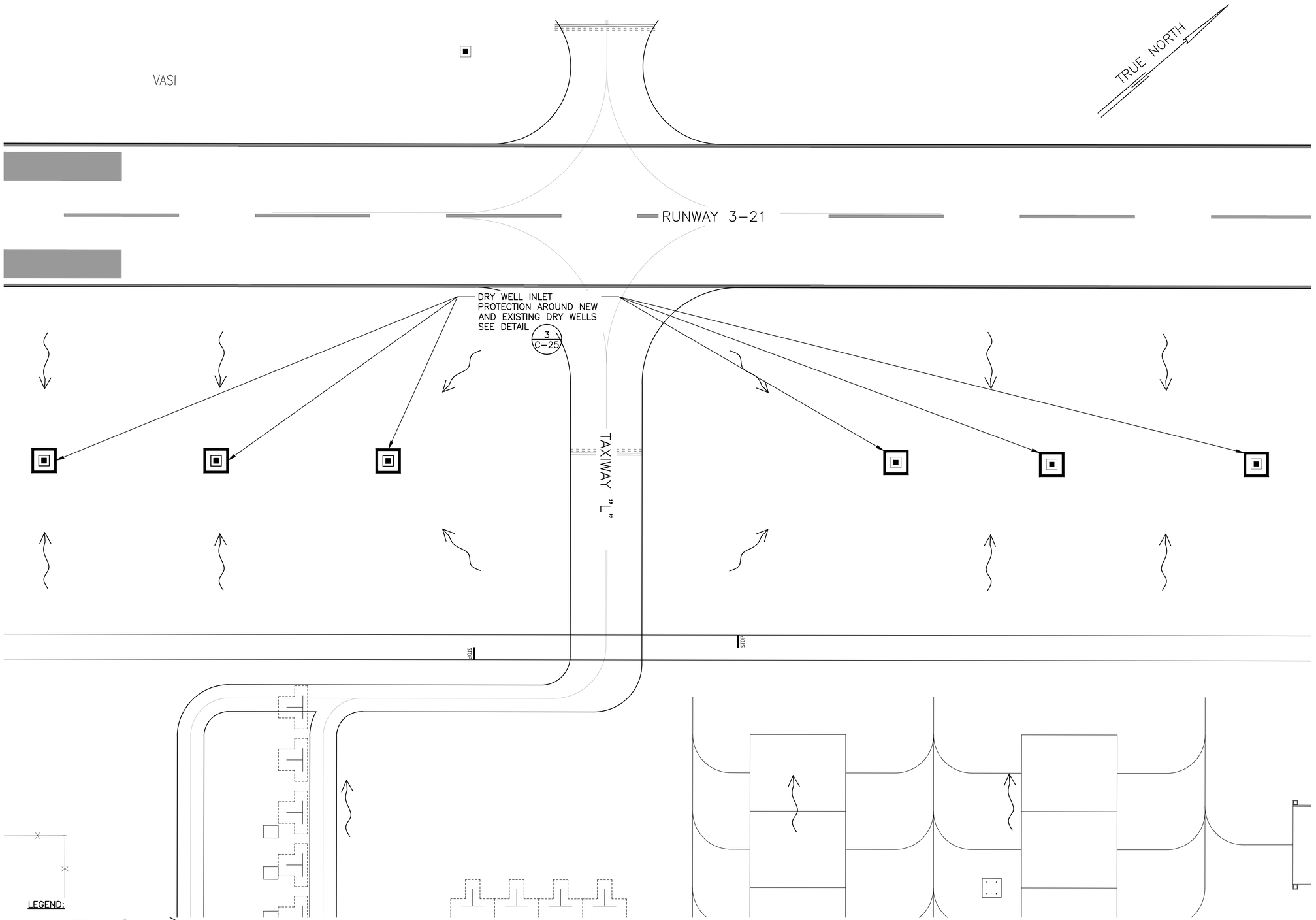

EROSION CONTROL – ARMY NATIONAL GUARD AVIATION RAMP
SCALE: 1"=50'

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
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No. 6186-C
HAWAII U.S.A.

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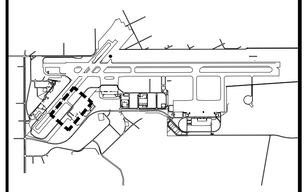
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

90% DESIGN SUBMITTAL
OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EROSION CONTROL PLAN 2

DATE :	DWG. NO.
SEPTEMBER 2021	C-3
SHEET :	
13 OF 48 SHEETS	

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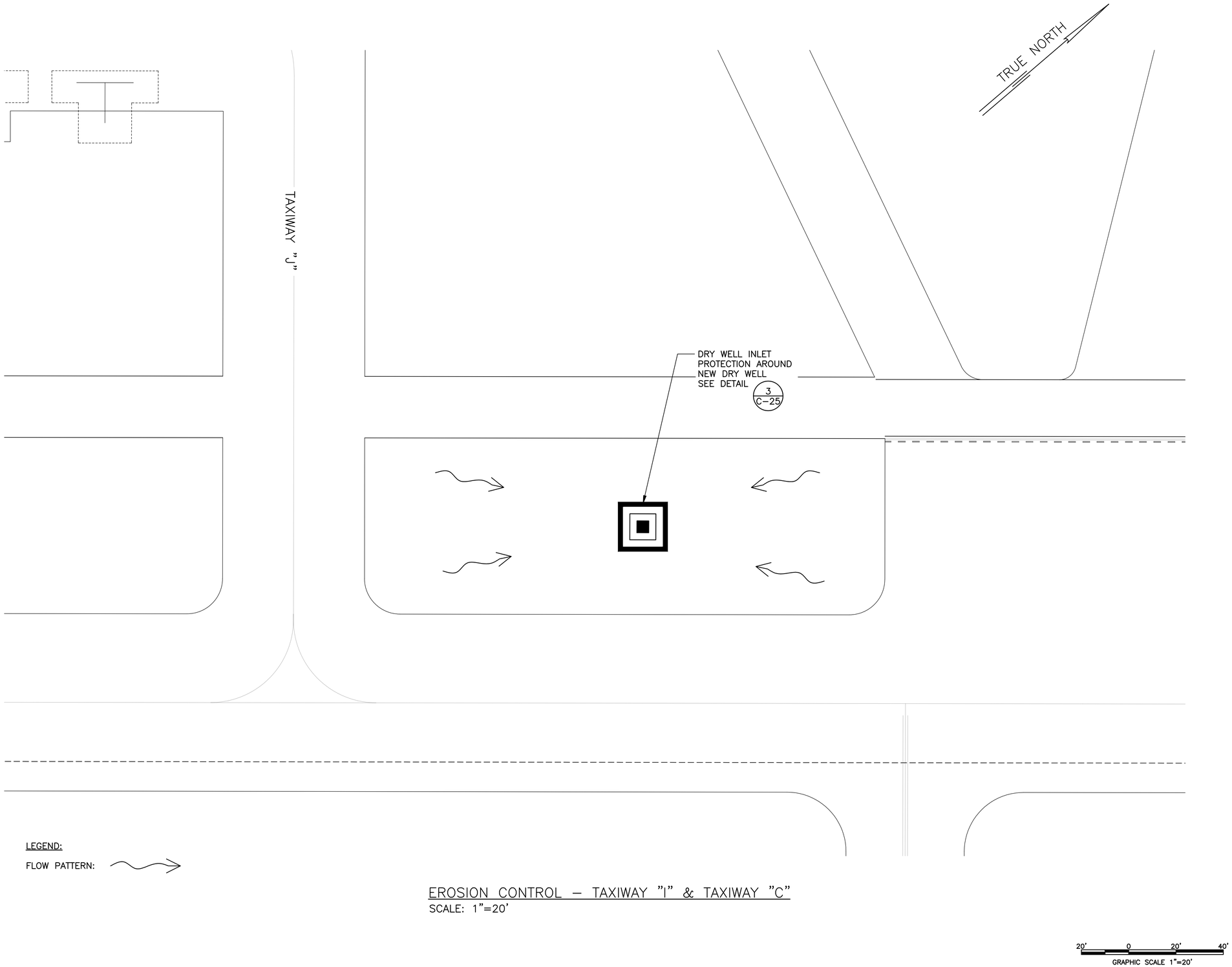

EROSION CONTROL – TAXIWAY "I" & TAXIWAY "C"
SCALE: 1"=20'

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
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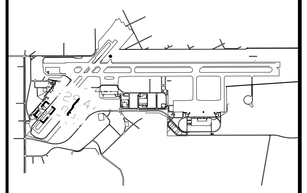
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

90% DESIGN SUBMITTAL
OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EROSION CONTROL PLAN 3

DATE :	DWG. NO.
SEPTEMBER 2021	C-4
SHEET :	
14 OF 48 SHEETS	

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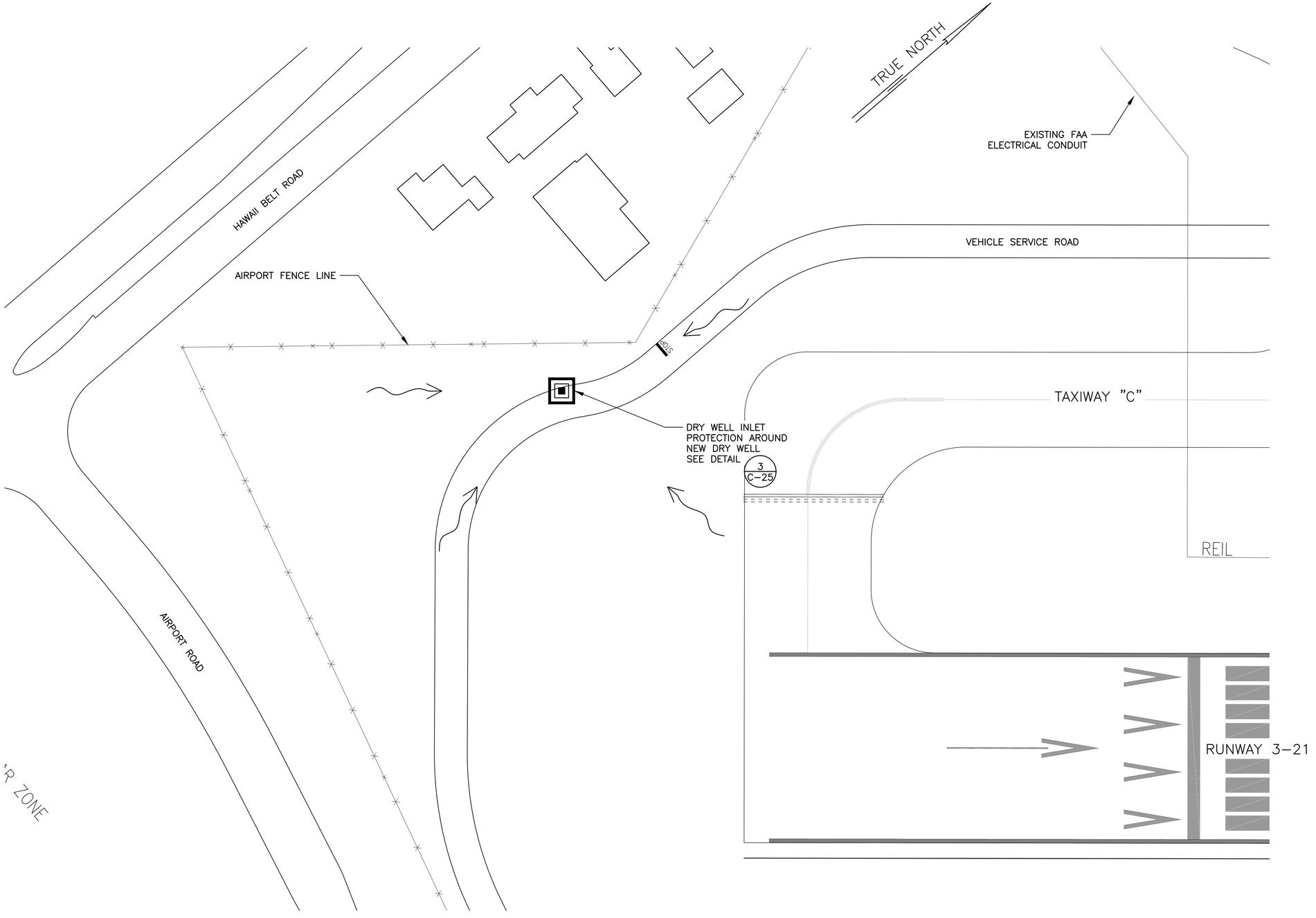

LEGEND:

FLOW PATTERN:

EROSION CONTROL – VEHICLE SERVICE ROAD
SCALE: 1"=40'

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
HAWAII U.S.A.

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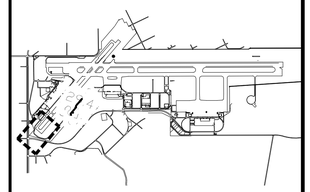
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

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OCTOBER 1, 2021
DATE

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EROSION CONTROL PLAN 4

DATE :	DWG. NO.
SEPTEMBER 2021	C-5
SHEET :	
15 OF 48 SHEETS	

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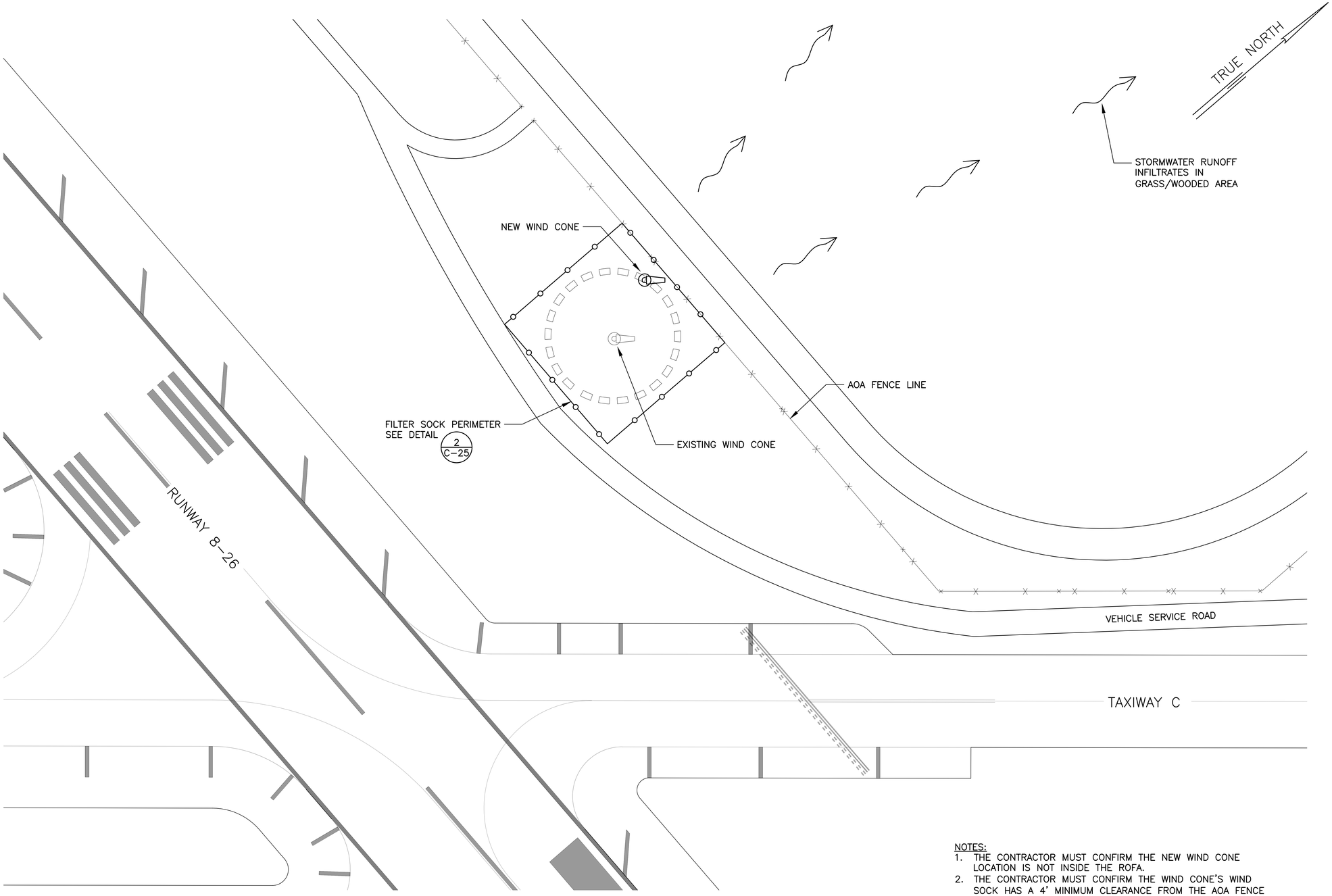

NOTES:
1. THE CONTRACTOR MUST CONFIRM THE NEW WIND CONE LOCATION IS NOT INSIDE THE ROFA.
2. THE CONTRACTOR MUST CONFIRM THE WIND CONE'S WIND SOCK HAS A 4' MINIMUM CLEARANCE FROM THE AOA FENCE LINE.

EROSION CONTROL – RUNWAY 8 END WIND CONE
SCALE: 1"=40'

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
HAWAII U.S.A.

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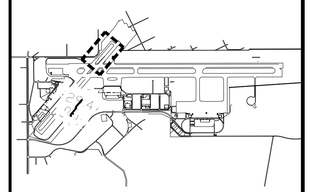
DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



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OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EROSION CONTROL PLAN 5

DATE :	DWG. NO.
SEPTEMBER 2021	C-6
SHEET :	
16 OF 48 SHEETS	

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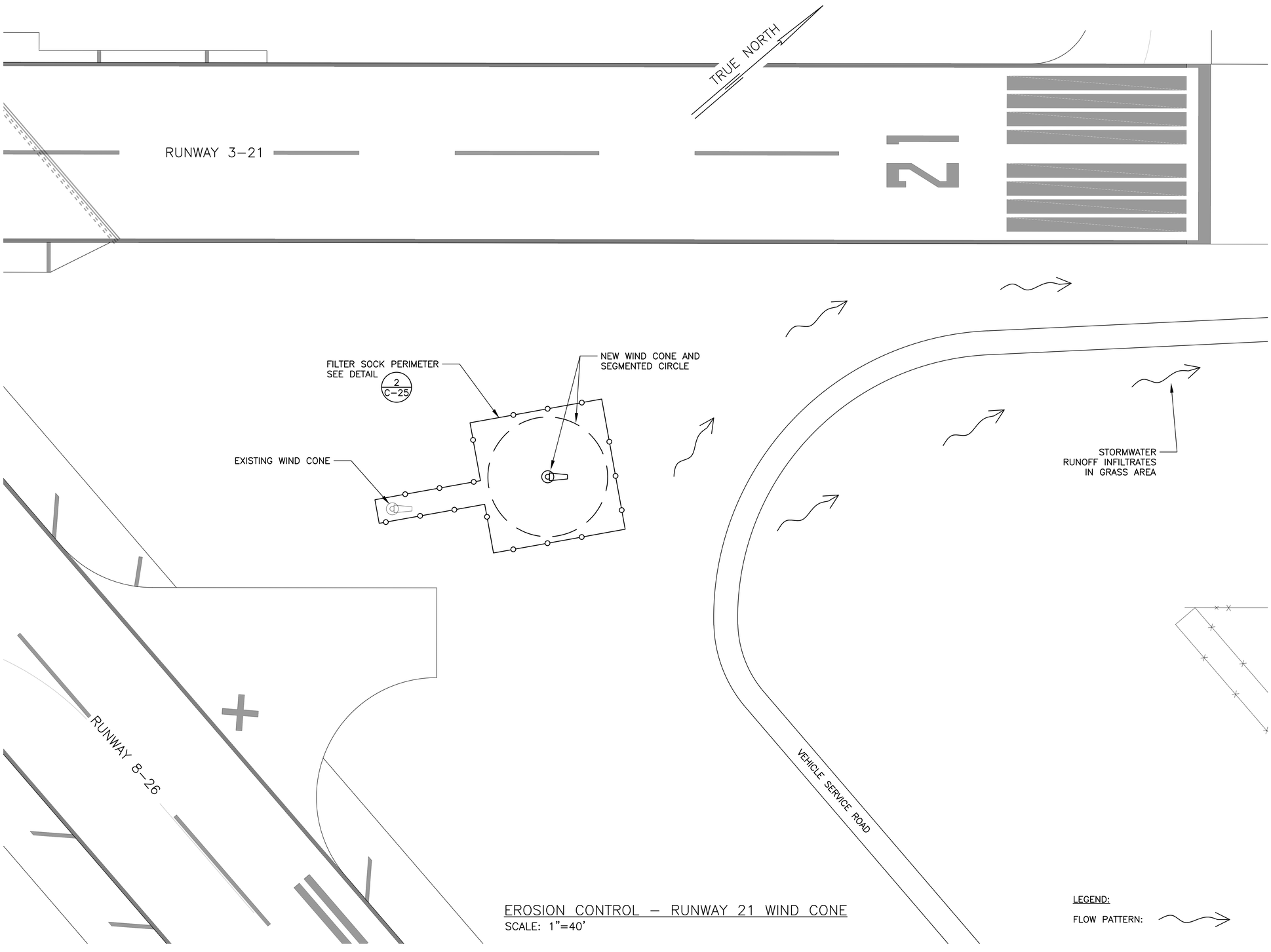

EROSION CONTROL – RUNWAY 21 WIND CONE
SCALE: 1"=40'

LEGEND:

FLOW PATTERN:

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
HAWAII U.S.A.

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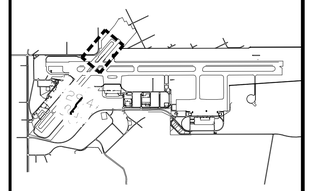
Wesley R. Segawa & Associates, Inc.

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



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OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EROSION CONTROL PLAN 6

DATE :	DWG. NO.
SEPTEMBER 2021	C-7
SHEET :	
17 OF 48 SHEETS	

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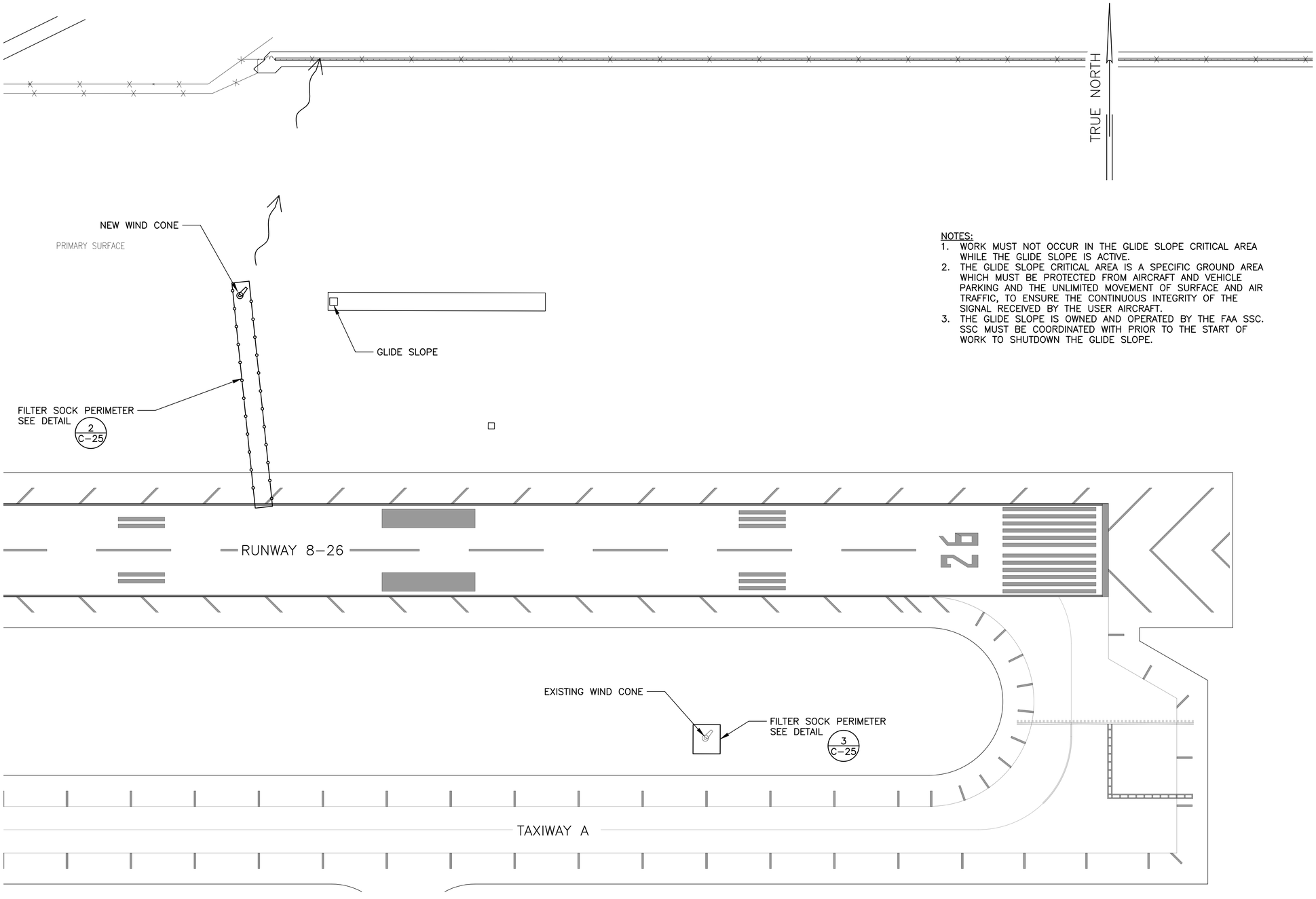
DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDIA
01562-58
OCTOBER 2022



NOTES:
1. WORK MUST NOT OCCUR IN THE GLIDE SLOPE CRITICAL AREA WHILE THE GLIDE SLOPE IS ACTIVE.
2. THE GLIDE SLOPE CRITICAL AREA IS A SPECIFIC GROUND AREA WHICH MUST BE PROTECTED FROM AIRCRAFT AND VEHICLE PARKING AND THE UNLIMITED MOVEMENT OF SURFACE AND AIR TRAFFIC, TO ENSURE THE CONTINUOUS INTEGRITY OF THE SIGNAL RECEIVED BY THE USER AIRCRAFT.
3. THE GLIDE SLOPE IS OWNED AND OPERATED BY THE FAA SSC. SSC MUST BE COORDINATED WITH PRIOR TO THE START OF WORK TO SHUTDOWN THE GLIDE SLOPE.

LEGEND:

FLOW PATTERN:

EROSION CONTROL – RUNWAY 26 END WIND CONE
SCALE: 1"=80'

80' 0 80' 160'
GRAPHIC SCALE 1"=80'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
HAWAII U.S.A.

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Wesley R. Segawa & Associates, Inc.

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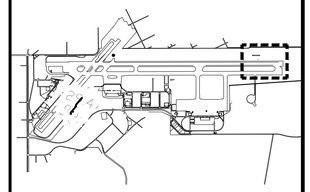
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

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OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EROSION CONTROL PLAN 7

DATE :	DWG. NO.
SEPTEMBER 2021	C-8
SHEET :	
18 OF 48 SHEETS	

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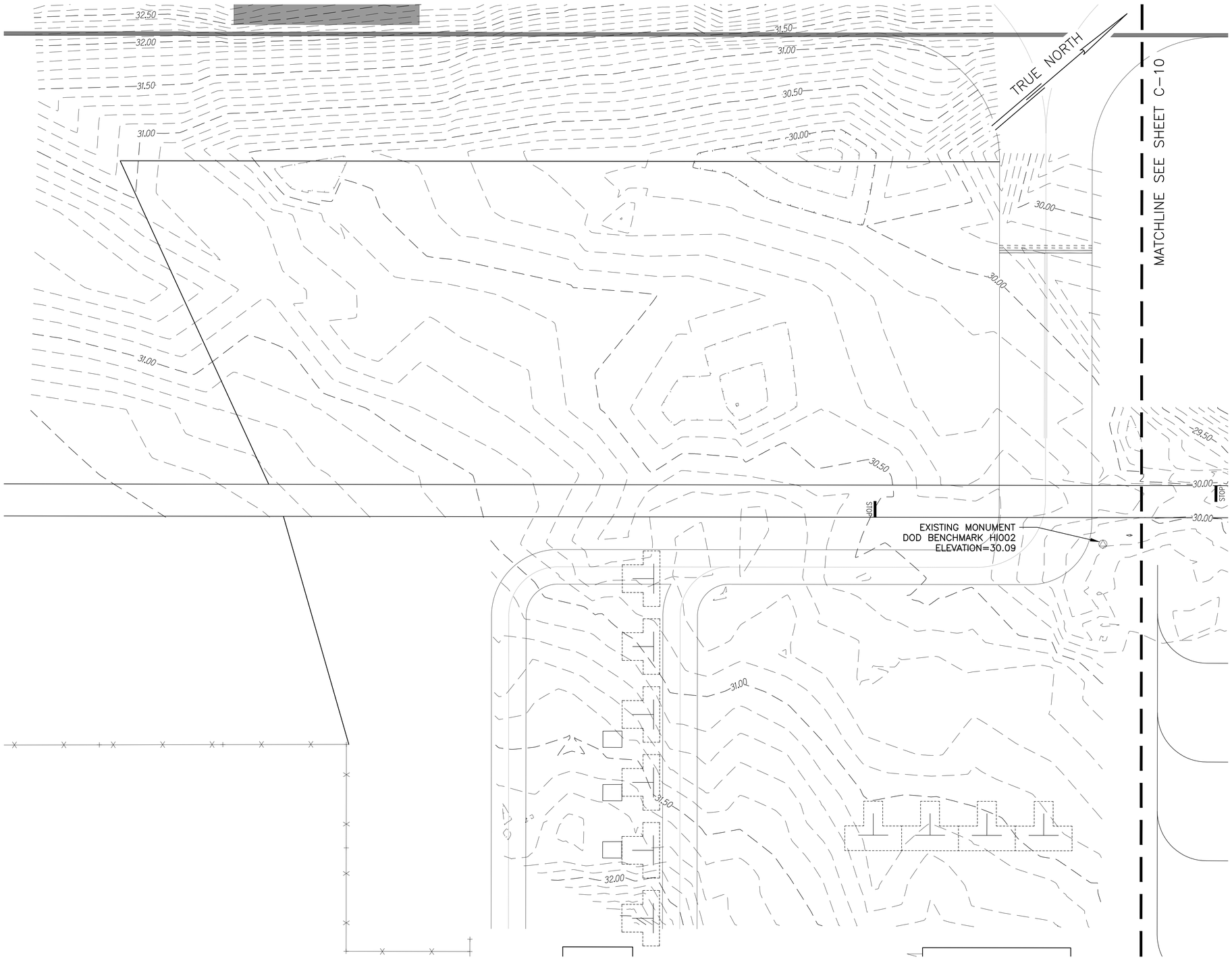

EXISTING CONDITIONS PLAN
SCALE: 1"=40'

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
HAWAII U.S.A.

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RF	RF	CD	NF

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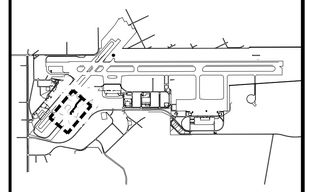

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DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EXISTING CONDITIONS PLAN 1

DATE :	DWG. NO.
SEPTEMBER 2021	C-9
SHEET :	
19 OF 48 SHEETS	

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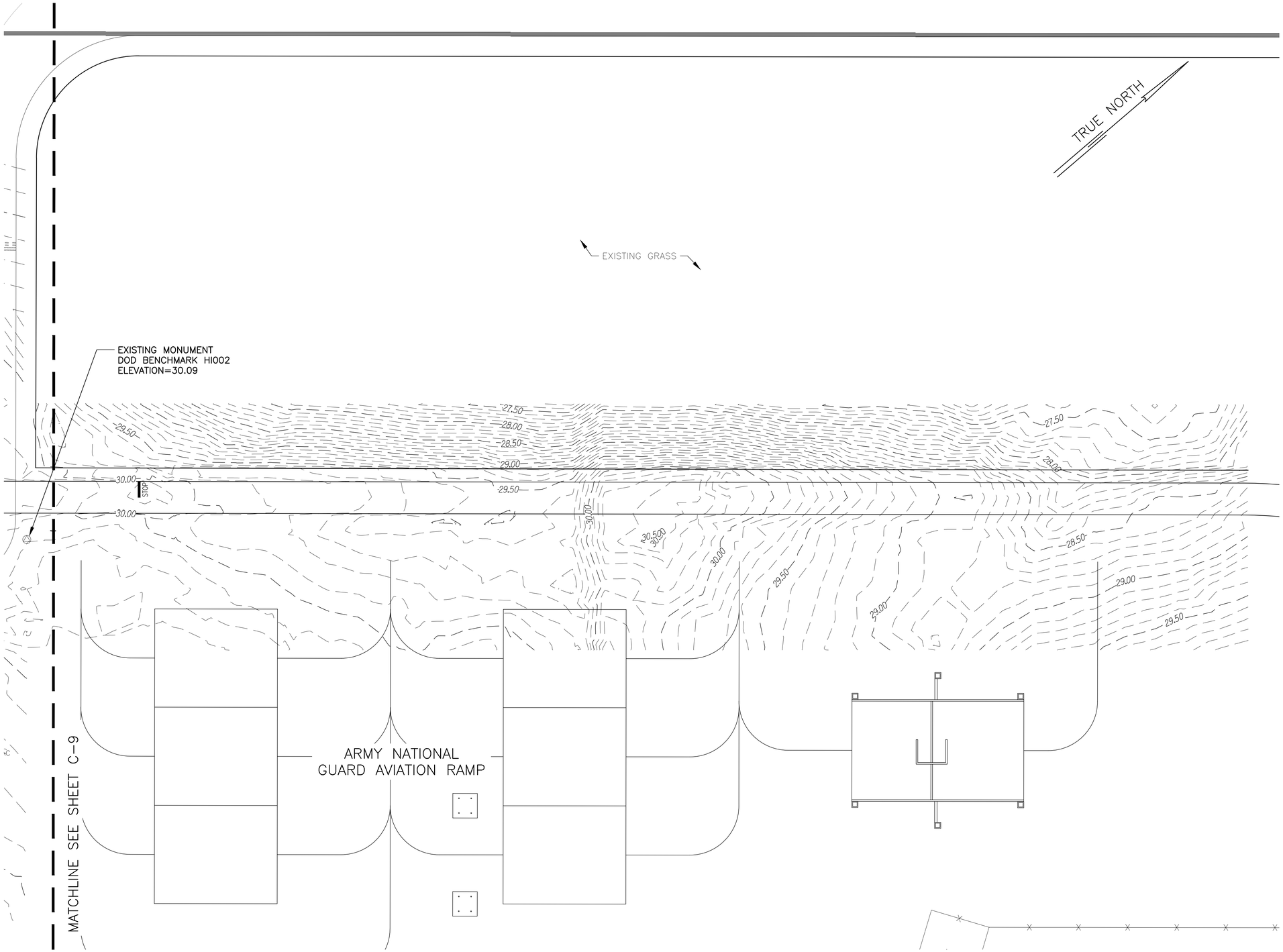

EXISTING CONDITIONS PLAN
SCALE: 1"=40'

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
HAWAII U.S.A.

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NO.	DATE	REVISIONS

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DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EXISTING CONDITIONS PLAN 2

DATE :	DWG. NO.
SEPTEMBER 2021	C-10
SHEET :	
20 OF 48 SHEETS	

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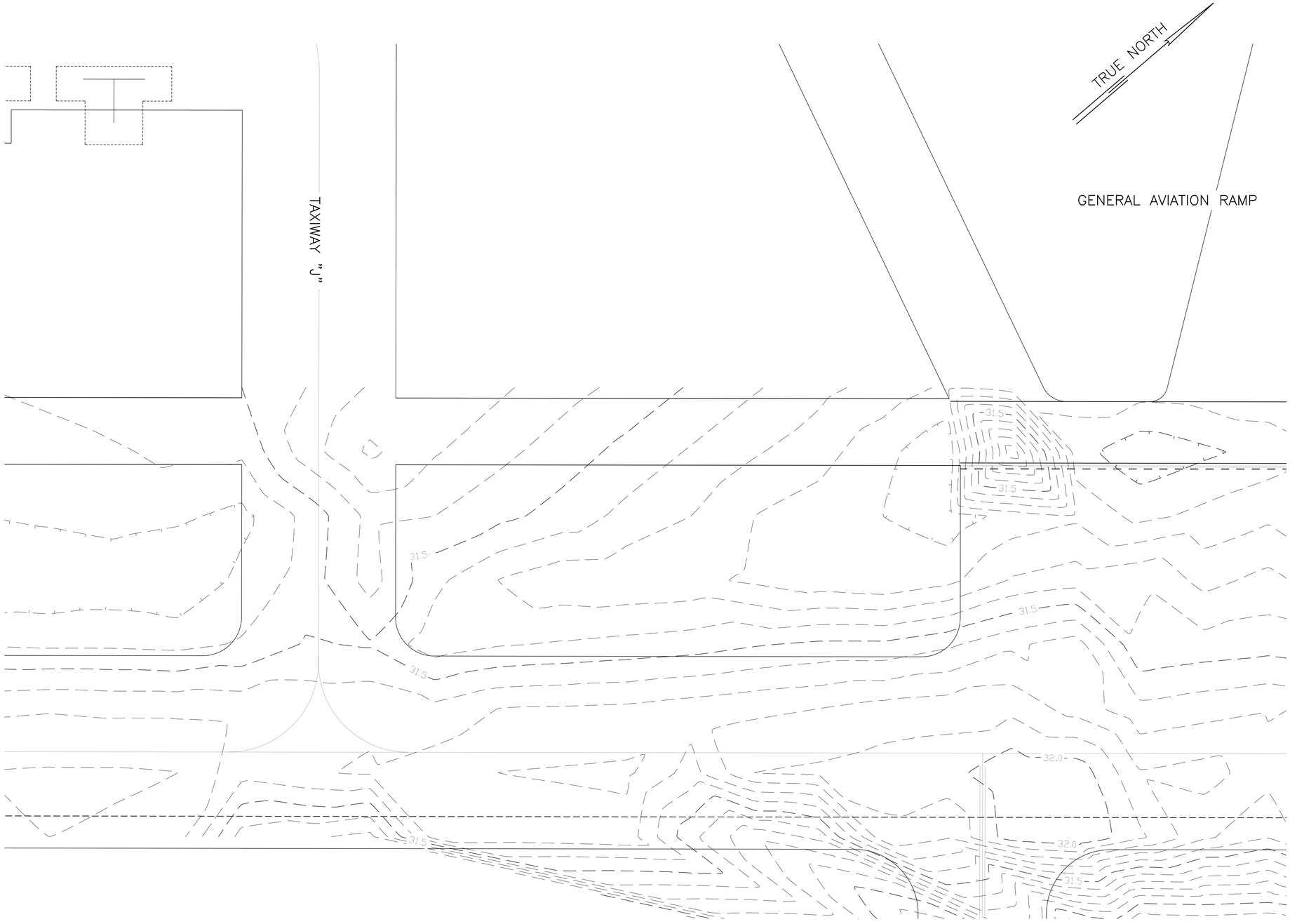
DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDIA
01562-61
OCTOBER 2022



EXISTING CONDITIONS PLAN
SCALE: 1"=20'

20' 0 20' 40'
GRAPHIC SCALE 1"=20'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
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HAWAII U.S.A.

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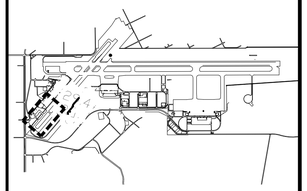
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

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OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EXISTING CONDITIONS PLAN 3

DATE :	DWG. NO.
SEPTEMBER 2021	C-11
SHEET :	
21 OF 48 SHEETS	

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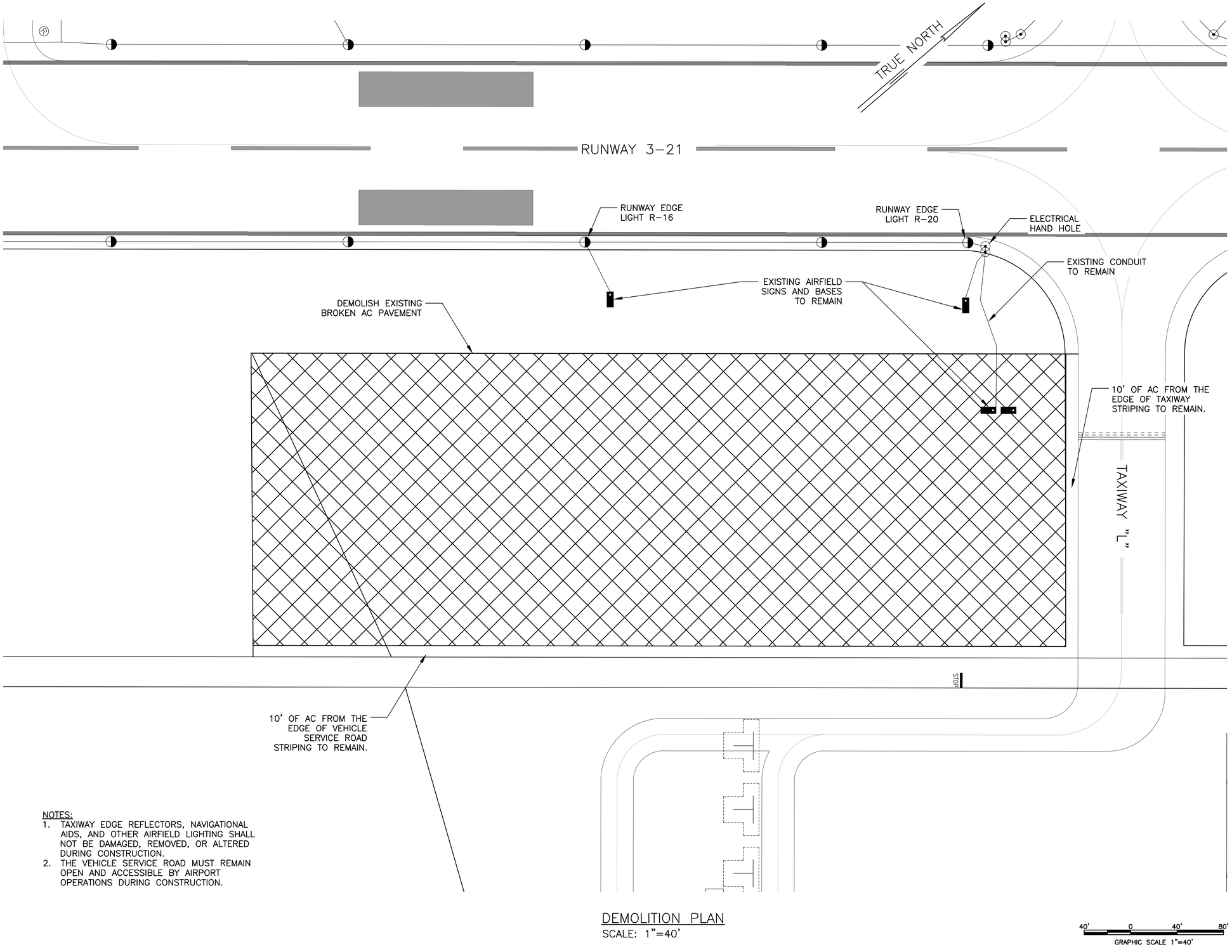

NOTES:
1. TAXIWAY EDGE REFLECTORS, NAVIGATIONAL AIDS, AND OTHER AIRFIELD LIGHTING SHALL NOT BE DAMAGED, REMOVED, OR ALTERED DURING CONSTRUCTION.
2. THE VEHICLE SERVICE ROAD MUST REMAIN OPEN AND ACCESSIBLE BY AIRPORT OPERATIONS DURING CONSTRUCTION.

DEMOLITION PLAN
SCALE: 1"=40'

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
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HAWAII U.S.A.

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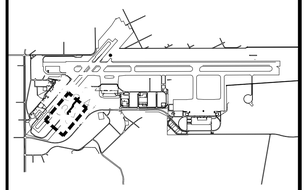
RF	RF	CD	NF

KEY PLAN / NOTES:



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DATE

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

DEMOLITION PLAN

DATE :	DWG. NO.
SEPTEMBER 2021	C-12
SHEET :	
22 OF 48 SHEETS	

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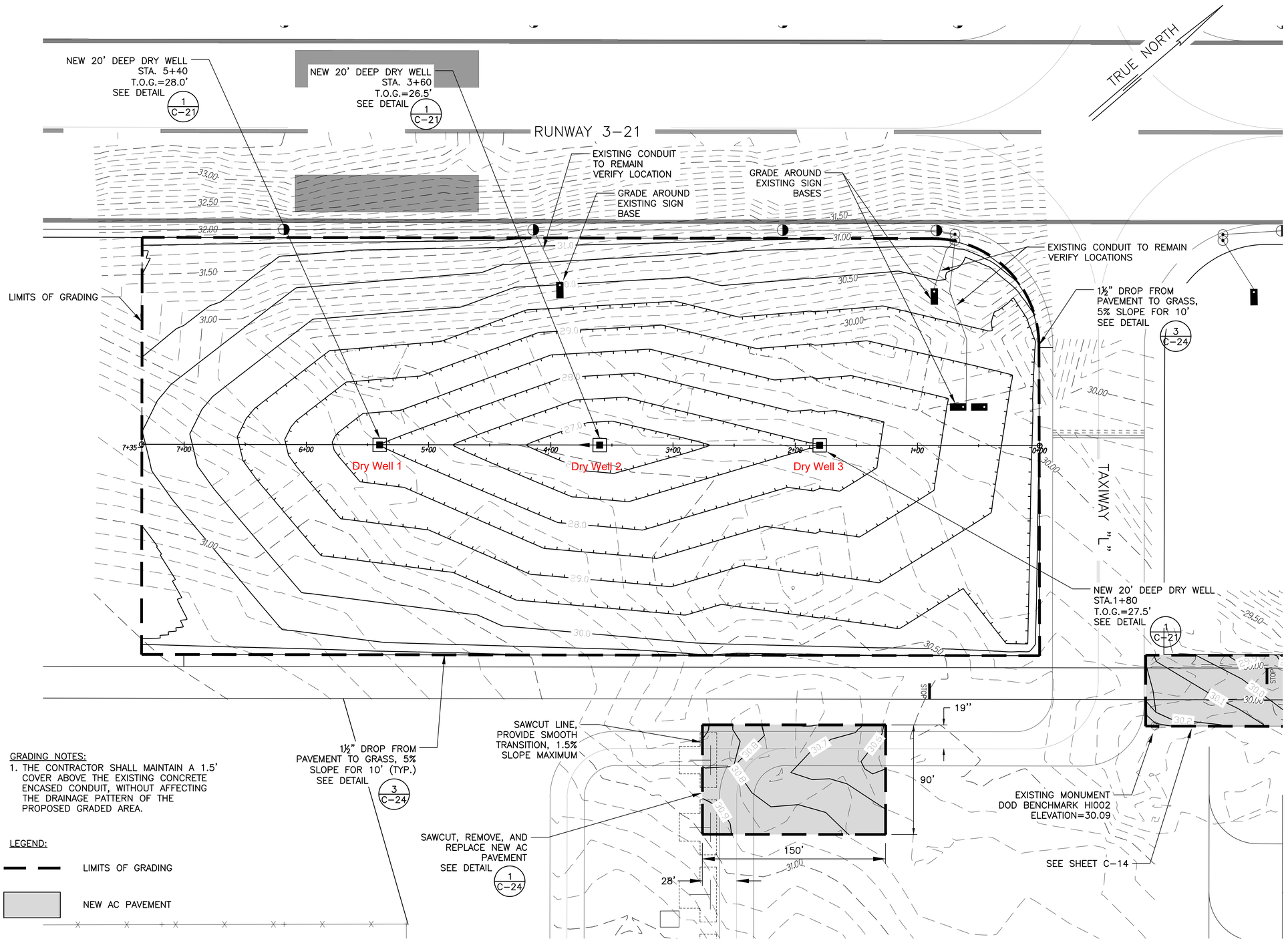

GRADING NOTES:

1. THE CONTRACTOR SHALL MAINTAIN A 1.5' COVER ABOVE THE EXISTING CONCRETE ENCASED CONDUIT, WITHOUT AFFECTING THE DRAINAGE PATTERN OF THE PROPOSED GRADED AREA.

LEGEND:

LIMITS OF GRADING

NEW AC PAVEMENT

GRADING PLAN – ARMY NATIONAL GUARD AVIATION RAMP

SCALE: 1"=40'

GRAPHIC SCALE 1"=40'

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
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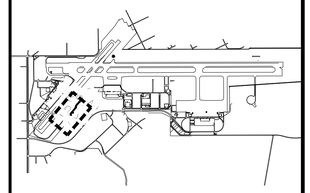

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AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

GRADING PLAN 1

DATE :	DWG. NO.
SEPTEMBER 2021	C-13
SHEET :	
23 OF 48 SHEETS	

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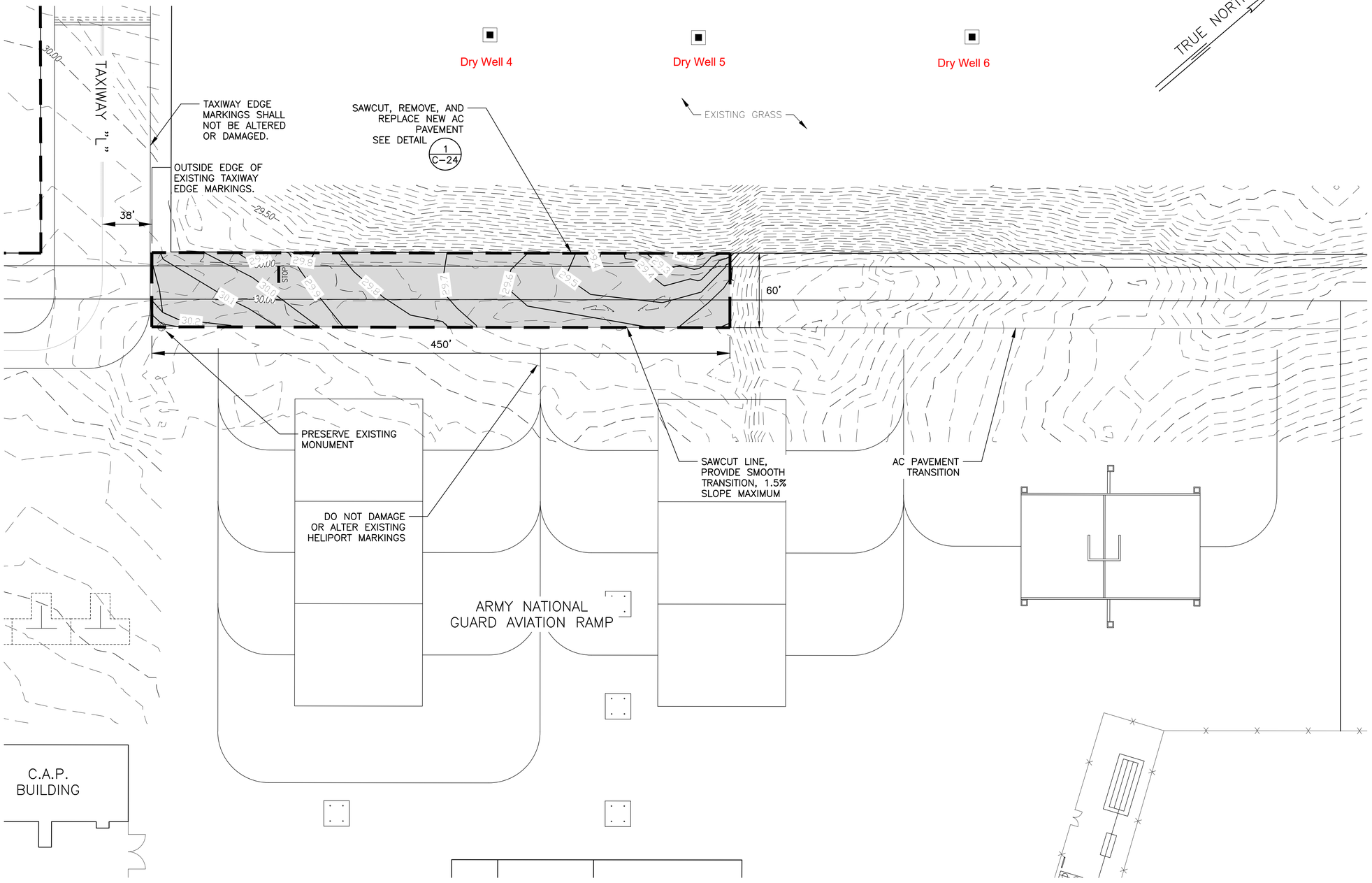
DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDIA
01562-64
OCTOBER 2022



NOTES:
1. AIRFIELD STRIPING AFFECTED BY THE DRY WELL INSTALLATION SHALL BE RESTRIPED IN ACCORDANCE WITH SPECIFICATION SECTION 02620 – RUNWAY AND TAXIWAY MARKINGS.

DRAINAGE IMPROVEMENTS PLAN
SCALE: 1"=40'

LEGEND:
LIMITS OF GRADING
NEW AC PAVEMENT

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

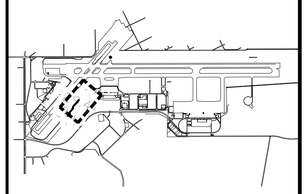
NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C
HAWAII U.S.A.

This work was prepared by me or under my supervision.
Exp. 04-30-22

Wesley R. Segawa & Associates, Inc.

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

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OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

GRADING PLAN 2

DATE :	DWG. NO.
SEPTEMBER 2021	C-14
SHEET :	
24 OF 48 SHEETS	

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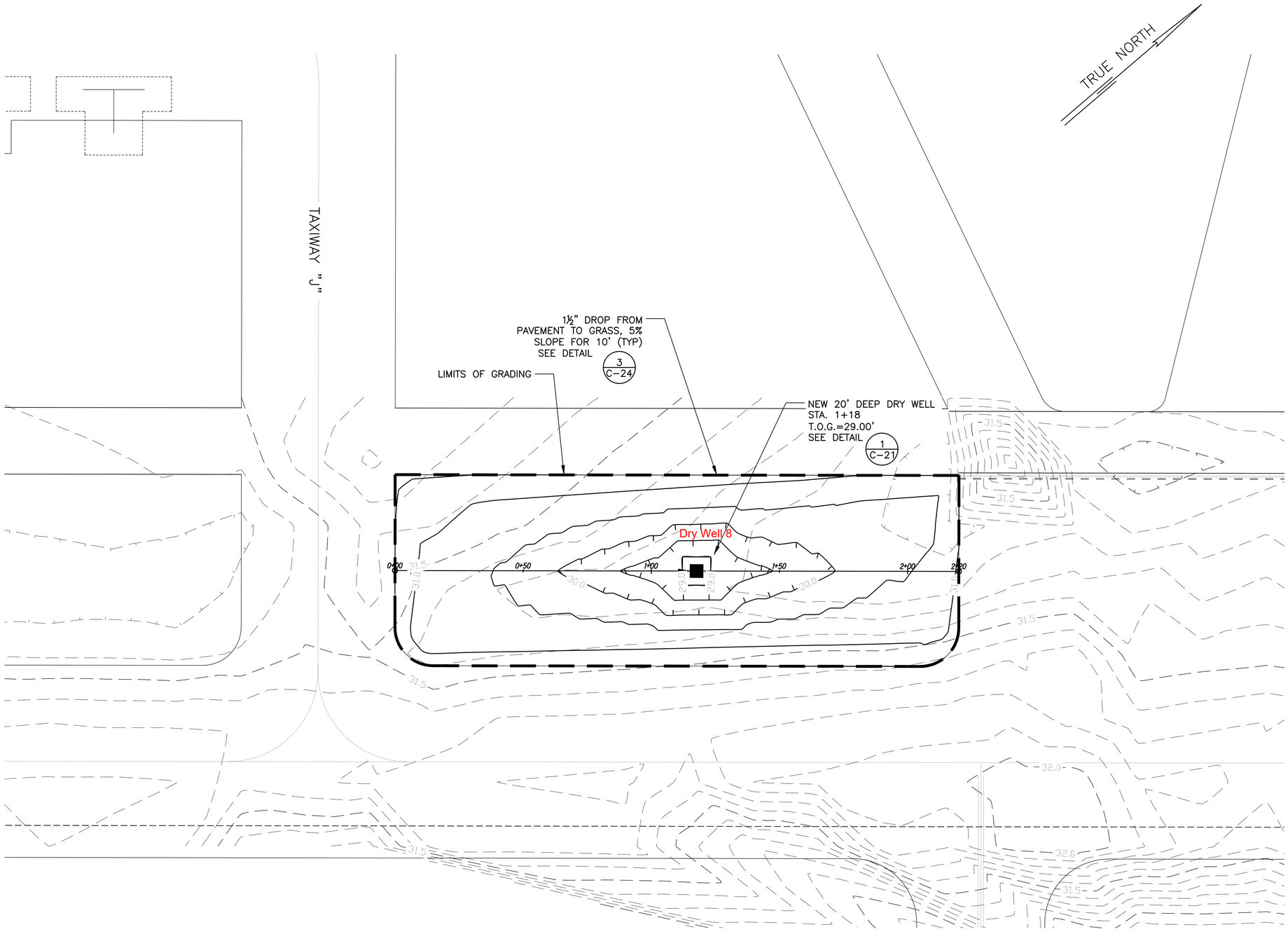

GRADING PLAN – TAXIWAY "I" & TAXIWAY "C"
SCALE: 1"=20'

20' 0 20' 40'
GRAPHIC SCALE 1"=20'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
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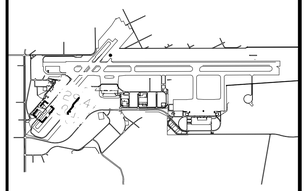

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DATE

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

GRADING PLAN 3

DATE :	DWG. NO.
SEPTEMBER 2021	C-15
SHEET :	
25 OF 48 SHEETS	

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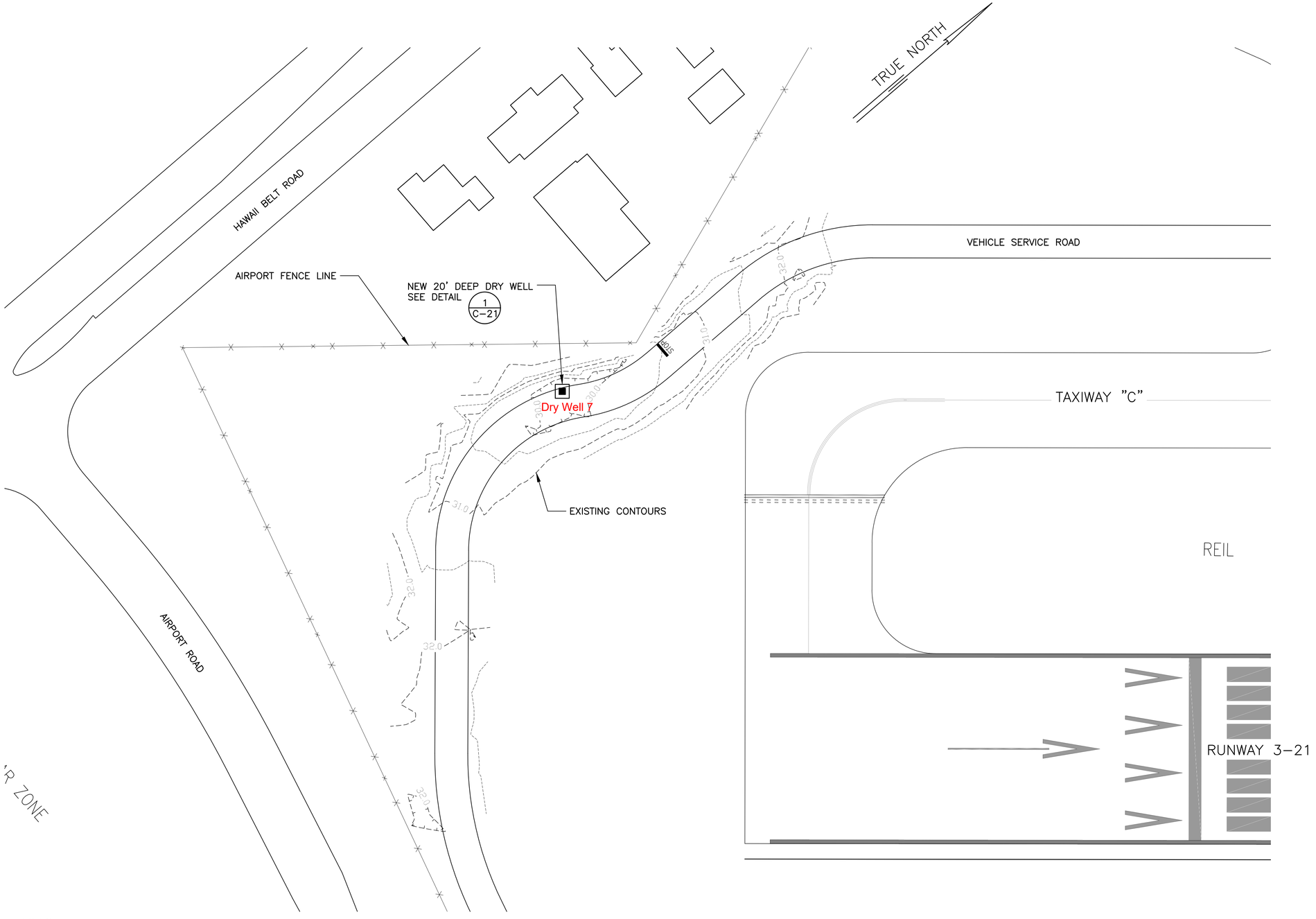
DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDIA
01562-66
OCTOBER 2022



NOTES:
1. CONTOURS SHOWN ARE EXISTING CONDITIONS. THE CONTRACTOR MUST VERIFY THE DRAINAGE LOW POINT PRIOR TO THE INSTALLATION OF THE DRY WELL.

VEHICLE SERVICE ROAD DRAINAGE PLAN
SCALE: 1"=40'

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

STATE OF HAWAII 1959

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DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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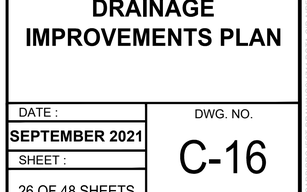

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

DRAINAGE IMPROVEMENTS PLAN

DATE :	DWG. NO.
SEPTEMBER 2021	C-16
SHEET :	
26 OF 48 SHEETS	

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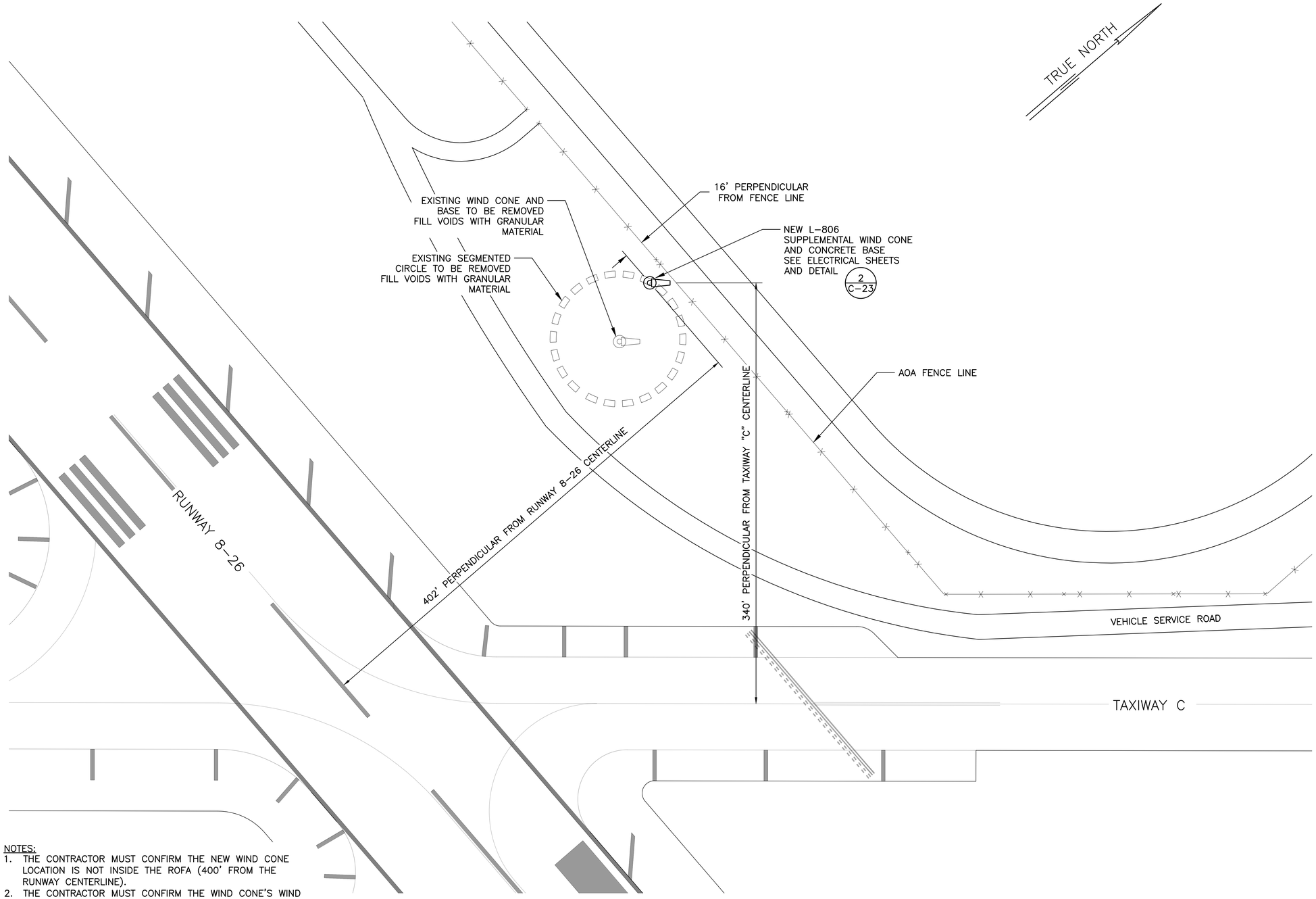

NOTES:
1. THE CONTRACTOR MUST CONFIRM THE NEW WIND CONE LOCATION IS NOT INSIDE THE ROFA (400' FROM THE RUNWAY CENTERLINE).
2. THE CONTRACTOR MUST CONFIRM THE WIND CONE'S WIND SOCK HAS A 4' MINIMUM CLEARANCE FROM THE AOA FENCE LINE.
3. THE CONTRACTOR MUST VERIFY THAT THE RUNWAY 8 WIND CONE IS CONNECTED TO THE RUNWAY 8-26 EDGE LIGHT SYSTEM. OUTAGES OF THE RUNWAY 8-26 EDGE LIGHTS MUST BE COORDINATED WITH ITO.

RUNWAY 8 END WIND CONE REPLACEMENT PLAN
SCALE: 1"=40'

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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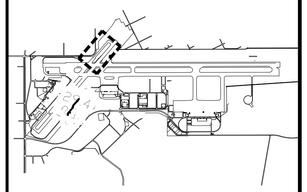
KEY PLAN / NOTES:



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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

WIND CONE REPLACEMENT PLAN 1

DATE :	DWG. NO.
SEPTEMBER 2021	C-17
SHEET :	
27 OF 48 SHEETS	

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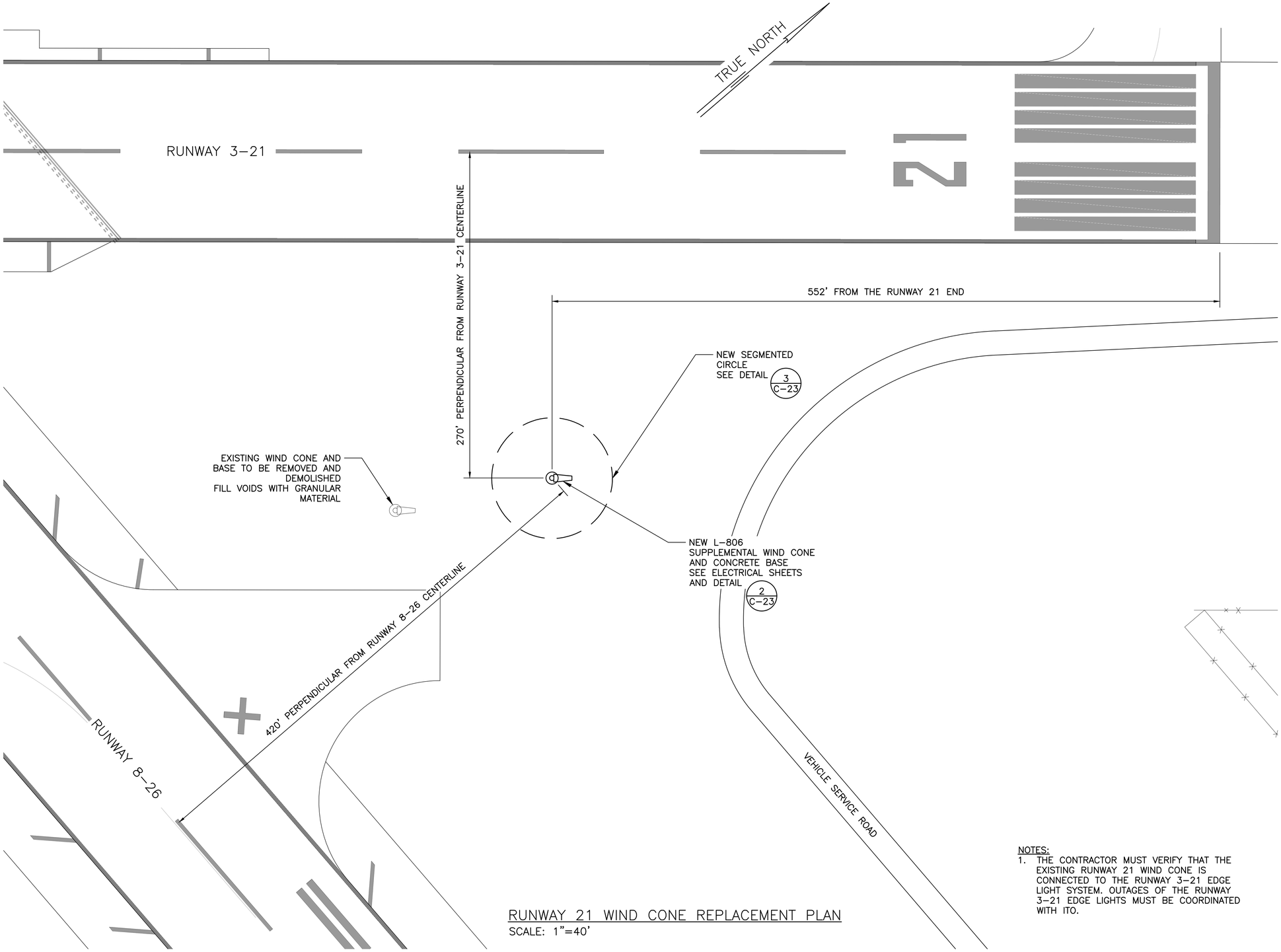

RUNWAY 21 WIND CONE REPLACEMENT PLAN
SCALE: 1"=40'

NOTES:
1. THE CONTRACTOR MUST VERIFY THAT THE EXISTING RUNWAY 21 WIND CONE IS CONNECTED TO THE RUNWAY 3–21 EDGE LIGHT SYSTEM. OUTAGES OF THE RUNWAY 3–21 EDGE LIGHTS MUST BE COORDINATED WITH ITO.

40' 0 40' 80'
GRAPHIC SCALE 1"=40'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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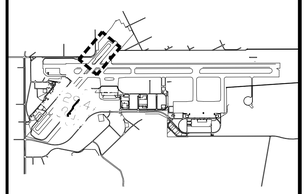

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AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

WIND CONE REPLACEMENT PLAN 2

DATE :	DWG. NO.
SEPTEMBER 2021	C-18
SHEET :	
28 OF 48 SHEETS	

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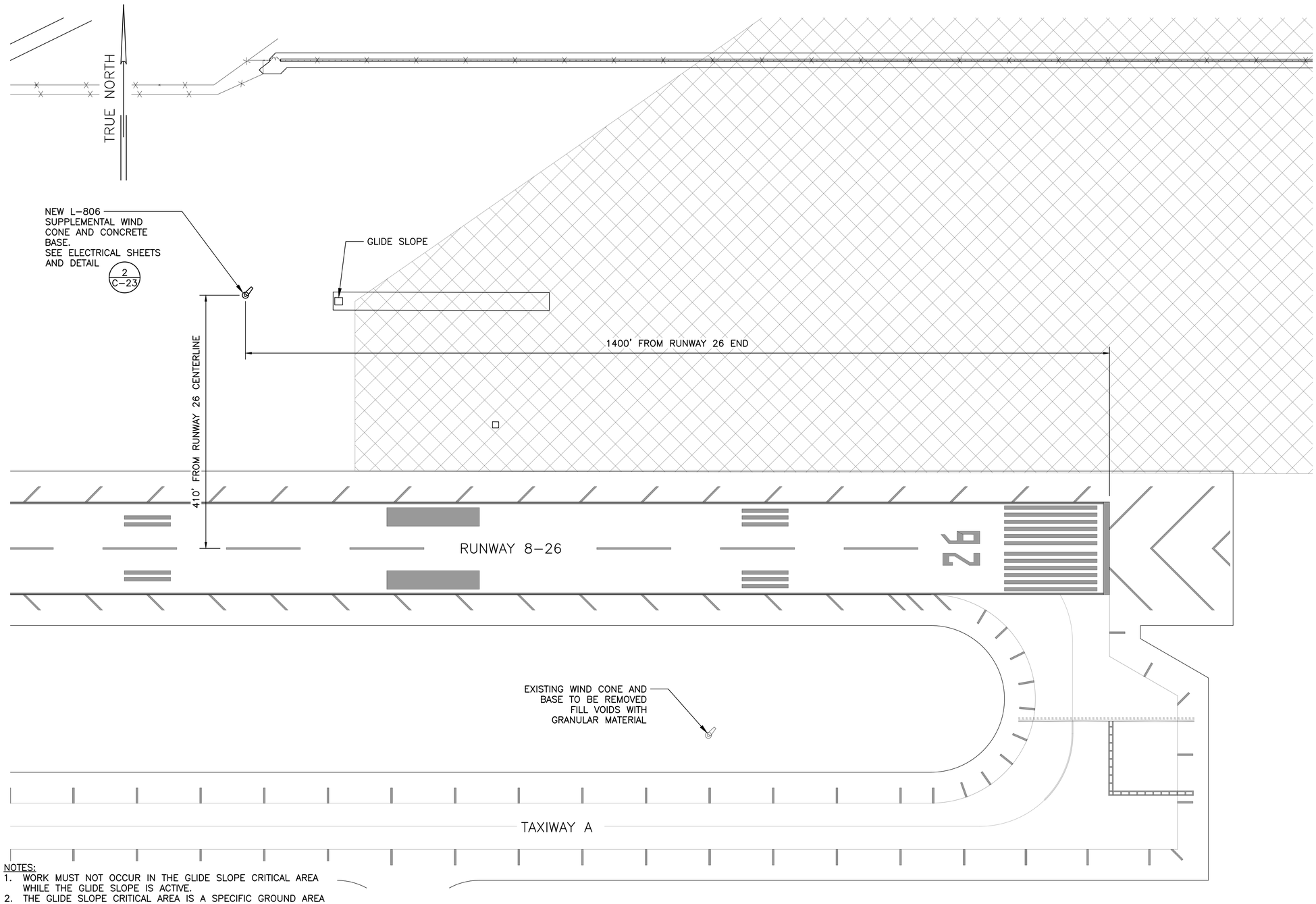

NOTES:
1. WORK MUST NOT OCCUR IN THE GLIDE SLOPE CRITICAL AREA WHILE THE GLIDE SLOPE IS ACTIVE.
2. THE GLIDE SLOPE CRITICAL AREA IS A SPECIFIC GROUND AREA WHICH MUST BE PROTECTED FROM AIRCRAFT AND VEHICLE PARKING AND THE UNLIMITED MOVEMENT OF SURFACE AND AIR TRAFFIC, TO ENSURE THE CONTINUOUS INTEGRITY OF THE SIGNAL RECEIVED BY THE USER AIRCRAFT.
3. THE GLIDE SLOPE IS OWNED AND OPERATED BY THE FAA SSC. SSC MUST BE COORDINATED WITH PRIOR TO THE START OF WORK TO SHUTDOWN THE GLIDE SLOPE.

RUNWAY 26 END WIND CONE REPLACEMENT PLAN
SCALE: 1"=80'

LEGEND:
GLIDE SLOPE CRITICAL AREA:

80' 0 80' 160'
GRAPHIC SCALE 1"=80'

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STATE OF HAWAII

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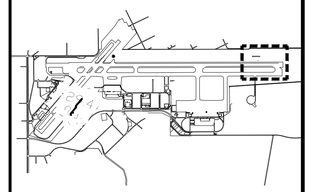

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AT
HILO INTERNATIONAL AIRPORT
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AH1021-20

SHEET TITLE:

WIND CONE REPLACEMENT PLAN 3

DATE :	DWG. NO.
SEPTEMBER 2021	C-19
SHEET :	
29 OF 48 SHEETS	

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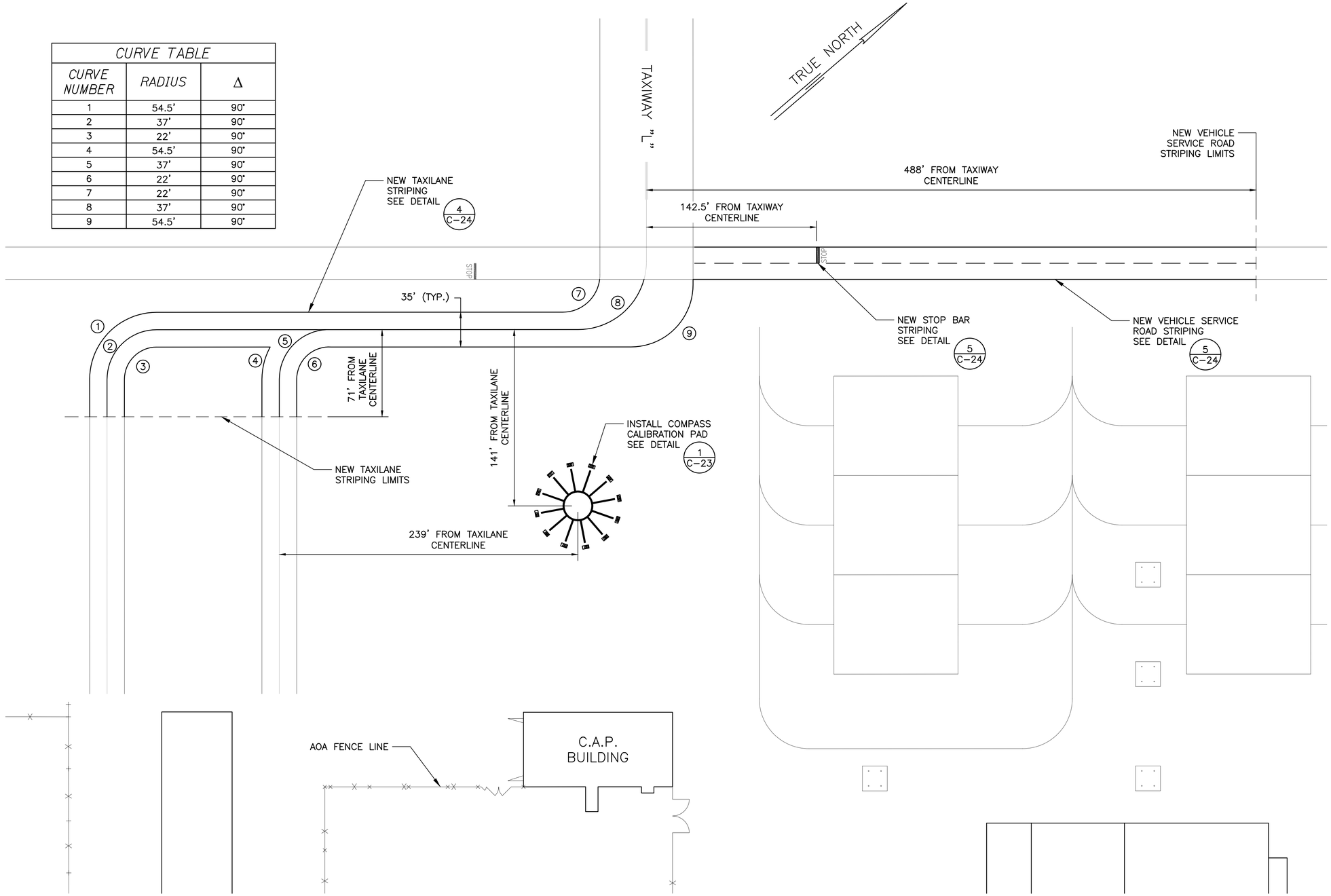
CURVE TABLE		
CURVE NUMBER	RADIUS	Δ
1	54.5'	90°
2	37'	90°
3	22'	90°
4	54.5'	90°
5	37'	90°
6	22'	90°
7	22'	90°
8	37'	90°
9	54.5'	90°



STRIPING PLAN
SCALE: 1"=40'

50' 0 25' 50'
GRAPHIC SCALE 1"=50'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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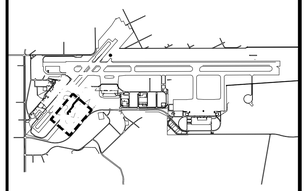

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

STRIPING PLAN

DATE :	DWG. NO.
SEPTEMBER 2021	C-20
SHEET :	
30 OF 48 SHEETS	

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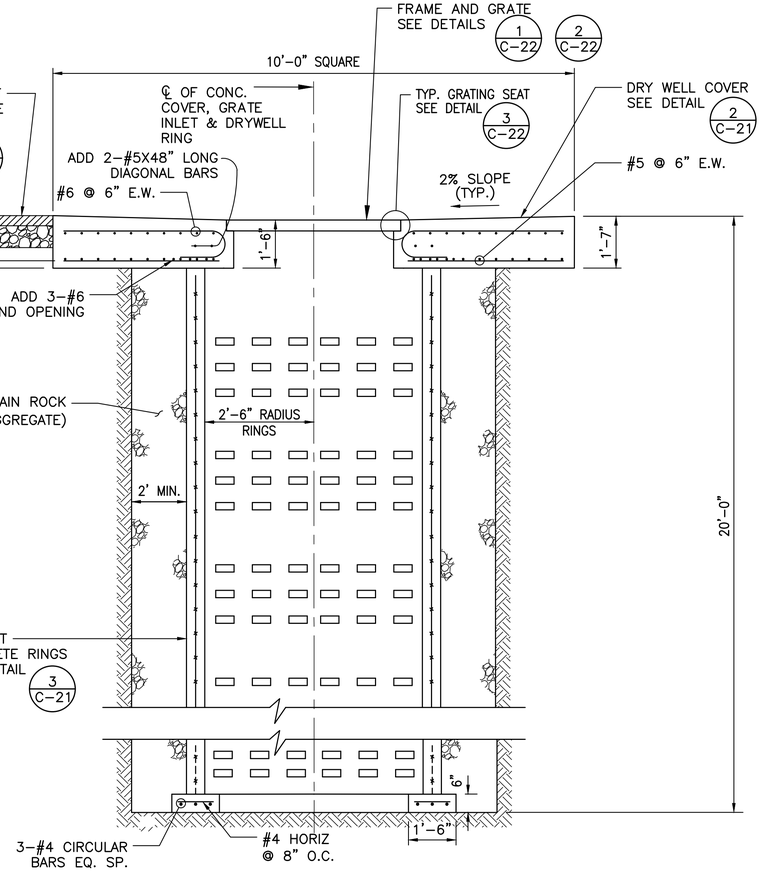
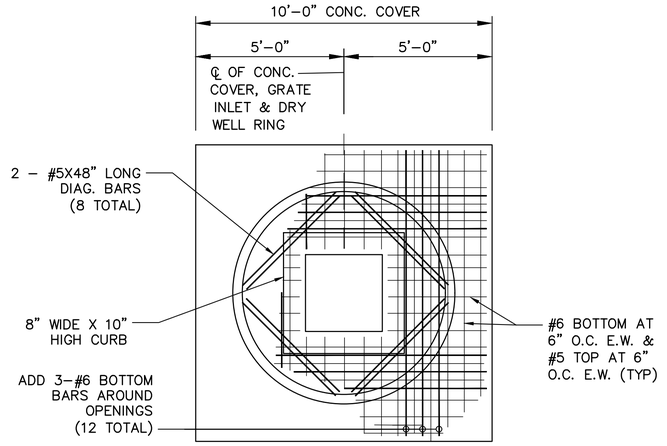
DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDIA
01562-71
OCTOBER 2022

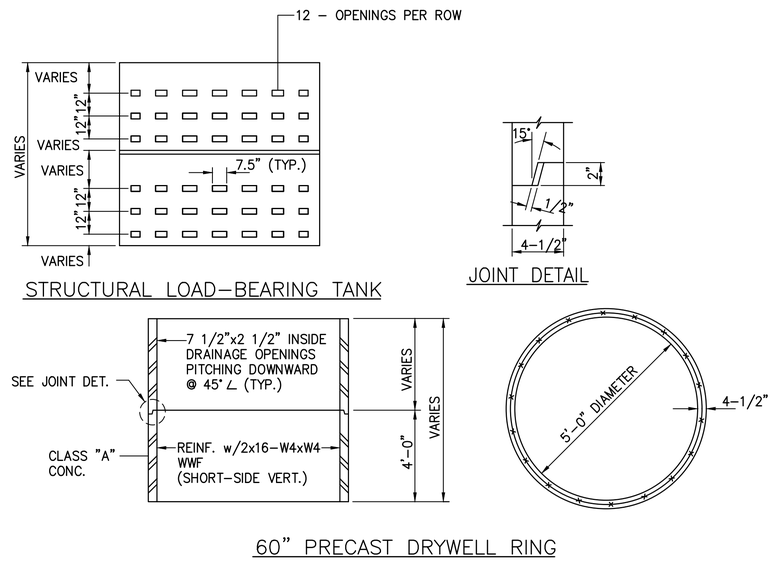


1 C-21 20' DEEP DRY WELL SECTION
SCALE: NOT TO SCALE



2 C-21 TYPICAL DRY WELL COVER DETAIL
SCALE: NOT TO SCALE

NOTES:
1. BACKFILL WITH #4 CRUSHED ROCK (1 1/2").
2. CONCRETE FOR COVER SHALL BE 4000 PSI, 28 DAY COMPRESSIVE STRENGTH.
3. ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A-615, GRADE 60. BENDS & HOOKS SHALL BE TO FAR FACE OF INTERSECTING WALL OR SLAB.
4. CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOW, UNLESS NOTED OTHERWISE:
   a) CONCRETE CAST AGAINST EARTH 3"
   b) CONCRETE EXPOSED TO EARTH 2"
   c) CONCRETE EXPOSED TO WEATHER 2"
5. CERTAIN DRY WELLS SHALL BE TESTED AS DESCRIBED IN THE UNDERGROUND INJECTION CONTROL (UIC) PERMIT APPLICATION. A GEOLOGIST, HIRED BY THE CONTRACTOR, SHALL WITNESS THE TESTING, PREPARE AND SUBMIT A REPORT TO THE DEPARTMENT OF HEALTH AS NECESSARY TO OBTAIN A PERMIT TO OPERATE THE DRY WELLS.
6. ONLY WATER SOLUBLE DRILLING LUBRICANTS ARE ALLOWED. NO CLAY OR OTHER DRILLING LUBRICANTS, WHICH HAVE THE POTENTIAL TO REDUCE PERMEABILITY, IS PERMITTED.
7. DEPENDING ON THE SOIL PROPERTIES, THE CONTRACTOR SHALL CONSULT WITH THE ENGINEER TO DETERMINE IF DRAIN RINGS SHALL BE INSTALLED.



3 C-21 TYPICAL PRECAST REIN. CONC. RING DETAILS
SCALE: NOT TO SCALE

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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HILO INTERNATIONAL AIRPORT
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AH1021-20

SHEET TITLE:

DRY WELL DETAILS 1

DATE :	DWG. NO.
SEPTEMBER 2021	C-21
SHEET :	
31 OF 48 SHEETS	

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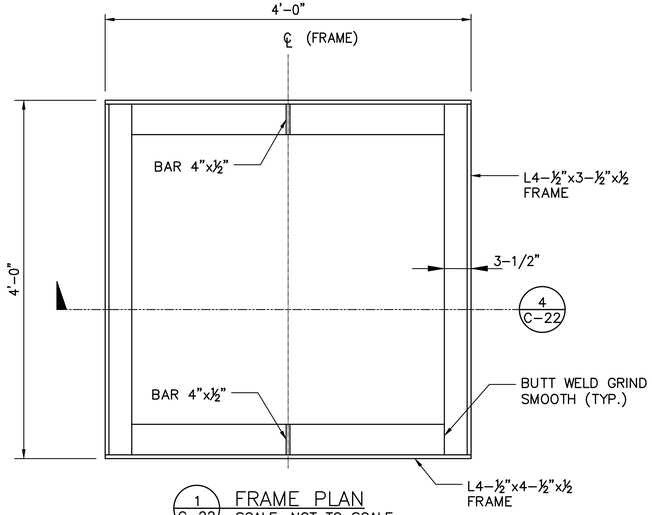
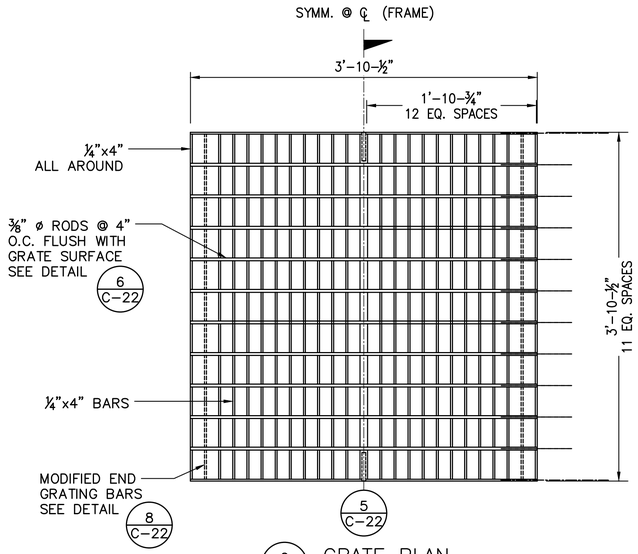
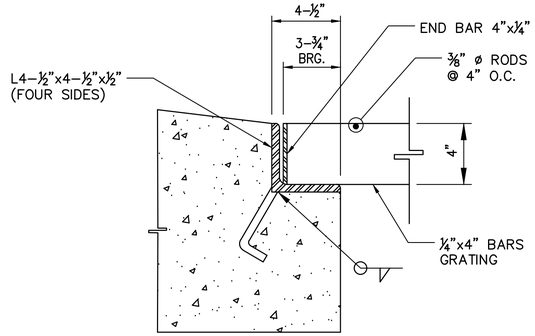


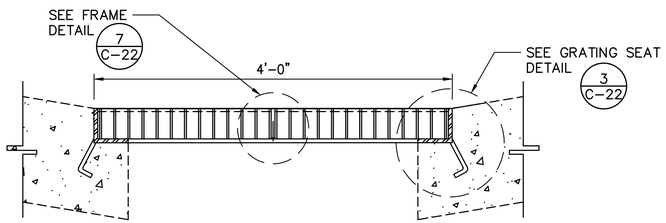
1 C-22 FRAME PLAN
SCALE: NOT TO SCALE



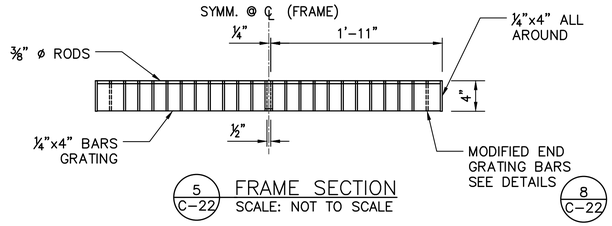
2 C-22 GRATE PLAN
SCALE: NOT TO SCALE



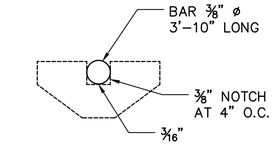
3 C-22 GRATE SEAT DETAIL
SCALE: NOT TO SCALE



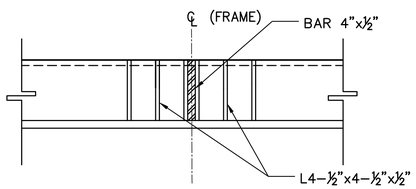
4 C-22 FRAME SECTION
SCALE: NOT TO SCALE



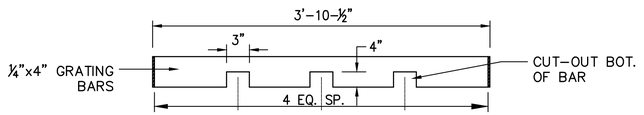
5 C-22 FRAME SECTION
SCALE: NOT TO SCALE



6 C-22 NOTCH DETAIL
SCALE: NOT TO SCALE



7 C-22 FRAME DETAIL
SCALE: NOT TO SCALE



8 C-22 MODIFIED END GRATING BARS DETAIL
SCALE: NOT TO SCALE

NOTES:

1. GRATING SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123.
2. ALL STEEL SHALL BE STRUCTURAL GRADE (ASTM A36 MIN.)
3. ALL WELDS 5/16" UNLESS OTHERWISE NOTED. GRIND SMOOTH ALL EXPOSED WELDS.
4. ALL WELDING SHALL BE IN ACCORDANCE WITH CURRENT EDITION OF REINF. STEEL WELDING CODE AWS D1.4.

STATE OF HAWAII 1859

Airports Division
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STATE OF HAWAII

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KEY PLAN / NOTES:

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OCTOBER 1, 2021
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AT
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SOUTH HILO, HAWAII

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SHEET TITLE:

DRY WELL DETAILS 2

DATE :	DWG. NO.
SEPTEMBER 2021	C-22
SHEET :	
32 OF 48 SHEETS	

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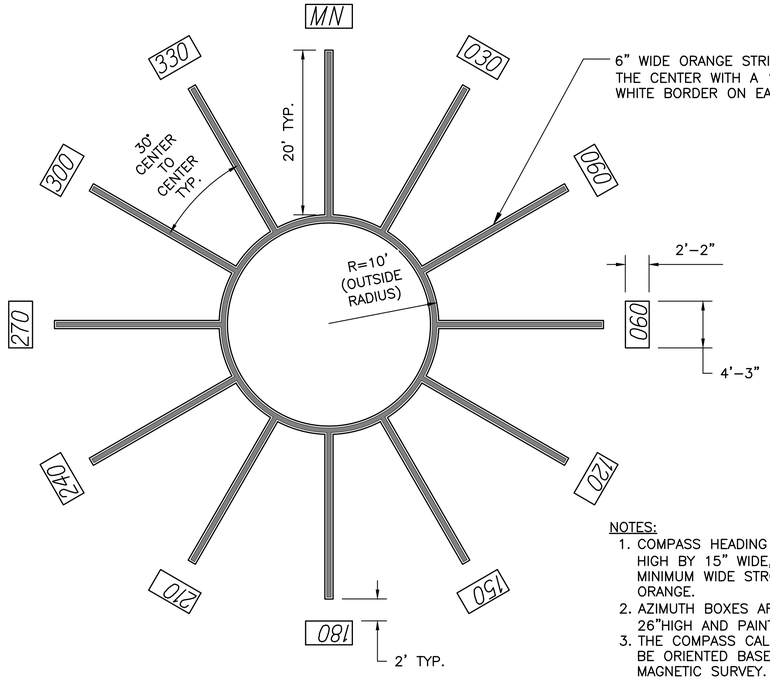
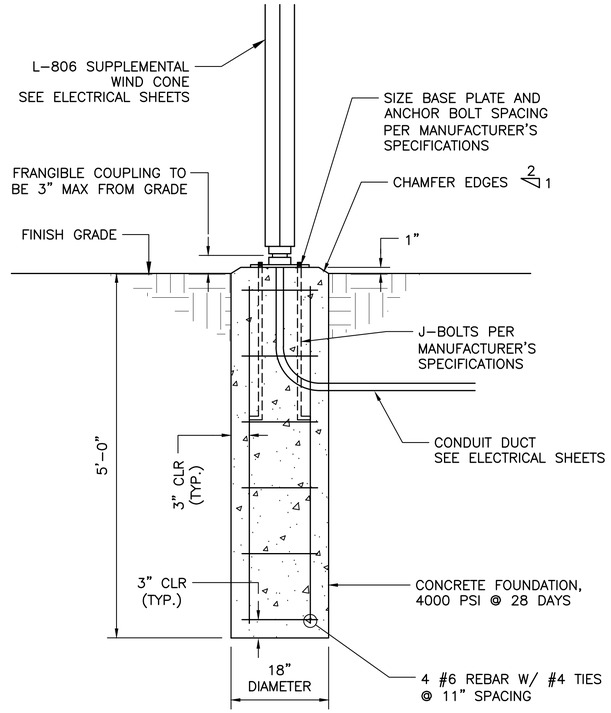
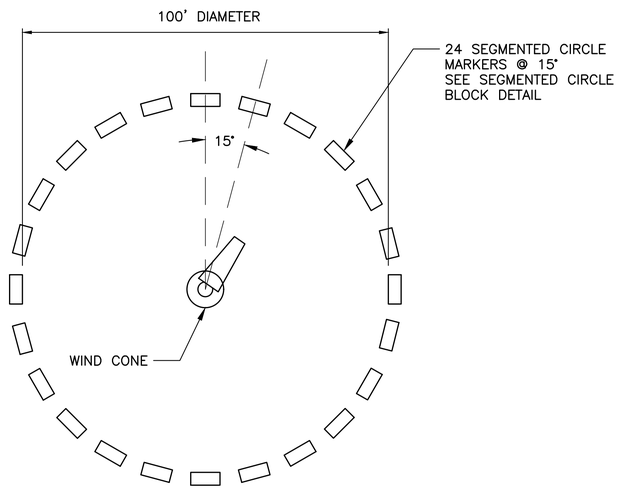


NOTES:
1. COMPASS HEADING CHARACTERS ARE 24" HIGH BY 15" WIDE, WITH A 3.5" MINIMUM WIDE STROKE AND PAINTED ORANGE.
2. AZIMUTH BOXES ARE 51" WIDE BY 26"HIGH AND PAINTED WHITE.
3. THE COMPASS CALIBRATION PAD SHALL BE ORIENTED BASED ON THE APPROVED MAGNETIC SURVEY.

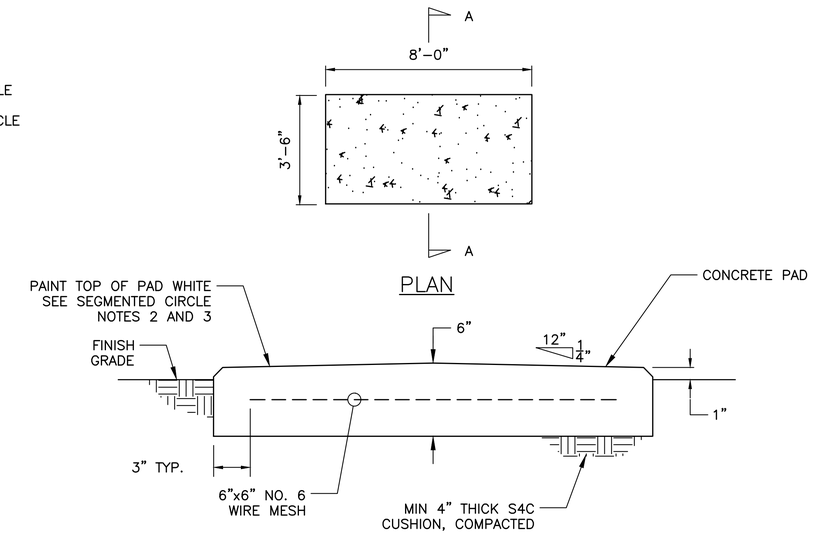
1 C-23 COMPASS CALIBRATION PAD DETAIL
SCALE: NOT TO SCALE



2 C-23 SUPPLEMENTAL WIND CONE FOUNDATION DETAIL
SCALE: NOT TO SCALE



3 C-23 SEGMENTED CIRCLE DETAIL
SCALE: NOT TO SCALE



SECTION "A-A"

4 C-23 SEGMENTED CIRCLE BLOCK DETAIL
SCALE: NOT TO SCALE

SEGMENTED CIRCLE NOTES:

1. THE LOCATION OF THE DEMOLSIHED SEGMENTED CIRCLE SHALL BE FILLED AND MADE LEVEL WITH THE EXISTING AREA.
2. TOPS OF SEGMENTED CIRCLE BLOCKS SHALL BE PAINTED WHITE WITH 1 PRIME COAT & 2 FINISH COATS.
3. PAINT SHALL BE WHITE, CONFORMING TO FEDERAL SPECIFICATION TT-P-952A (ACRYLIC EMULSION) EQUAL TO OIL PAINT, AS AMENDED. REFLECTIVE MEDIA SHALL NOT BE USED IN THE PAINT. PREPARATION AND APPLICATION SHALL BE IN ACCORDANCE WITH THE PAINT MANUFACTURER'S RECOMMENDATIONS.
4. THE AREA AROUND THE SEGMENTED CIRCLE SHALL BE CLEARED OF DEBRIS AND VEGETATION SHALL BE TRIMMED SO THE SEGMENTED CIRCLE MAY BE CLEARLY SEEN FROM THE AIR.
5. THE FURNISHING AND INSTALLATION OF THE SEGMENTED CIRCLE SHALL MEET ALL REQUIREMENTS SPECIFIED IN FAA AC 150/5340-5, SEGMENTED CIRCLE AIRPORT MARKER SYSTEM.
6. SEGMENTED CIRCLE BLOCKS SHALL CONFORM TO SPECIFICATION SECTION 03300 – CONCRETE FOR MISCELLANEOUS STRUCTURES.

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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Exp. 04-30-22

Wesley R. Segawa & Associates, Inc.

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:

NO.	DATE	REVISIONS

90% DESIGN SUBMITTAL
OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

NAVAID DETAILS

DATE :	DWG. NO.
SEPTEMBER 2021	C-23
SHEET :	
33 OF 48 SHEETS	

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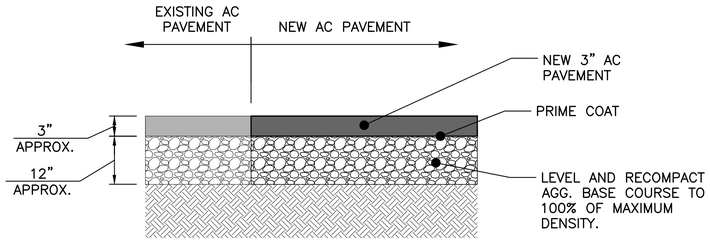
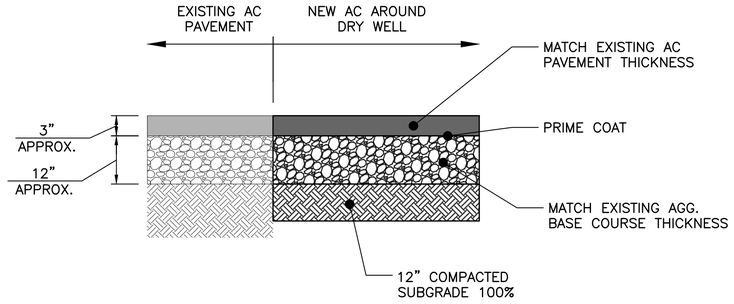
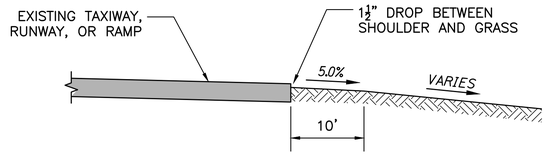


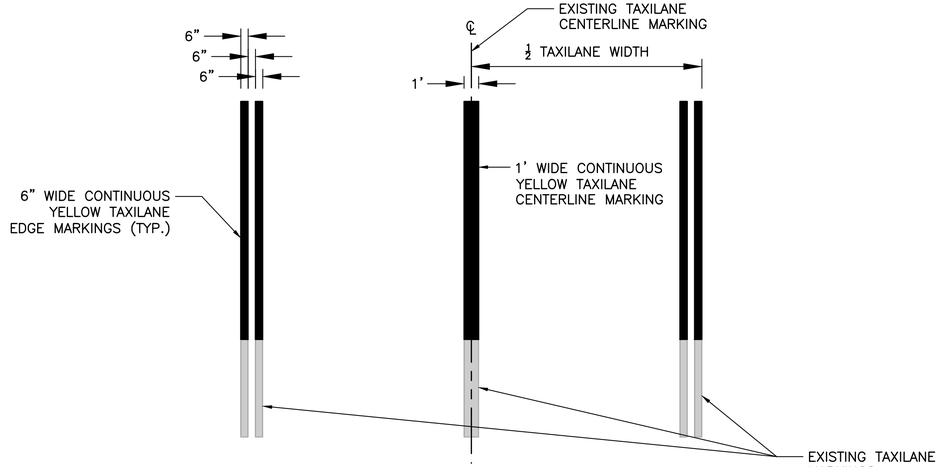
1 C-24 AC PAVEMENT
SCALE: NOT TO SCALE



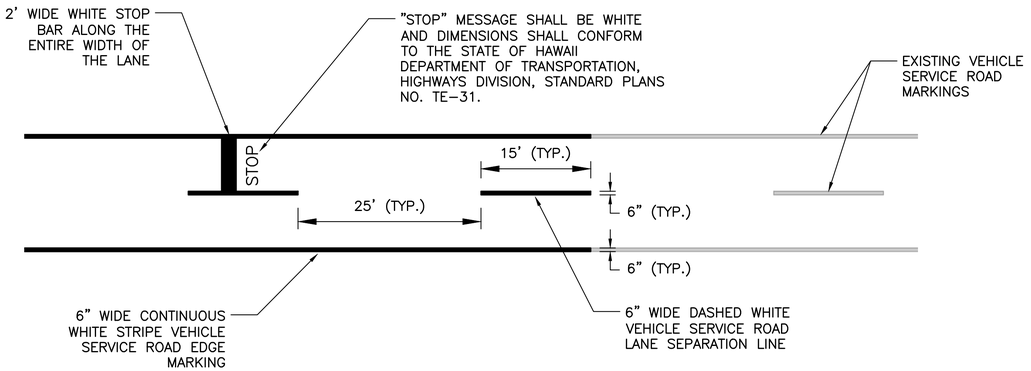
2 C-24 DRY WELL AC SECTION
SCALE: NOT TO SCALE



3 C-24 PAVEMENT DROP SECTION
SCALE: NOT TO SCALE



4 C-24 TAXILANE PAVEMENT MARKINGS
SCALE: NOT TO SCALE



5 C-24 VEHICLE SERVICE ROAD PAVEMENT MARKINGS
SCALE: NOT TO SCALE

PAVEMENT MARKING NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE LAID OUT BY A LICENSED SURVEYOR WITH SUFFICIENT REFERENCE POINTS. DETAILS FOR NEW PAVEMENT MARKINGS SHLL BE IN ACCORDANCE WITH FAA ADVISORY CIRCULAR 140/5340-1M (OR CURRENT EDITION) "STANDARDS FOR AIRPORT MARKINGS".
2. THE CONTRACTOR SHALL NOT DISCARD ANY EXCESS PAINT ON EXISTING PAVEMENT MARKINGS, INCLUDING PERFORMING TEST SPRAYS ON THE EXISTING MARKINGS, SPRAYING EXISTING MARKINGS TO CLEAN PAINT GUNS, AND PAINTING ADDED MARKINGS TO AVOID REQUIRED PAINT CLEAN UP. THE CONTRACTOR SHALL POSSESS TRAPS FOR EXCESS SPRAYING AND TEST SPRAY, AND A WATERPROOF CONTAINER TO CAPTURE AND HOLD ALL PAINTING WASH WATER. ALL WASH WATER SHALL BE PROPERLY HAULED AND DISPOSED OFF AIRPORT PROPERTY DAILY.

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

PAVEMENT AND PAVEMENT MARKING DETAILS

DATE :
SEPTEMBER 2021
SHEET :
34 OF 48 SHEETS

DWG. NO.
C-24

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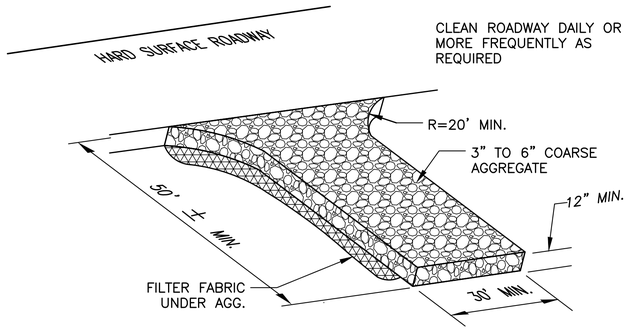
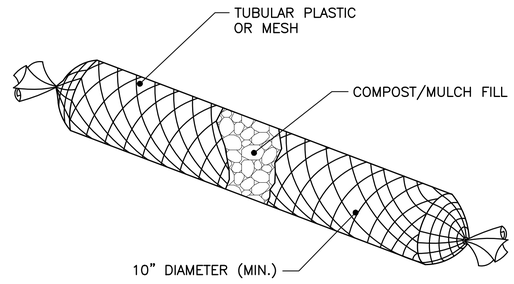


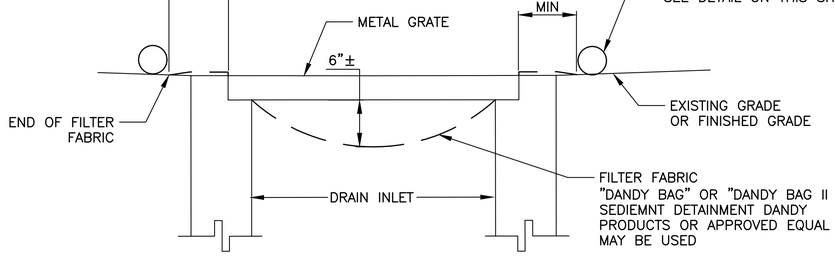
1 C-25 STABILIZED CONSTRUCTION ENTRANCE/EXIT
SCALE: NOT TO SCALE



2 C-25 FILTER SOCK DETAIL
SCALE: NOT TO SCALE

FILTER SOCK NOTES:

1. FILTER SOCK SHALL BE "BIOSOCK" COMPOST FILTER (BY ENVIROTECH BIOSOLUTIONS) OR PRE-APPROVED EQUAL. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
2. FILTER SOCK SHALL NOT CONTAIN BIOSOLIDS AND SHALL BE CONSISTENT WITH EPA GUIDELINES.
3. STAKING, WHERE REQUIRED, SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
4. MINIMUM OVERLAP SHALL BE 2' ON THE HORIZONTAL PLANE.



3 C-25 GRATED INLET AND MANHOLE FILTER DETAIL
SCALE: NOT TO SCALE

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

BMP DETAILS

DATE :	DWG. NO.
SEPTEMBER 2021	C-25
SHEET :	
35 OF 48 SHEETS	

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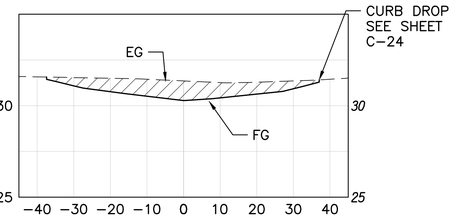
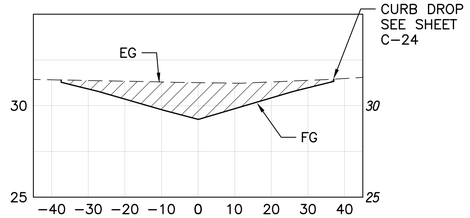


EXISTING ELEV.	31.58	31.54	31.50	31.45	31.35	31.26	31.28	31.36	31.44
PROPOSED ELEV.		31.08	30.77	30.52	30.28	30.43	30.63	30.93	

GENERAL AVIATION RAMP GRASS: STA. 0+50.00

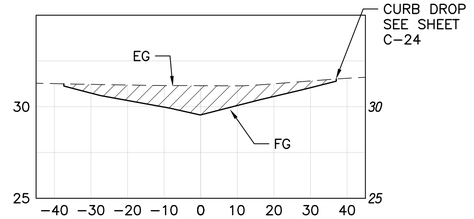
Material(s) at Station 0+50.00			
Material Name	Area	Volume	Cumulative Volume
Cut	51.33	47.53	47.53 CuYd
Fill	0.00	0.00	0.00 CuYd



EXISTING ELEV.	31.42	31.38	31.34	31.30	31.26	31.23	31.30	31.39	31.49
PROPOSED ELEV.		30.91	30.36	29.79	29.25	29.84	30.43	30.98	

GENERAL AVIATION RAMP GRASS: STA. 1+00.00

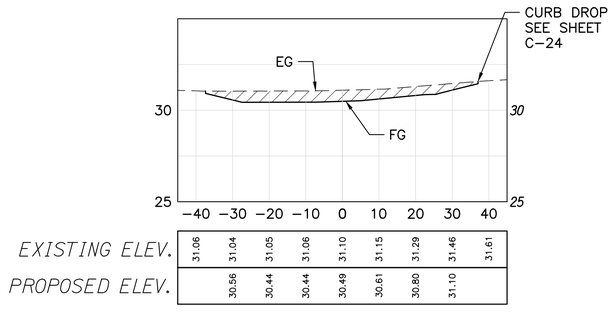
Material(s) at Station 1+00.00			
Material Name	Area	Volume	Cumulative Volume
Cut	75.77	117.69	165.22 CuYd
Fill	0.00	0.00	0.00 CuYd



EXISTING ELEV.	31.26	31.22	31.19	31.16	31.15	31.14	31.25	31.41	31.55
PROPOSED ELEV.		30.75	30.34	29.98	29.56	30.07	30.56	31.04	

GENERAL AVIATION RAMP GRASS: STA. 1+50.00

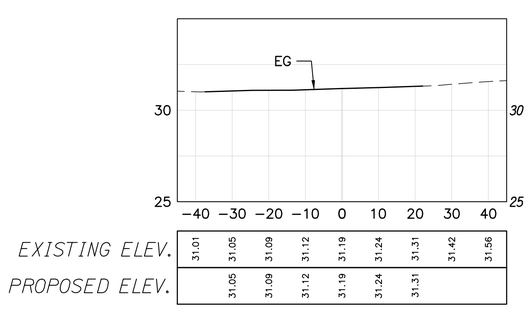
Material(s) at Station 1+50.00			
Material Name	Area	Volume	Cumulative Volume
Cut	62.04	127.61	292.83 CuYd
Fill	0.00	0.00	0.00 CuYd



EXISTING ELEV.	31.06	31.04	31.05	31.06	31.10	31.15	31.29	31.46	31.61
PROPOSED ELEV.		30.56	30.44	30.44	30.49	30.61	30.80	31.10	

GENERAL AVIATION RAMP GRASS: STA. 2+00.00

Material(s) at Station 2+00.00			
Material Name	Area	Volume	Cumulative Volume
Cut	37.76	92.41	385.24 CuYd
Fill	0.00	0.00	0.00 CuYd



EXISTING ELEV.	31.01	31.05	31.09	31.12	31.19	31.24	31.31	31.42	31.56
PROPOSED ELEV.		31.05	31.09	31.12	31.19	31.24	31.31		

GENERAL AVIATION RAMP GRASS: STA. 2+20.00

Material(s) at Station 2+20.00			
Material Name	Area	Volume	Cumulative Volume
Cut	0.00	13.99	399.22 CuYd
Fill	0.00	0.00	0.00 CuYd

4' 0 4' 8'
VERTICAL SCALE 1"=4'

20' 0 20' 40'
HORIZONTAL SCALE 1"=20'

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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KEY PLAN / NOTES:

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OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

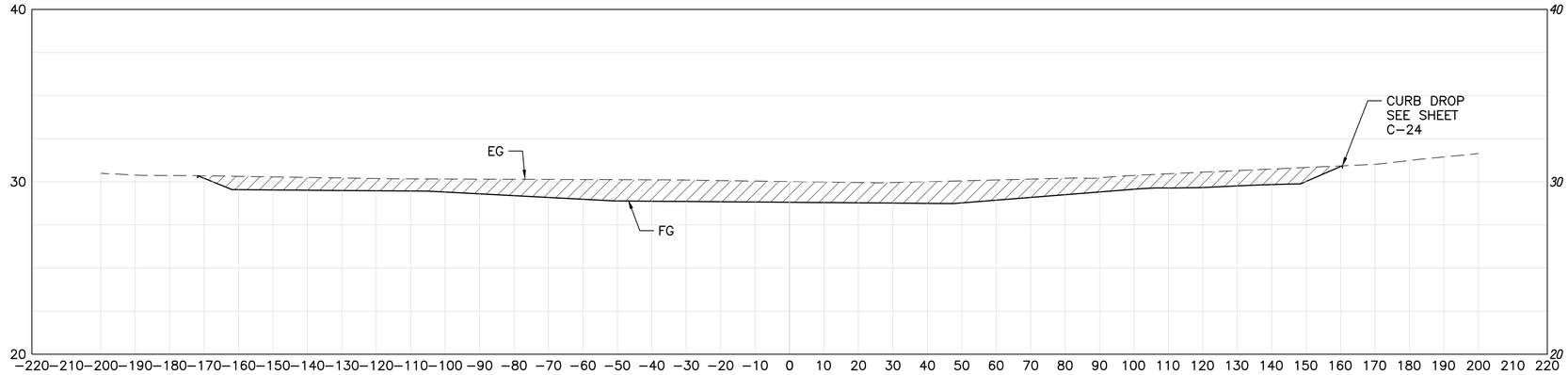
CROSS SECTIONS 1

DATE :	DWG. NO.
SEPTEMBER 2021	C-26
SHEET :	
36 OF 48 SHEETS	

H:\CAD\PROJECT DRAWINGS\1711 DOTA GIP AIRFIELD OPEN ENDHILOPONDING IMPROVEMENTS\DESIGN\TO - PONDING IMPROVEMENTS CROSS SECTIONS.DWG

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDIA
01562-77
OCTOBER 2022



PROPOSED ELEV.	30.49	30.39	30.37	30.35	30.32	30.29	30.25	30.22	30.19	30.17	30.16	30.15	30.15	30.14	30.13	30.12	30.11	30.10	30.07	30.04	30.01	29.99	29.96	29.95	30.00	30.06	30.11	30.16	30.21	30.23	30.37	30.47	30.56	30.65	30.74	30.83	30.92	31.01	31.24	31.44	31.64
PROPOSED ELEV.				30.20	29.54	29.53	29.51	29.50	29.48	29.46	29.40	29.30	29.19	29.09	28.98	28.89	28.87	28.86	28.84	28.83	28.81	28.80	28.78	28.77	28.75	28.78	28.93	29.09	29.25	29.41	29.57	29.64	29.66	29.76	29.84	30.02	30.88				

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 0+50.00

Material(s) at Station 0+50.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	319.53	296.17	296.17 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

PROPOSED ELEV.	30.54	30.56	30.56	30.52	30.50	30.46	30.41	30.37	30.32	30.30	30.29	30.28	30.27	30.26	30.25	30.24	30.23	30.22	30.19	30.15	30.11	30.07	30.04	30.00	29.99	29.97	29.96	29.95	29.93	29.95	30.06	30.17	30.27	30.38	30.49	30.62	30.76	30.91	31.12	31.34	31.57
PROPOSED ELEV.				30.36	29.64	29.60	29.49	29.39	29.28	29.18	29.07	28.97	28.86	28.76	28.66	28.55	28.45	28.35	28.34	28.32	28.31	28.29	28.28	28.27	28.43	28.59	28.75	28.91	29.07	29.22	29.38	29.54	29.70	29.86	30.02	30.17	30.32				

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 1+00.00

Material(s) at Station 1+00.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	395.88	662.41	958.59 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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SOUTH HILO, HAWAII

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SHEET TITLE:

CROSS SECTIONS 2

DATE :
SEPTEMBER 2021
SHEET :
37 OF 48 SHEETS

DWG. NO.
C-27

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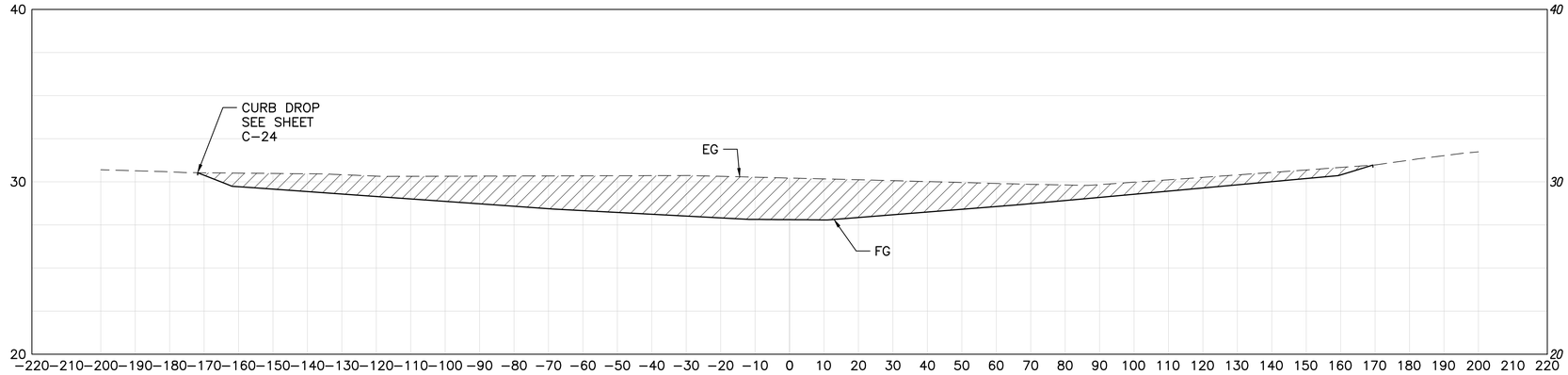

	PROPOSED ELEV.	PROPOSED ELEV.
−200	30.70	
−190	30.64	
−180	30.58	
−170	30.52	30.38
−160	30.50	29.71
−150	30.48	29.57
−140	30.46	29.43
−130	30.41	29.29
−120	30.33	29.15
−110	30.32	29.00
−100	30.32	28.86
−90	30.33	28.72
−80	30.34	28.58
−70	30.34	28.44
−60	30.35	28.33
−50	30.35	28.22
−40	30.36	28.12
−30	30.36	28.01
−20	30.32	27.91
−10	30.27	27.82
0	30.22	27.80
10	30.17	27.79
20	30.12	27.93
30	30.07	28.09
40	30.01	28.25
50	29.96	28.40
60	29.91	28.56
70	29.85	28.73
80	29.82	28.91
90	29.83	29.09
100	29.98	29.28
110	30.12	29.46
120	30.26	29.64
130	30.40	29.82
140	30.54	30.01
150	30.69	30.19
160	30.83	30.40
170	30.98	
180	31.26	
190	31.52	
200	31.74	

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 1+50.00

	PROPOSED ELEV.	PROPOSED ELEV.
−200	30.79	
−190	30.71	
−180	30.64	
−170	30.57	30.44
−160	30.50	29.81
−150	30.42	29.67
−140	30.31	29.52
−130	30.21	29.38
−120	30.12	29.23
−110	30.12	29.09
−100	30.16	28.94
−90	30.20	28.80
−80	30.23	28.65
−70	30.27	28.50
−60	30.31	28.36
−50	30.35	28.21
−40	30.38	28.07
−30	30.42	27.92
−20	30.38	27.76
−10	30.34	27.58
0	30.29	27.39
10	30.24	27.61
20	30.19	27.84
30	30.14	28.04
40	30.10	28.22
50	30.06	28.41
60	30.02	28.60
70	29.98	28.78
80	29.94	28.97
90	29.96	29.15
100	30.10	29.34
110	30.24	29.52
120	30.38	29.71
130	30.51	29.89
140	30.65	30.08
150	30.78	30.26
160	30.92	30.48
170	31.05	
180	31.37	
190	31.69	
200	31.94	

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 2+00.00

Material(s) at Station 2+00.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	475.05	877.31	2639.91 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

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NO.	DATE	REVISIONS

90% DESIGN SUBMITTAL

OCTOBER 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

**AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII**

PROJECT NO.:

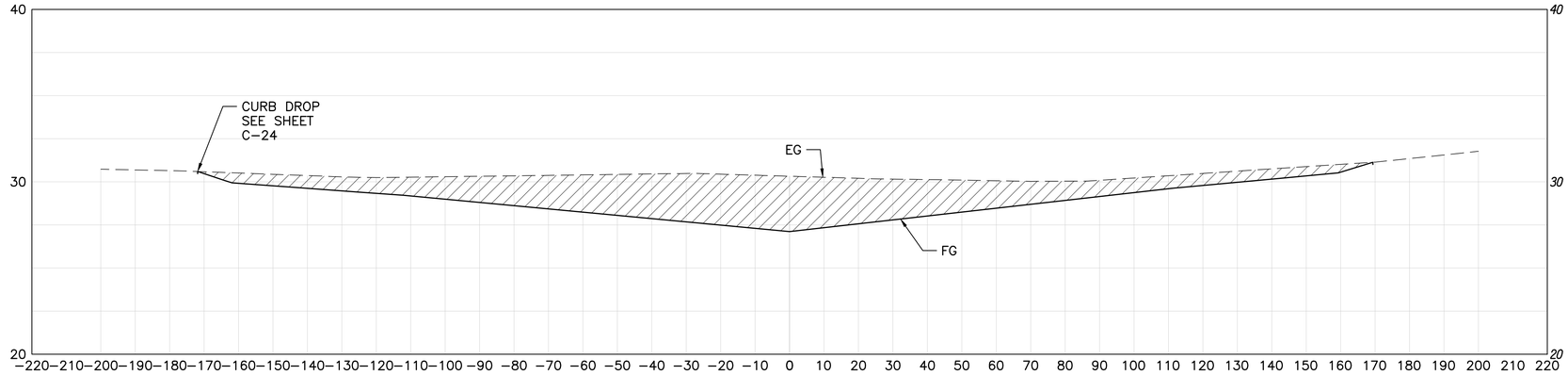
AH1021-20

SHEET TITLE:

CROSS SECTIONS 2

DATE :
SEPTEMBER 2021
SHEET :
37 OF 48 SHEETS

DWG. NO.
C-27



	−200	−190	−180	−170	−160	−150	−140	−130	−120	−110	−100	−90	−80	−70	−60	−50	−40	−30	−20	−10	0
PROPOSED ELEV.	30.73	30.69	30.65	30.58	30.51	30.44	30.36	30.29	30.24	30.27	30.29	30.32	30.35	30.37	30.40	30.43	30.46	30.48	30.44	30.38	30.32
PROPOSED ELEV.				30.47	29.91	29.77	29.62	29.47	29.33	29.18	28.99	28.80	28.61	28.42	28.24	28.05	27.86	27.67	27.49	27.30	27.11

	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
PROPOSED ELEV.	30.26	30.20	30.16	30.13	30.10	30.06	30.03	30.04	30.09	30.22	30.35	30.48	30.62	30.75	30.88	31.01	31.14	31.35	31.55	31.77
PROPOSED ELEV.	27.34	27.56	27.79	28.01	28.24	28.47	28.69	28.92	29.14	29.37	29.60	29.79	29.97	30.16	30.34	30.56				

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 2+50.00

Material(s) at Station 2+50.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	520.63	921.92	3561.82 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

	−200	−190	−180	−170	−160	−150	−140	−130	−120	−110	−100	−90	−80	−70	−60	−50	−40	−30	−20	−10	0
PROPOSED ELEV.	30.60	30.62	30.64	30.64	30.60	30.56	30.52	30.48	30.45	30.48	30.49	30.49	30.50	30.50	30.50	30.51	30.51	30.52	30.47	30.40	30.34
PROPOSED ELEV.				30.53	29.99	29.77	29.54	29.32	29.09	28.90	28.71	28.52	28.33	28.15	27.96	27.77	27.58	27.40	27.21	27.02	26.83

	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
PROPOSED ELEV.	30.27	30.21	30.25	30.20	30.11	30.10	30.09	30.12	30.18	30.31	30.45	30.58	30.72	30.85	30.98	31.11	31.24	31.45	31.66	31.86
PROPOSED ELEV.	27.06	27.29	27.51	27.74	27.96	28.19	28.41	28.64	28.87	29.09	29.32	29.56	29.82	30.09	30.35	30.64				

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 3+00.00

Material(s) at Station 3+00.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	622.95	1058.86	4620.69 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
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This work was prepared by me
or under my supervision.
Exp. 04–30–22

Wesley R. Segawa & Associates, Inc.

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:

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OCTOBER 1, 2021
DATE

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

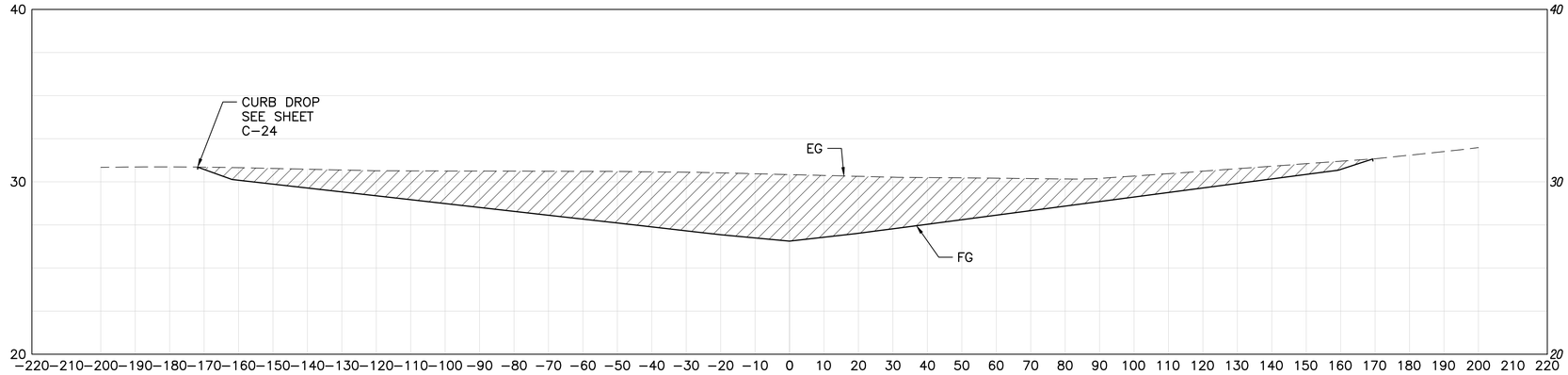
AH1021-20

SHEET TITLE:

CROSS SECTIONS 3

DATE :
SEPTEMBER 2021
SHEET :
38 OF 48 SHEETS

DWG. NO.
C-28



	−200	−190	−180	−170	−160	−150	−140	−130	−120	−110	−100	−90	−80	−70	−60	−50	−40	−30	−20	−10	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
PROPOSED ELEV.	30.84	30.86	30.86	30.85	30.82	30.78	30.73	30.68	30.64	30.63	30.63	30.62	30.62	30.61	30.61	30.60	30.58	30.56	30.52	30.47	30.42	30.37	30.32	30.27	30.25	30.23	30.21	30.19	30.16	30.20	30.34	30.47	30.61	30.76	30.90	31.05	31.19	31.34	31.54	31.75	31.99
PROPOSED ELEV.				30.72	30.09	29.87	29.64	29.41	29.19	28.96	28.74	28.51	28.29	28.06	27.83	27.61	27.38	27.16	26.93	26.74	26.56	26.78	27.01	27.27	27.54	27.80	28.06	28.33	28.59	28.85	29.11	29.38	29.64	29.90	30.17	30.43	30.72				

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 3+50.00

Material(s) at Station 3+50.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	675.72	1202.47	5823.16 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

	−200	−190	−180	−170	−160	−150	−140	−130	−120	−110	−100	−90	−80	−70	−60	−50	−40	−30	−20	−10	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
PROPOSED ELEV.	30.98	30.97	30.97	30.95	30.92	30.89	30.86	30.83	30.80	30.78	30.75	30.73	30.71	30.69	30.67	30.65	30.63	30.61	30.57	30.52	30.47	30.42	30.38	30.33	30.30	30.29	30.28	30.27	30.26	30.29	30.43	30.58	30.72	30.87	31.01	31.16	31.30	31.44	31.74	31.99	32.21
PROPOSED ELEV.				30.82	30.19	29.96	29.74	29.51	29.29	29.06	28.84	28.61	28.38	28.17	27.98	27.79	27.60	27.41	27.21	27.02	26.84	27.06	27.29	27.51	27.74	27.97	28.19	28.42	28.67	28.93	29.19	29.46	29.72	29.98	30.24	30.51	30.80				

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 4+00.00

Material(s) at Station 4+00.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	657.92	1234.85	7058.00 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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KEY PLAN / NOTES:

NO.	DATE	REVISIONS

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OCTOBER 1, 2021
DATE

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DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

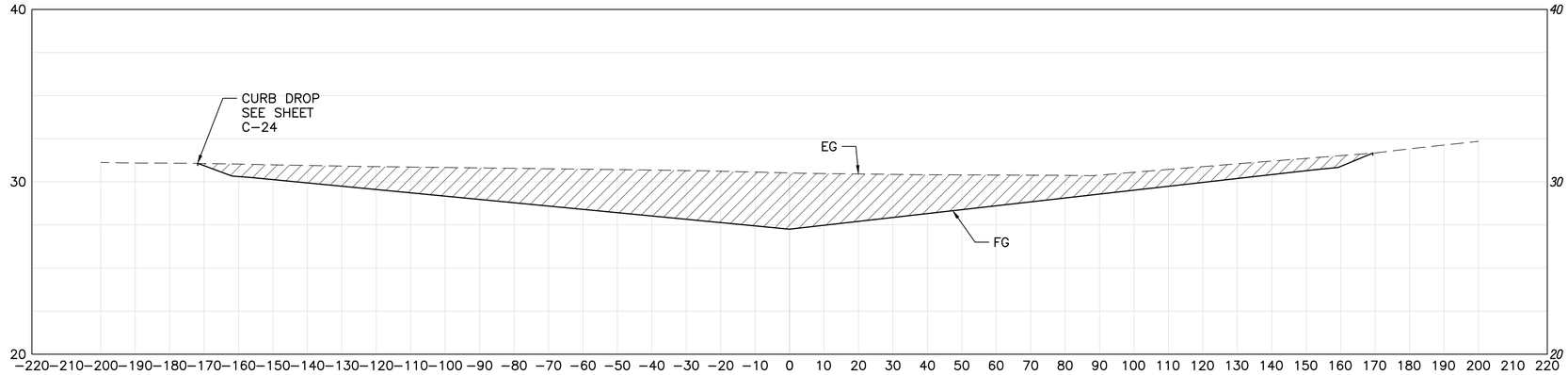
SHEET TITLE:

CROSS SECTIONS 4

DATE :
SEPTEMBER 2021
SHEET :
39 OF 48 SHEETS

DWG. NO.
C-29

H:\CADD\PROJECT DRAWINGS\1711 DOTA CIP AIRFIELD OPEN END\HILO\PONDING IMPROVEMENTS\DESIGN\TO - PONDING IMPROVEMENTS CROSS SECTIONS.DWG



	−200	−190	−180	−170	−160	−150	−140	−130	−120	−110	−100	−90	−80	−70	−60	−50	−40	−30	−20	−10
PROPOSED ELEV.	31.12	31.09	31.08	31.06	31.02	30.99	30.95	30.91	30.88	30.85	30.83	30.81	30.78	30.76	30.73	30.71	30.68	30.65	30.61	30.56
PROPOSED ELEV.				30.93	30.30	30.12	29.93	29.74	29.55	29.36	29.17	28.97	28.78	28.59	28.40	28.21	28.01	27.82	27.63	27.44

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
PROPOSED ELEV.	30.51	30.48	30.45	30.43	30.41	30.40	30.39	30.38	30.37	30.39	30.55	30.72	30.88	31.04	31.20	31.36	31.52	31.67	31.91	32.13	32.34
PROPOSED ELEV.	27.25	27.48	27.71	27.93	28.16	28.38	28.61	28.84	29.06	29.29	29.51	29.74	29.97	30.19	30.42	30.65	30.89				

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 4+50.00

Material(s) at Station 4+50.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	582.04	1148.11	8206.11 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

	−200	−190	−180	−170	−160	−150	−140	−130	−120	−110	−100	−90	−80	−70	−60	−50	−40	−30	−20	−10
PROPOSED ELEV.	31.19	31.18	31.17	31.15	31.14	31.11	31.07	31.03	30.99	30.92	30.85	30.78	30.71	30.64	30.61	30.64	30.67	30.67	30.66	30.64
PROPOSED ELEV.				31.02	30.40	30.25	30.09	29.94	29.78	29.63	29.47	29.31	29.16	29.00	28.81	28.62	28.43	28.24	28.05	27.86

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
PROPOSED ELEV.	30.62	30.59	30.57	30.54	30.52	30.51	30.49	30.46	30.43	30.43	30.60	30.76	30.93	31.09	31.26	31.42	31.59	31.75	31.99	32.22	32.42
PROPOSED ELEV.	27.67	27.90	28.12	28.35	28.57	28.80	29.03	29.24	29.43	29.62	29.80	29.99	30.18	30.36	30.55	30.74	30.97				

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 5+00.00

Material(s) at Station 5+00.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	497.02	999.12	9205.23 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
No. 6186-C

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AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

CROSS SECTIONS 5

DATE :
SEPTEMBER 2021
SHEET :
40 OF 48 SHEETS

DWG. NO.
C-30

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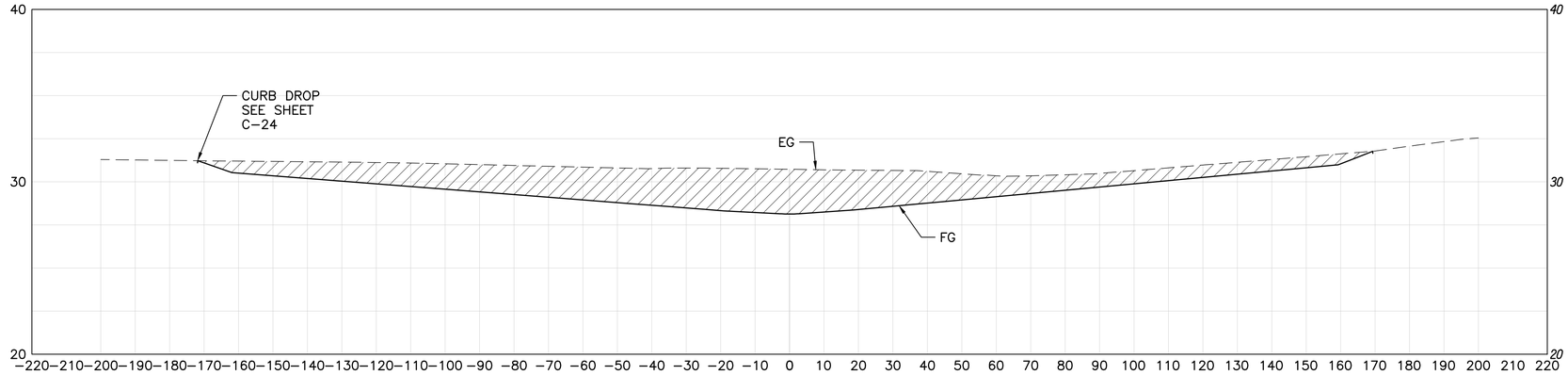

	PROPOSED ELEV.	*PROPOSED ELEV.*
−200	31.29	
−190	31.27	
−180	31.24	
−170	31.22	31.09
−160	31.20	30.50
−150	31.18	30.34
−140	31.16	30.19
−130	31.14	30.03
−120	31.12	29.88
−110	31.09	29.72
−100	31.04	29.57
−90	30.99	29.41
−80	30.95	29.26
−70	30.90	29.10
−60	30.85	28.95
−50	30.80	28.79
−40	30.77	28.64
−30	30.80	28.48
−20	30.78	28.33
−10	30.76	28.22
0	30.73	28.13
10	30.70	28.25
20	30.67	28.39
30	30.66	28.58
40	30.61	28.76
50	30.47	28.95
60	30.35	29.14
70	30.35	29.32
80	30.41	29.51
90	30.48	29.70
100	30.65	29.88
110	30.81	30.07
120	30.97	30.26
130	31.13	30.44
140	31.29	30.63
150	31.45	30.81
160	31.62	31.04
170	31.79	
180	32.07	
190	32.33	
200	32.54	

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 5+50.00

Material(s) at Station 5+50.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	477.26	902.11	10107.34 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

	PROPOSED ELEV.	*PROPOSED ELEV.*
−200	31.41	
−190	31.39	
−180	31.36	
−170	31.34	31.21
−160	31.31	30.60
−150	31.28	30.44
−140	31.24	30.29
−130	31.21	30.13
−120	31.17	29.98
−110	31.14	29.84
−100	31.12	29.74
−90	31.09	29.64
−80	31.06	29.54
−70	31.03	29.43
−60	30.99	29.33
−50	30.94	29.23
−40	30.89	29.13
−30	30.85	29.03
−20	30.85	28.92
−10	30.88	28.83
0	30.87	28.78
10	30.85	28.81
20	30.84	28.92
30	30.83	29.06
40	30.81	29.19
50	30.78	29.33
60	30.71	29.47
70	30.64	29.61
80	30.57	29.74
90	30.54	29.88
100	30.70	30.02
110	30.86	30.16
120	31.02	30.33
130	31.18	30.52
140	31.34	30.71
150	31.50	30.89
160	31.66	31.12
170	31.82	
180	32.15	
190	32.45	
200	32.70	

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 6+00.00

Material(s) at Station 6+00.00

Material Name	Area	Volume	Cumulative Volume
Ground Removed	422.31	832.93	10940.27 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

4' 0 4' 8'
VERTICAL SCALE 1"=4'

20' 0 20' 40'
HORIZONTAL SCALE 1"=20'

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

NEAL S. FUKUMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6186-C

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Exp. 04–30–22

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AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

CROSS SECTIONS 7

DATE :
SEPTEMBER 2021
SHEET :
42 OF 48 SHEETS

DWG. NO.
C-32

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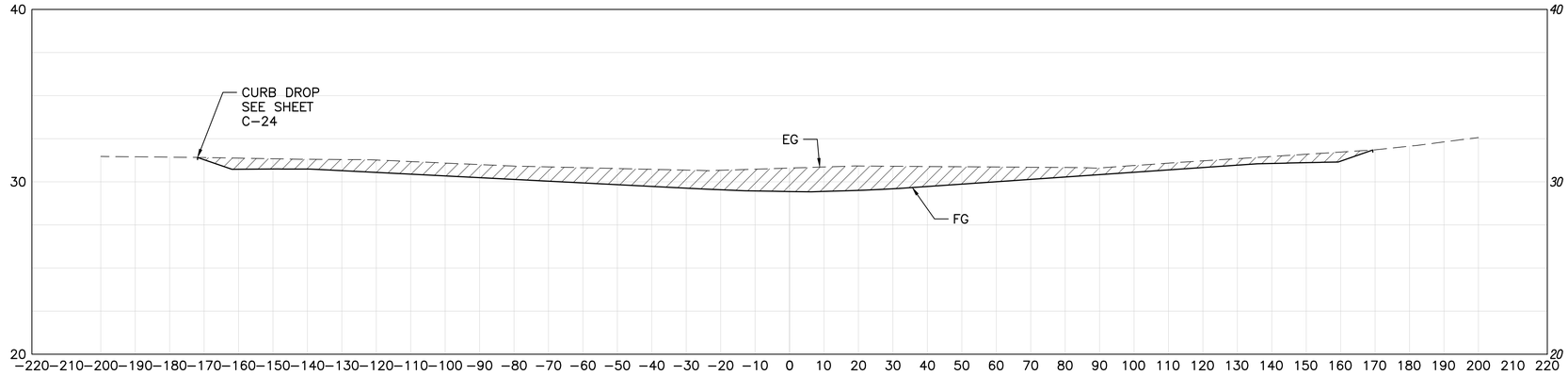

	PROPOSED ELEV.	*PROPOSED ELEV.*
–200	31.47	
–190	31.45	
–180	31.43	
–170	31.40	31.28
–160	31.37	30.73
–150	31.33	30.75
–140	31.30	30.74
–130	31.29	30.65
–120	31.26	30.55
–110	31.18	30.44
–100	31.09	30.34
–90	31.00	30.24
–80	30.91	30.14
–70	30.86	30.04
–60	30.82	29.93
–50	30.77	29.83
–40	30.72	29.73
–30	30.68	29.63
–20	30.67	29.54
–10	30.73	29.47
0	30.80	29.43
10	30.86	29.44
20	30.92	29.50
30	30.90	29.60
40	30.89	29.73
50	30.87	29.86
60	30.86	30.00
70	30.85	30.14
80	30.83	30.28
90	30.81	30.42
100	30.94	30.55
110	31.08	30.69
120	31.22	30.83
130	31.34	30.97
140	31.47	31.06
150	31.60	31.11
160	31.72	31.20
170	31.85	
180	32.06	
190	32.31	
200	32.57	

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 6+50.00

Material(s) at Station 6+50.00			
Material Name	Area	Volume	Cumulative Volume
Ground Removed	265.18	636.56	11576.83 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

	PROPOSED ELEV.	*PROPOSED ELEV.*
–200	31.53	
–190	31.51	
–180	31.49	
–170	31.47	31.35
–160	31.46	30.86
–150	31.45	30.99
–140	31.43	31.02
–130	31.42	30.97
–120	31.39	30.96
–110	31.31	30.92
–100	31.22	30.90
–90	31.13	30.84
–80	31.04	30.74
–70	30.95	30.64
–60	30.86	30.54
–50	30.78	30.43
–40	30.69	30.34
–30	30.60	30.25
–20	30.53	30.16
–10	30.54	30.12
0	30.60	30.09
10	30.66	30.07
20	30.72	30.13
30	30.79	30.19
40	30.85	30.28
50	30.95	30.40
60	31.05	30.54
70	31.07	30.67
80	31.08	30.81
90	31.08	30.94
100	31.09	31.01
110	31.11	31.08
120	31.24	31.14
130	31.37	31.19
140	31.50	31.23
150	31.63	31.23
160	31.76	31.27
170	31.88	
180	32.10	
190	32.32	
200	32.53	

ARMY NATIONAL GUARD AVIATION RAMP GRASS: STA. 7+00.00

Material(s) at Station 7+00.00			
Material Name	Area	Volume	Cumulative Volume
Ground Removed	125.51	361.75	11938.59 CuYd
Ground Fill	0.00	0.00	0.00 CuYd

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

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AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

CROSS SECTIONS 8

DATE :
SEPTEMBER 2021
SHEET :
43 OF 48 SHEETS

DWG. NO.
C-33

H:\CADD\PROJECT DRAWINGS\1711 DOTA CIP AIRFIELD OPEN END\HILO\PONDING IMPROVEMENTS\DESIGN\TO - PONDING IMPROVEMENTS CROSS SECTIONS.DWG

Appendix C

Best Management Plans

Reporting Forms

C.1 Written Follow-Up Notification Form

C.2 Health and Safety Plan

C.3 Construction Activities Release Response Plan

C.4 Inactive Pipeline Removal Plan

C.5 Soil Management Plan

C.6 Stormwater Management Plan

The purpose of the reporting forms is to ensure consistency between actions taken and the associated management plans. Add notation to indicate all deviations from the management plans.

C.1

Hawaii Hazardous Substance Written Follow-Up Notification Form

PLEASE PROVIDE THE FOLLOWING INFORMATION

Incident Case No.: _____

CONTACT INFORMATION:

Caller's Information

Name:_____

Address: _____

City:_____

State: _____Zip:_____

Telephone number:_____

Owner's Information:

Name: _____

Title:_____

Company: _____

Address: _____

City: _____

State: _____Zip:_____

Telephone number: _____

Operator's Information

Name: ____

Title:_____

Company:_____

Address:_____

City:_____

State:_____Zip.;_____

Telephone number: _____

Name of a contact person at the facility or vessel where the release has occurred: _____

_____

Telephone number: _____

HAZARDOUS SUBSTANCE RELEASED:

Name (trade and chemical) of the hazardous substance which has been released: _____

_____

_____

Chemical Abstract Service (CAS) Number (if applicable): _____

_____

_____

Approximate quantity of the hazardous substance released: _____

_____

_____

INCIDENT INFORMATION

Location of the release: _____

_____

_____

A brief description of the release: _____

_____

_____

Media into which the release occurred or is likely to occur (Indicate all those that apply):

☐ Air ☐ Soil ☐ Groundwater ☐ Concrete ☐ Asphalt ☐ Stream ☐ Ocean ☐ Other

Cause of the release: _____

_____

Date of the release: _____

Time of the release: _____

Duration of the release: _____

Time that the person in charge of the construction where the release occurred obtained knowledge of release:

_____

Source of the release:_____

_____

RESPONSE INFORMATION

Response measures taken thus far:_____

_____

Any appropriate information relating to the ability of the owner or operator of the facility or vessel where the release has occurred to pay for or perform any proposed or required response actions:

_____

_____

The names of other federal, state, or local government agencies that have been notified of the release:_____

_____

_____

HEALTH INFORMATION

Known or anticipated acute health risks:_____

_____

Known or anticipated chronic health risks:_____

_____

Advice regarding medical attention necessary for exposed individuals:_____

_____

Potential impacts to public health or welfare: _____

_____

Potential impacts to the environment:_____

_____

"I certify under penalty of law that I have personally examined and am familiar with the information submitted and believe the submitted info is true accurate and complete."

Signature:_____Date:_____

Printed Name:_____

Title:_____Company:_____

Appendix C.2

HEALTH AND SAFETY PLAN – OIL HAZARDS	
	Environmental Hazard Management Plan (EHMP) **Hilo International Airport**
Prepared By: _____	
Organization: _____	**Version:** _____
Name: _____	**Reference:** _____
Signature: _____	**Date:** _____

Project Name: **Hilo International Airport**

Project Location: _____

Parties may use this sample as a basis for preparing their site-specific plan.

REVISE THIS SAMPLE PLAN BY:

1. *Completing Table 2 with names and telephone numbers.*
2. *Attaching a Figure 1 map below at conclusion of Appendix C.2 to show locations of the work site and the nearest medical facilities and hospitals. Alternatively, make sure the on-site workers know where the closest medical facilities are.*
3. *Reviewing the Occupational Safety and Health Administration (OSHA) regulations to make sure the hazard levels described in Table 1 are still current.*
4. *Including any additional specific instructions.*

IMPLEMENT THIS PLAN BY:

1. *Warning on-site workers that they may encounter oil, oily water, and oil-impacted soil in below ground excavations.*
2. *Making the on-site workers aware of the need for proper safety procedures and familiarizing them with the contents of this plan.*
3. *Making sure a copy of this completed plan is located at the construction site.*

NOTE: IF YOU ARE DEALING WITH HAZARDOUS CHEMICALS OTHER THAN OIL, OILY WATER, AND OIL-IMPACTED SOIL. YOU MAY NEED ADDITIONAL HAZARDOUS CHEMICAL RESPONSE PLANS AND PROCEDURES THAT ARE NOT COVERED IN THIS PLAN.

DELETE THIS BOX AFTER COMPLETING THIS PLAN.

1. INTRODUCTION

Soil impacted by contaminants (total petroleum hydrocarbons [TPH]), and oil may be encountered during excavation projects. This Health and Safety Plan (HSP) provides information on the potential hazards that may be encountered and describes what

protective measures and monitoring needs to be conducted (Table 1, below), and also provides emergency contact information (Table 2, below).

2. WORKER AWARENESS

- On-site workers who may be exposed to impacted soil by contaminants (TPH) and oil should have the appropriate and current level of Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) (29 Code of Federal Regulations [CFR] 1910.120) training.
- A daily on-site tailgate safety meeting should be conducted. These meetings should include a discussion of the day's work and an analysis of hazards that may be encountered.
- If site or work conditions change, this HSP may have to be amended accordingly. Apprise on-site workers of any changes.

3. SITE CONTROL AND GENERAL HEALTH AND SAFETY REQUIREMENTS

- Minimize exposure of workers and others to potential hazards by restricting workplace access.
- Do not smoke, eat, or drink during and after entering the work zone. Conduct these activities upwind and outside of the work zone after first washing hands.
- Avoid skin contact with oil, contaminated soil; and avoid inhalation of dust particles.

4. WORKSPACE AIR MONITORING AND ACTION THRESHOLDS

- Monitor workspace air conditions during work activities to verify that safe conditions are maintained by comparing measurements to the action levels in Table 1.
- **If action levels are exceeded**, take the actions listed in Table 1, or equivalent, to monitor workspace air conditions.

Use the field monitoring devices listed in Table 1, or equivalent, to monitor workspace air conditions.

Table 1: Action Levels

Contaminant	Medium/Hazard	Monitoring Instrument (See HDOH HEER TGM for more information	Monitoring Instructions	Action Levels and Applicable Actions (See OSHA for more information)
TPH as gasoline range organics (GRO), TPH as diesel range organics (DRO), TPH as residual range organics (RRO), benzene, toluene, total xylenes, naphthalene, HVOCs.	Air/Inhalation	Photoionization detector (PID) with I0.6 electron volt (eV) Lamp	Monitor breathing zone while work is ongoing. Compare action threshold to time-averaged breathing zone measurements.	<0.5 parts per million by volume (ppmv): Proceed with caution. 0.5 to 10 ppmv: Level D, use benzene-specific detector (see below).
Benzene	Air/Inhalation	Draeger Benzene-specific detector tube (if necessary; see above)	Deploy benzene-specific detector tube for benzene if PID levels exceed 0.5 ppmv.	<0.5 ppmv: Level D personal protective equipment (PPE) >0.5 ppmv: Exit area and consult Health and Safety Manager (Table 2) for further direction.

Contaminant	Medium/Hazard	Monitoring Instrument (See HDOH HEER TGM for more information	Monitoring Instructions	Action Levels and Applicable Actions (See OSHA for more information)
TPH-GRO, TPH-DRO, TPH-RRO	Soil (dust)/Inhalation	None (visual) – inspect workspace air for fugitive dust caused by work activities or high winds		Evacuate area if visible fugitive dust is observed and cannot be readily mitigated. Contact Health and Safety Manager (Table 2) for further direction.

Acute exposure to elevated concentrations of these constituents listed in Table I may cause the following symptoms, amongst others:

- Abnormal eye and nose irritation
- Headache
- Allergic dermatitis
- Blurred vision
- Dizziness
- Giddiness
- Nausea and/or vomiting
- Abnormal fatigue

In the event workers experience, any of the above symptoms while conducting work involving exposure to oil, oily water and oil-impacted soil, they should stop work, leave the work area, and consult the Health and Safety Manager (Table 2).

5. PROTECTIVE CLOTHING

A minimum of OSHA Level D PPE should be used for activities involving disturbance, movement, sampling, or management of oil, oily water and oil-impacted soil. Level D PPE consists of the following:

- Safety Glasses
- Hard hat
- Surgical (rubber or nitrile) gloves
- Coveralls or full-length pants
- Boots with chemical-resistant steel toe and shank

Additional PPE may be required in response to project-specific hazards or unusual conditions, such as workers who could potentially come into close contact with oil seeping from soils or floating on groundwater.

6. EMERGENCY CONTACTS

Table 2: Emergency Contacts

Organization	Purpose	Phone No.
Contractor-Designated Health and Safety Manager Name:_____	Hazardous work conditions	( ) ___ - ____
For Emergencies: Fire, Ambulance, or Police	Fire danger or workplace injury	9-1-1

7. REFERENCES

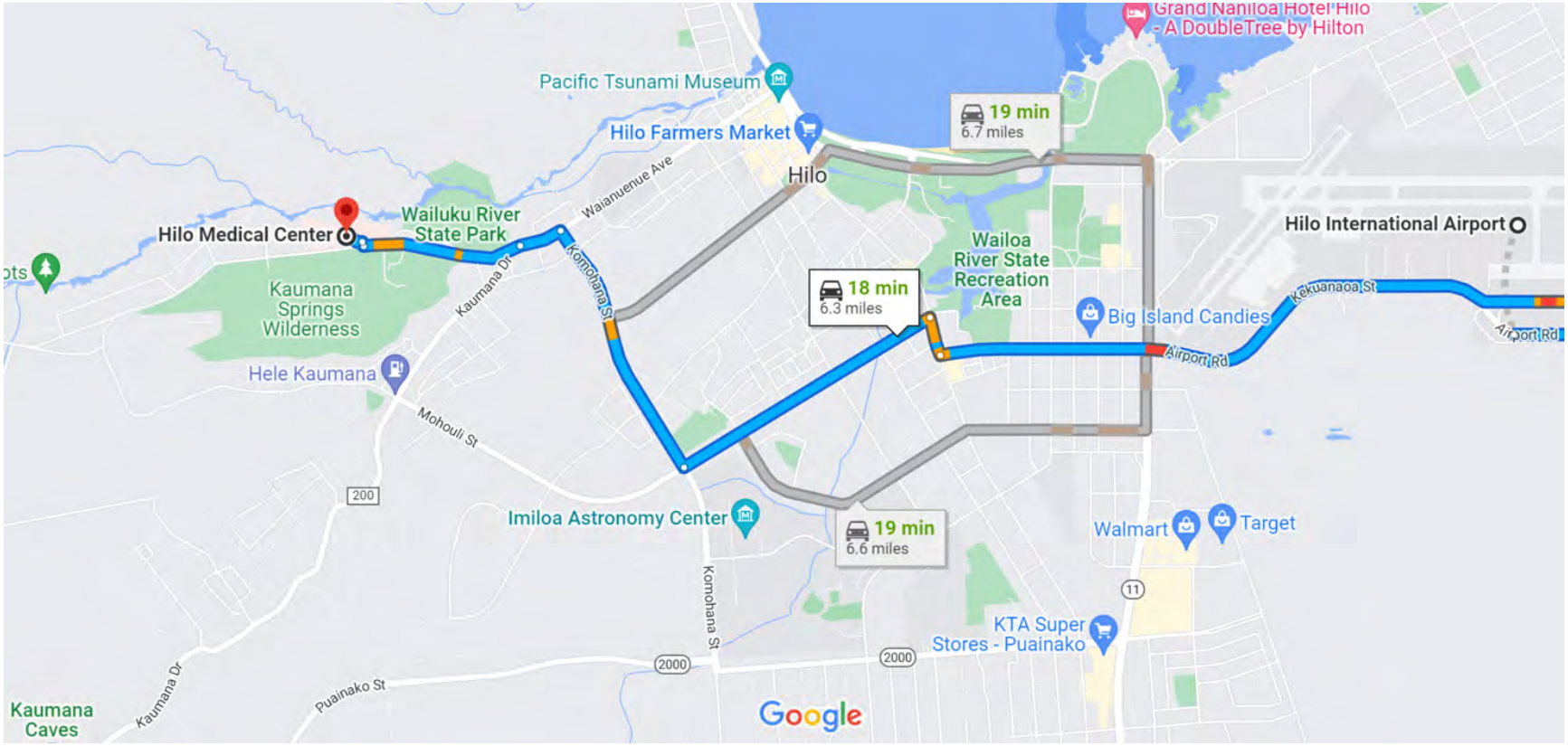
State of Hawaii Department of Health (HEER) 2008 and updates. Technical Guidance Manual for the Implementation of the Hawai'i State Contingency Plan, Interim Final.

OSHA, 29 CFR Sections 1910 and 1015.12 (b)(3).

Google Maps

Hilo International Airport, 2450 Kekuanaoa St, Hilo, HI 96720 to Hilo Medical Center, 1190 Waianuenue Ave, Hilo, HI 96720

Drive 6.3 miles, 18 min



Map data ©2022 2000 ft

https://www.google.com/maps/dir/Hilo+International+Airport,+2450+Kekuanaoa+St,+Hilo,+HI+96720/Hilo+Medical+Center,+Waianuenue+Avenue,+Hilo,+HI/@19.710372,-155.0863182,14z/data=!3m1!5… 1/1

CONSTRUCTION ACTIVITIES – RELEASE RESPONSE PLAN	
	Environmental Hazard Management Plan (EHMP) **Hilo International Airport**
Prepared By:	
Organization:	**Version:**
Name:	**Reference:**
Signature:	**Date:**

Project Name: **Hilo International Airport**

Project Location:

Parties may use this sample as a basis for preparing their own site-specific plan.

REVISE THIS PLAN BY:

1. Completing Tables 1 through 3.
2. Checking to make sure the notification requirements in Section 2 of the C-EHMP Addendum and Section 7 of the DOTA EHE-EHMP are current.
3. Including any additional specific instructions.

IMPLEMENT THIS PLAN BY:

1. *Warning on-site workers that they may encounter oil, oily water, and oil-impacted soil in below ground excavations.*
2. *Making the on-site workers aware of proper response procedures and familiarizing them with the contents of this plan.*
3. *Making sure a copy of the completed plan is located at the construction site.*
4. *Accessing additional guidance for completing this form can be found in Section 7 of the DOTA EHE-EHMP.*
5. *Ensuring on-site workers are familiar with surface drainage patterns, presence and flow directions of storm drains that could direct releases to harbor waters, locations of storm drain outlets to the harbor that may need to be protected with oil booms or other measures, potential locations for emergency storage tanks, etc. Obtain further information on these conditions from HDOH HEER Office, if necessary.*
6. *Submit a copy of this form to the HDOH HEER Office if contamination is encountered during subsurface activities.*

NOTE: IF YOU ARE DEALING WITH HAZARDOUS CHEMICALS OTHER THAN THE ABOVE LISTED SOIL CONTAMINATION, YOU MAY NEED ADDITIONAL HAZARDOUS CHEMICAL RESPONSE PLANS AND PROCEDURES THAT ARE NOT COVERED IN THIS PLAN

DELETE THIS BOX AFTER COMPLETING THIS PLAN

1. INTRODUCTION

This Construction Activities Release Response Plan (Plan) describes how to proceed in the event of an unplanned or discovery of, or accidental release of oil, oily water, or oil-impacted soil.

On-site workers need to minimize the possibility of spills and releases of oil, oily water, and oil-impacted soil during excavation by;

- Familiarizing themselves with the site conditions;
- Implementing appropriate Health and Safety, Soil Management Plan; and
- Being prepared at all times to encounter and manage oil, oily water, and oil-impacted soils.

Nevertheless, there is the potential that uncontrolled releases or spills of impacted water and soil can occur. Such releases can pose a hazard to human health and/or the environment and require an emergency response and/or regulatory agency notification. Human health concerns include human contact with impacted soil, explosive or fire hazards, and disruptions to the normal operations in the area around the construction site, particularly disruptions to traffic flow. A major environmental impact of concern is discharge of oil or oily water via storm drains.

The responses described here are applicable to incidents that may occur during construction activities, and that can be controlled by the on-site workers undertaking the construction work.

2. TYPICAL RELEASES

The releases described below can occur during the repair or replacement of deep utilities (water, sewer, electric, and fuel and communications lines) and new construction of buildings and buried utilities that require excavation and the removal of impacted soil.

Small incidental releases (e.g., < 1 cubic yard of soil or about three 55-gallon drums of soil) that do not spread and do not interfere with construction activities should be cleaned up as part of the normal activities of the construction team.

For the following types of more significant release, respond immediately as outlined in this plan.

- Surface spillage of oil, oily water, and oil-impacted soil from excavations that actually spills, or threatens to spill, beyond the boundaries of the construction site.
- Breakages or other malfunctions of pipelines, storage facilities, groundwater treatment systems, or re-infiltration galleries/trenches used for below ground construction dewatering that continue to release oil or oily water.
- Oil-impacted soils or debris-contaminated soils (DCS) temporarily stockpiled on the ground surface that are eroded or washed away by rain, and that continue to spread under the action of rain or other causes such as water from a water supply pipeline break.
- Spillage outside of the construction site during the handling and disposing of oil, oily water, and oil-impacted soils or DCS removed from excavations.
- The release of oil from abandoned or active oil pipelines encountered and damaged during the construction activities that threaten to, or actually, spill out of the excavation.

3. RELEASE RESPONSE TEAM

In the event of a release, the following team will determine the necessary response, make proper notifications and perform the response.

Table 1: Contractor Release Response Team

Name	Phone
Internal Contacts	
Contractor-designated Release Response Coordinator **Name:**	( ) --- -----
Contractor-designated Health and Safety Manager **Name:**	( ) --- -----

Name	Phone
On-site Construction Superintendent **Name:**	( ) --- -----
Landowner Contact **Name:**	( ) --- -----

4. RESPONSE PROCEDURES

4.1 General

The priority of response action is the protection of human health. The second priority is to ensure that there is no impact to the to the environment. **Immediate action is required.** Do not delay prudent response action.

In the event of a release:

- Notify the response coordinator (Table 1).
- Take immediate action to contain the release (do not wait if Release Response Coordinator is unavailable).
- In dangerous circumstances, give the notice to evacuate the work area and notify persons in Table 1. In the event, no persons listed in Table 1 are available to obtain assistance as necessary by contacting appropriate persons listed in Table 3.

Other general responses include:

- Use appropriate personal protective equipment (PPE).
- Eliminate or contain the source of the release.
- Put up signs or caution tape to let other workers know that there was a release and to stay away.
- Place barriers or absorbents around the release to prevent contamination from spreading.
- Secure impacted soil stockpiles by covering, repairing, or constructing containment berms around the stockpile, etc.
- Remove released material and clean all surfaces.
- Dispose of the released material as appropriate (see **Soil Management Plan).**
- Monitor air quality in the location of the release to assess the vapor hazards as defined in the Health and Safety Plan (HSP). Take appropriate action if hazardous conditions exist as required by the HSP. Use appropriate PPE.

In the event the release takes place indoors, perform the following:

- Use appropriate PPE.
- Close off vents and air ducts leading from the release area to other parts of the building.
- Open windows and doors to the outside so that vapors can escape and safely dissipate in the outdoor air.
- In the event there is electrical equipment operating in the vicinity of the release and hydrocarbon vapor are detected near the explosivity limits (see **HSP**):
    - Turn off the equipment, preferably at the main breaker, to avoid sparking.
- Remove released material and clean all surfaces.
- Dispose of the released material as appropriate (see **Soil Management Plan).**
- Monitor air quality in the location of the release to assess the vapor hazards as defined in the HSP. Take appropriate action if hazardous conditions exist as required by the HSP.

If necessary, protect nearby storm drains by use of an adsorbent, booms or drain covers; and protect potentially affected storm drain outlets by the placement of floating oil booms on the water.

5. RESPONSE EQUIPMENT AND MATERIALS

To deal with the incidental or more significant releases, the equipment and materials listed in Table 2 are available either at the construction site or are stored nearby.

Table 2: Response Equipment and Materials

Equipment and Materials	Purpose	Source of Equipment and Materials
Spill kits	Cleanup of small releases to land	
Trucks and loading equipment	Excavating and transporting oil- impacted soil	
Steel roll-off bins	Temporary storage of oil-impacted soil pending waste profiling or on- site relocation	
Pumps, piping, storage tanks	Transfer of impacted water and oil to on-site tanks or approved disposal trenches	
Plastic sheeting	Cover and secure soil stockpiles	
Hay bales, silt fences, wattles	Erosion control and containment of materials	
Oil absorbent pads	Absorption and containment of oil or fluids released to land or within excavations	
Sandbags or equivalent	Construction of a small dike along areas of the release to prevent releases from spreading or entering storm drains.	
Sediment and oil filters	Connected to the end of an excavation dewatering hose, these filter out sediment and oil	

6. NOTIFICATION INFORMATION

If the release meets the notification requirements:

- Notify the person in the first entry in Table 3.
- If utilities are involved, notify the affected utility in Table 3.
- Notify the operator in Table 2.

Table 3: Other Potential Contacts

Organization	Purpose	Phone
State Agency Contacts		
Hawaii State Emergency Response Commission/the HDOH HEER Office	Any required release reporting	(808) 586-4249 (808) 247-2191 (after hours)
Fire, Ambulance, or Police	Required in the event of fire danger or injury	9-1-1
Underground Utility Contacts		
Gas Utility Name:	Notification of any utility gas damage or break	( ) --- -----
Electric Utility Name:	Notification of any electric utility damage or break	( ) --- -----
Water Utility Name:	Notification of any water utility damage or break	( ) --- -----
Operator Contact		
Landowner Name:	Notification of any significant release	( ) --- -----
Federal Contact		
U.S. Coast Guard (USCG) Name:	Notification of any sheens on harbor waters	( ) --- -----

7. RELEASE COMMUNICATIONS AND AGENCY REPORTING REQUIREMENTS

7.1 Circumstances under which agency notification is required

Pursuant to Title II, Chapter 451, *Hawaii Administrative Rules* (HAR) §11-451-7, releases meeting any of the following criteria must be reported to the first agency contact appearing in Table 3 within 24 hours of first occurrence or observance.

- Any release causing surface water to exhibit sheen.
- Any release of petroleum or hazardous substances to navigable waters (e.g. ocean, local canals, streams).
- Any release of oil to the environment is greater than 25 gallons.
- Any release of oil less than 25 gallons that are not cleaned up within 72 hours.
- In addition, any sheens or oil or oily water releases to storm drains that have open connections to the harbor, even if contained within project boundaries and not yet impacting the harbor water.
- Sheen and oil observed in the storm drain should be reported to the USCG and HDOH HEER Office listed in Table 3.
- Releases to other waters of the United States require reporting to the USCG.

Report the following information to agencies when notifying of a reportable release:

- Name of the person making the notification.
- Location of the release.
- Time and date of discovery.
- Characteristics of the oil observed (color, viscosity, etc.)
- How the release occurred.
- Removal actions that were taken and volume removed.
- Whether the release poses an immediate threat to human health or the environment.
- Other agencies that have been notified of the spill.
- Known injuries resulting from the spill.

Provide details of actions taken consistent with the Construction Activities Release Response.

INACTIVE PETROLEUM PIPELINE AND USE MANAGEMENT PLAN	
Prepared By:	**Environmental Hazard Management Plan (EHMP)** **Hilo International Airport**
Organization:	**Version:**
Name:	**Reference:**
Signature:	**Date:**

Project Name: **Hilo International Airport**

Project Location:

Parties may use this sample as a basis for preparing their own site-specific plan.

REVISE THIS SAMPLE PLAN BY:

1. *Reviewing the requirements of this sample plan to ensure the construction worker can comply with its requirements, and modifying the plan, if necessary.*

IMPLEMENT THIS PLAN BY:

1. *Making sure on-site workers are aware of this plan and that they follow this plan.*
2. *Making sure a copy of the completed plan is located at the construction site.*
3. *Accessing additional guidance for completing this form can be found in Section10 of the DOTA EHE-EHMP.*
4. *Keeping a copy for your records and sending a copy to the HDOH HEER Office.*

DELETE THIS BOX AFTER COMPLETING THIS PLAN.

1. INTRODUCTION

Inactive pipeline may be encountered during excavation (activities). This plan provides procedures and guidelines for dealing with inactive pipelines if they are encountered.

2. PREPARATORY WORK

Prior to starting any belowground construction work, undertake the following:

- Contact Hawaii One Call at (866) 423-7287 to notify them of the proposed excavation activities. Underground facilities owners must be notified to mark any of their own underground utilities near the proposed excavation.
- Conduct an underground utility survey using geophysical surveying equipment (e.g., toning/metal detection, ground penetrating radar) before excavation begins.

3. NOTIFICATION REQUIMENTS

If unanticipated inactive pipelines are discovered during construction activities, notify the following:

- Contact the HDOH HEER Office via telephone within 24 hours after encountering the unanticipated pipeline.

4. PIPELINE TAPPING AND DRAINING

If unanticipated inactive pipelines are discovered during construction activities, notify the following:

- Contact the HDOH HEER Office via telephone within 24 hours after encountering the unanticipated pipeline.

Inactive piping may contain residual petroleum product and may be under pressure. This could present a possible safety and spill hazard if the line is cut prior to implementation of appropriate measures. If, through the notification process described in Section 7 of the DOTA EHE-EHMP, the nature and use of the piping cannot be determined, tapping may be required to determine if fluids are present or if the piping is pressurized, and to provide a means to drain residual product.

If you are performing the work, follow the procedures in Sections 5 through 8 below.

5. PIPELINE CUTTING AND CAPPING

Follow these general procedures for cutting and capping the pipelines:

1. Prior to cutting, tap the pipeline using non-sparking tools, and drain the contents of the pipeline to the extent practical and possible.
2. Cover the area below and adjacent to the cutting location with plastic sheeting and absorbent material, and place a catch basin beneath the location of the cut. Use these devices to collect residual fluid that may drain from the pipeline during and after cutting.
3. Use precautionary measure to prevent explosive hazards. For example, cut the pipeline using non-sparking tools and remove the pipeline segment.
4. Cap the cut-off ends of remaining pipeline segments to prevent any potential future leakage. Suitable capping methods include concrete plugs, blind flanges, cement plugs with rebar, or other methods that do not involve hot welding. Hot work, including welding, is not considered appropriate due to potential explosiveness of petroleum and associated vapors.

Consider the need for the presence of a vacuum truck on standby during pipeline cutting and capping.

6. PRODUCT SAMPLING

Sample the residual product that has been drained and collected during this process, and have it analyzed by a laboratory to enable proper profiling and off-site disposal.

7. INVESTIGATION-DERIVED WASTE DISPOSAL

Dispose of petroleum and other regulated wastes in accordance with applicable laws and regulations.

8. HEALTH AND SAFETY

Comply with the following health and safety measures whether or not these are included in the Health and Safety Plan (HSP).

- Personnel conducting post-discovery work on abandoned petroleum pipelines should have current 40/24-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and air-purifying respirator fit test certifications. At least one on-site worker potentially exposed to chemical or physical hazards should have basic first aid and cardiopulmonary resuscitation (CPR) training.
- Select air-purifying respirators based on the type of contaminant encountered (i.e., petroleum).
- Conduct air monitoring to monitor potential hazardous vapors and worker exposure. If petroleum is encountered, air monitoring typically includes use of a photoionization detector (PID) to monitor organic vapors for potential inhalation hazards, and a methane and oxygen/combustible gas indicator to monitor for potential explosive hazards.

9. DOCUMENTATION ACTIVITIES

Provide the HDOH HEER Office with the following information:

- A description of where the pipeline was encountered (Global Positioning System [GPS] coordinates or location relative to prominent landmarks), number and lineal footage of pipelines encountered, size of pipelines, depth of pipelines, condition of pipelines, and actions taken following pipeline discovery such as cutting or petroleum removal.
- A location map that shows where the pipeline was encountered. The map must include a north arrow and a scale.
- Photographs of the exposed portion of the pipeline in the excavation.
- Analytical laboratory reports for product recovered from the pipeline.

Provide details of pipeline removal activities consistent with Section 10 of the DOTA EHE-EHMP:

SOIL MANAGEMENT PLAN	
	Environmental Hazard Management Plan (EHMP) **Hilo International Airport**
Prepared By:	
Organization:	**Version:**
Name:	**Reference:**
Signature:	**Date:**

Project Name: **Hilo International Airport**

Project Location:

Parties may use this sample as a basis for preparing their own site-specific plan.

REVISE THIS SAMPLE PLAN BY:

1. *Reviewing the requirements of this sample plan to ensure the construction worker can comply with its requirements and modifying the plan, if necessary.*

IMPLEMENT THIS PLAN BY:

1. *Making sure on-site workers are aware of this plan and that they follow this plan.*
2. *Making sure a copy of the completed plan is located at the construction site.*
3. *Accessing additional guidance for completing this form in Section11 of the of the DOTA EHE-EHMP.*
4. *Keeping a copy for your records and sending a copy to the HDOH HEER Office.*

DELETE THIS BOX AFTER COMPLETING THIS PLAN.

1. INTRODUCTION

These procedures are intended to protect construction workers, the environment, and tenants in buildings from contact with impacted soil where such soils are known to exist, or where people may potentially be exposed. They also provide requirements for excavating, stockpiling, reusing and disposing of impacted soils.

2. SOIL EXCAVATION AND STOCKPILING

If you encounter oil or oil-impacted soils, or otherwise contaminated soil, or if you are conducting soil surface excavations around former rail line tracks, within three feet of a former aboveground storage tank (AST) or within three feet of a current or former building built prior to 1988 do the following:

- Always place excavated contaminated soil or anticipated contaminated soil on plastic sheeting.
- For surface soil in the vicinity of railway tracks or within three feet of an AST or building built prior to 1988, assume the soil is impacted with pesticides, arsenic, and dioxins/furans in the railway track case and termiticides, arsenic, and lead in the latter (building and AST) case. At a minimum, place excavation material (i.e. surface soils) in a temporary stockpile on plastic adjacent to work.
- If the amount of excavated soil is less than one cubic yard (cy) (equivalent to about three 55-gallon drums), it can be replaced in the excavation upon completion of the work without further evaluation.

- For excavation volumes exceeding 1-cy, segregate unimpacted soil from the oil-impacted soil, debris-contaminated soil (DCS), or metals or pesticide-contaminated soils and stockpile these separately.
- Have a qualified environmental professional direct any necessary collection of soil samples, direct testing of the samples in the field or at an off-site laboratory, and direct segregation of impacted soils from non-impacted soils.
- Place contaminated stockpiled soils in containers (such as 20-yard steel roll-off bins, super sacks, tri-wall boxes, or drums) or within lined containment areas (i.e., underlain by plastic sheeting). Drain any liquid phase oil or fuel product associated with the soil prior to stockpiling. Remove and properly dispose of any oil observed in the excavation.
- Cover stockpiles of contaminated soils and containerized soil with plastic sheeting or tarps to minimize dust, stormwater, and odor concerns. Inspect cover frequently for damage.
- Stockpile soil near the project area prior to reuse.

3. REUSE OF EXCAVATED SOILS

This plan provides general guidelines. For more details, consult Section 11 of the DOTA EHE-EHMP of this Document and the HDOH Fill Guidance (HDOH 2017). Unimpacted soils can be used as backfill, with the exception of within utility corridors. Utility corridors should be backfilled with clean fill and lined with geotextile fabric between the clean fill and contaminated soil.

Excavated oil-impacted soil can be used as backfill only under the following conditions:

- The oil-impacted soil is placed up to 1-foot below surface grade.
- Impacted soil can be used as backfill provided it does not contain any free oil, oil sheens, oil stains or total petroleum hydrocarbon (TPH) concentrations greater than 5,000 ppm (parts per million).
- Measure the TPH concentration either by an off-site laboratory or through the use of a field test such as the paper towel or glove test. Soils determined to be heavily contaminated should be excavated and disposed at an approved landfill.
- Excavated soils can also be used to backfill other excavations located within the proximity of the excavations with the approval of HEER Office. While backfilling, the more highly impacted soil should be placed in the bottom of the excavation and the cleanest soil at the top. In the event the surface will not be paved, at least 1-foot of non-impacted soil must be placed as the final backfill.

In some cases, oil samples and analyses may need to be performed to determine whether soils are suitable and when they can be used as backfill. The HDOH HEER Office will determine when sampling is required. If necessary, the following number of samples should be collected:

Less than 20 cubic yards: one sample per decision unit (plus replicates).

Larger than 20 cubic yards: one sample per decision unit (plus replicates) for each 20 cubic yards up to the first 100 cubic yards.

Larger than 100 cubic yards of soil: one sample per decision unit (plus replicates) for every additional 100 cubic yards.

For further description of soil stockpile characterization, review the current HDOH HEER Office guidance of the Technical Guidance Manual (TGM) at *https://health.hawaii.gov/heer/tgm/.*

4. OFF-SITE DISPOSAL

If you intend to transport the excavated soil to an off-site disposal facility, confirm with the disposal facility the number of soil samples needed for laboratory testing, as well as the standards for disposal.

5. EQUIPMENT DECONTAMINATION

Equipment used in contaminated areas must be decontaminated before use in non-contaminated areas. All liquid and solid waste resulting from on-site decontamination must be collected and appropriately disposed of.

6. SOILS MANAGEMENT DOCUMENTATION

Any known or suspected contaminated soils backfilled on-site should be mapped with GPS coordinates or physical measurements to nearby landmarks. This documentation should be provided to the HDOH HEER Office in a concise letter or project follow-up report. The HDOH HEER Office should also be notified if contaminated soils are excavated and disposed of off-site. In some instances, the HDOH HEER Office may require that you obtain its approval for how you intend to excavate, manage, and backfill or dispose of soil.

Provide details of how contaminated soil was handled consistent with Section 11 *of the DOTA EHE-EHMP*:

STORMWATER MANAGEMENT PLAN	
Prepared By:	**Environmental Hazard Management Plan (EHMP)** **Hilo International Airport**
Organization:	**Version:**
Name:	**Reference:**
Signature:	**Date:**

Project Name: **Hilo International Airport**

Project Location:

Parties may use this sample as a basis for preparing their own site-specific plan.

REVISE THIS SAMPLE PLAN BY:

1. *Reviewing the requirements of this sample plan to ensure the construction worker can comply with its requirements and modifying the plan, if necessary.*
2. *Consulting with the HDOH HEER Office for answers to any questions.*

IMPLEMENT THIS PLAN BY:

1. *Making sure on-site workers are aware of this plan and that they follow this plan.*
2. *Making sure a copy of the completed plan is located at the construction site.*
3. *Accessing additional guidance for completing this form in Section15 of the DOTA EHE-EHMP.*
4. *Keeping a copy for your records and sending a copy to the HDOH HEER Office.*

DELETE THIS BOX AFTER COMPLETING THIS PLAN.

1. INTRODUCTION

If contaminated soil or groundwater is encountered during excavation, appropriate response actions will be taken, and the actions will conform to HDOH and U.S. Environmental Protection Agency (EPA) regulatory guidelines. The response actions include ensuring that these media are not exposed to stormwater. Anticipated tasks associated with managing stormwater are summarized below.

2. STORMWATER MANAGEMENT PROCEDURES

Field oversight will be provided during excavation activities conducted as part of construction. Purposes of the oversight are to identify contaminated media that could be exposed to stormwater runoff and to provide guidance related to controlling stormwater on the property. In addition, the weather will be monitored throughout each workday for signs of approaching storms and/or heavy rains.

Inspections of engineering stormwater controls will occur each day to minimize potential for exposure of contaminated media to stormwater runoff and minimize potential for contaminated stormwater to leave the construction site.

All construction will comply with the conditions of an HDOH-approved National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharge associated with construction activity. Conditions of the permit include preparation of a Construction Site Best Management Practices Plan.

3. OPEN EXCAVATIONS

In the absence of engineering and administrative controls, petroleum-contaminated soil (PCS) and/or groundwater exposed in open excavations could come into contact with stormwater, thus potentially contaminating the stormwater with contaminants of potential concern (COPC). To prevent this, the following activities will occur:

- Where possible, excavations will be backfilled as soon as practicable to limit the time they are open and potentially exposed to stormwater runoff and direct precipitation.
- Where possible, the edges of excavations will be bermed, thus minimizing potential for entry of stormwater runoff.
- Open excavations will be inspected each day to minimize potential for direct precipitation to cause the excavation to overflow.

4. SOIL STOCKPILES

In the absence of engineering and administrative controls, excavated PCS stored in stockpiles could come into contact with stormwater, thus potentially contaminating the stormwater with COPCs. To prevent this, the following activities will occur:

- Soil stockpiles will be placed on plastic sheeting, and the sheeting will be bermed at the edges, thus minimizing potential for contact with stormwater runoff.
- At the end of each day, or in the event of a storm, the soil stockpiles will be covered with plastic sheeting, thus minimizing potential for contact with direct precipitation.
- The soil stockpiles will be inspected each day to ensure that the plastic sheeting is intact.

5. DEWATERING INFILTRATION PITS

In the absence of engineering and administrative controls, water in infiltration pits used for on- site dewatering could come into contact with stormwater. To prevent this, the following activities will occur:

- Where possible, infiltration pits will be backfilled as soon as practicable to limit the time they are open and potentially exposed to stormwater runoff and direct precipitation.
- Where possible, the edges of infiltration pits will be bermed, thus minimizing potential for entry of stormwater runoff.
- Infiltration pits will be inspected each day to minimize potential for direct precipitation to cause the pit to overflow.

6. EROSION AND SEDIMENT CONTROL MEASURES

Erosion and sediment control measures will be in place and functional before construction activities commence. These measures will be maintained throughout the construction period. If stormwater discharge from the site is anticipated, the following preventive measures may be implemented:

- Stormwater flowing toward active construction areas will be diverted using appropriate control measures, as practicable.
- Erosion control measures will be designed to handle the size of the disturbed or drainage area in order to detain runoff and trap sediment.
- Height of the property boundary can be increased using sandbags.
- Additional silt fencing will be added at affected property boundaries, if warranted.
- Berms surrounding soil stockpiles will be increased as necessary.
- Moveable booms will be available to contain spills.
- Absorbent pads will be employed if free product is observed in stormwater runoff.

Provide details of how stormwater was managed (consistent with Section 15 of the DOTA EHE-EHMP) when a significant storm event occurred during construction:

Appendix D

Construction Material Evaluation Information

Effects of Substances on Concrete and Guide to Protective Treatments

by Beatrix Kerkhoff

Introduction

Portland cement concrete is durable in most natural environments; however, concrete is sometimes used in areas where it is exposed to substances that can attack and deteriorate it. This publication discusses the effects of many substances on concrete and provides guidelines to protective treatments.

The first line of defense against chemical attack is to use quality concrete with maximum chemical resistance. This is enhanced by the application of protective treatments in severe environments to keep corrosive substances from contacting the concrete or to improve the chemical resistance of the concrete surface. Protective surface treatments are not infallible, as they can deteriorate or be damaged during or after construction, leaving the durability of the concrete element up to the chemical resistance of the concrete itself.

Proper maintenance—including regularly scheduled cleaning or sweeping, and immediate removal of spilled materials—is a simple way to maximize the useful service life of both coated and uncoated concrete surfaces.

Improving the Chemical Resistance of Concrete

Quality concrete must be assumed in any discussion on how various substances affect concrete. In general, achievement of adequate strength and sufficiently low permeability to withstand many exposures requires proper proportioning, placing, and curing. Fundamental principles and special techniques that improve the chemical resistance of concrete follow. Refer to *Design and Control of Concrete Mixtures* (Kosmatka et al. 2002) for further information.

Fig. 1. Aggressive substances can compromise the durability of concrete. Shown are concrete beams exposed to high-concentration sulfate soils/solutions. (PCA/CALTRANS test plot, Sacramento, California) (Stark 2002) (IMG12296)

Low water-cement ratio (w/c)—the water-cement ratio or the water-cementitious materials ratio (where applicable) should not exceed 0.45 by weight (0.40 for corrosion protection of embedded metal in reinforced concrete). Water-cement ratios for severe chemical exposures often range from 0.25 to 0.40 to maximize chemical resistance.

Cement content—at least 335 kg/m³ (564 lb/yd³) of cementitious material should be used for concrete exposed to severe freeze-thaw, deicer, and sulfate environments.

Suitable cement type—cement should be suited to the exposure, such as sulfate-resistant cement to help prevent sulfate attack (Table 1). Sulfate-resistant cements, however, like other portland or blended hydraulic cements, are not resistant to most acids or other highly corrosive substances.

Suitable aggregate—quality aggregate is not prone to freeze-thaw deterioration or chemical attack. If an aggregate is shown by field performance (history) or by testing to be susceptible to alkali-aggregate reaction (AAR), appropriate measures should be taken to design a concrete mixture to minimize its susceptibility to AAR. (See Farny and Kerkhoff 2007 and PCA 2007 for further guidance.) Some aggregates may be more suitable than others for certain chemical exposures. (See "Acids" under "Design Considerations.")

Suitable water—mixing water should not contain impurities that can impair basic concrete properties or reduce chemical resistance. Steinour (1960), and Abrams (1920 and 1924) discuss the effects of impure mixing water.

Chemical admixtures (optional)—dosage varies to achieve desired reduction in permeability and to improve chemical resistance. Water reducers (ASTM C494) and superplasticizers (ASTM C1017) can be used to reduce the water-cement ratio, resulting in reduced permeability and less absorption of corrosive chemicals. Polymer admixtures, such as styrene-butadiene latex, used in the production of polymer-modified concrete, greatly reduce the permeability of concrete to many corrosive chemicals. A typical dosage of latex admixture would be about 15% latex solids by weight of cement. Certain integral water-repelling admixtures, also called hydrophobic pore-blocking or dampproofing admixtures, can slightly improve the chemical resistance of concrete to certain chemicals such as formic acid (Aldred 1988). However, many integral water-repellents offer little to no improvement; therefore tests should be performed to determine the effectiveness of particular admixtures. (See "Evaluating the Effectiveness of Concrete Surface Protection by Testing.") Admixtures containing chloride should not be used for reinforced concrete. Corrosion inhibitors (ASTM C1582) reduce chloride-induced steel corrosion. (See "Corrosion of Reinforcement" under "Design Considerations.") Alkali-silica reactivity inhibitors, such as lithium nitrate, can be considered when potentially reactive aggregate is used and when alkali solutions will be in contact with concrete. Shrinkage reducing admixtures can reduce the formation of shrinkage cracks through which aggressive chemicals can penetrate the concrete.

Supplementary cementitious materials (optional)—dosage varies to improve chemical resistance. Supplementary cementitious materials (SCMs) such as fly ash and metakaolin (ASTM C618), slag

Table 1. Requirements for Concrete Exposed to Sulfate-Containing Soils and Solutions

Sulfate exposure	Sulfate (SO_4) in soil, % by mass	Sulfate (SO_4) in water, ppm	Cement type*			Maximum water-cementitious material ratio, by mass
			ASTM C150	ASTM C595	ASTM C1157	
Negligible	Less than 0.10	Less than 150	No special type required			—
Moderate**	0.10 to 0.20	150 to 1500	II	IP(MS), IS(<70)(MS)	MS	0.50
Severe	0.20 to 2.00	1500 to 10,000	V	IP(HS) IS(<70)(HS)	HS	0.45
Very severe	Over 2.00	Over 10,000	V	IP(HS) IS(<70)(HS)	HS	0.40

* Pozzolans and slag that have been determined by testing according to ASTM C1012 or by service record to improve sulfate resistance may also be used. Maximum expansions when using ASTM C1012: Moderate exposure—0.10% at 6 months; Severe exposure—0.05% at 6 months or 0.10% at 12 months; Very Severe exposure—0.10% at 18 months. Sulfate resistance of individual pozzolans or slags needs to be established by demonstrating a maximum expansion of 0.10% at 1 year, before a 6 months test duration is acceptable. Refer to ACI 201 (2001) for more guidance.

** Includes seawater.

Test method: ASTM C1580, *Standard Test Method for Water-Soluble Sulfate in Soil.*
Source: Adapted from Bureau of Reclamation 1981, ACI 201, and ACI 318.

(ASTM C989), and especially silica fume (ASTM C1240) can improve chemical resistance by reducing the permeability of the concrete and by producing additional cementitious compounds. Dosages by mass of cementitious material often range from 15% to 25% for Class F fly ash, 15% to 40% for Class C fly ash, 35% to 50% or more for slag, and 5% to 10% for silica fume. Dosage is usually proportional to severity of exposure to chemical. Supplementary cementitious materials may not prevent chemical attack but they can slow it down, significantly in some cases. Supplementary cementitious materials can help control alkali-silica reactivity for concretes exposed to high-alkali, high-pH solutions. Unless previous data exist to confirm the beneficial effect of these materials in specific exposures, testing should be performed to substantiate improved chemical resistance. (See "Evaluating the Effectiveness of Concrete Surface Protection by Testing.")

Air entrainment—the proper amount of entrained air is dependent on the exposure condition and on maximum aggregate size (Table 2). Air entrainment makes concrete resistant to freezing and thawing cycles. In addition it improves sulfate and salt resistance, watertightness, and workability.

Table 2. Target Total Air Content for Concrete

Nominal maximum aggregate size, mm	(in.)	Air content, percent* Severe exposure**	Moderate exposure**
9.5	(⅜)	7.5	6
12.5	(½)	7	5.5
19	(¾)	6	5
25	(1)	6	4.5
37.5	(1½)	5.5	4.5

* Project specifications often allow the air content of the delivered concrete to be within -1 to +2 percentage points of the table target values.
** Severe exposure is an environment in which concrete is exposed to wet freeze-thaw condtions, deicers, or other aggressive agents. Moderate exposure is an environment in which concrete is exposed to freezing but will not be continually moist, not be exposed to water for long periods before freezing, and not be in contact with deicers or aggressive chemicals.
Adapted from Kosmatka et al. (2002) and ACI 318.

Suitable workability—avoid mixes so harsh and stiff that honeycombing occurs as well as mixes so fluid that excessive water rises to the surface. If necessary, water reducers and superplasticizers can be used to make mixes more workable (higher slump). Supplementary cementitious materials can increase or decrease the workability of fresh concrete, so appropriate mix adjustments should be made.

Thorough mixing—mixing should continue until concrete is uniform, with all materials evenly distributed. Silica fume may require a longer mixing period to become thoroughly distributed throughout a concrete mixture.

Consolidation—concrete should be properly molded into forms and around reinforcement to eliminate stone pockets, honeycomb, and entrapped air.

Finishing—slabs should not be finished while bleedwater is on the surface or, as this will increase the permeability at the surface, decreasing its chemical resistance (and strength). Supplementary cementitious materials or blended cements may affect the bleeding characteristics of concrete. For instance, silica fume mixes tend to bleed very little, and slag or fly ash mixes may bleed longer due to a slower set. Placing concrete at the proper temperature promotes uniform bleeding and setting characteristics and helps control finishing operations.

Proper jointing—isolation, contraction, and construction joints should be used to control cracking. Contraction joints in slabs on ground should be spaced about 24 to 30 times the slab thickness and 36 times the slab thickness for mixtures with low water content and large aggregates (19 mm (¾ in.) or larger). Joints should be properly sealed with a material capable of enduring the environment. Waterstops, if used, must be properly placed. Construction methods such as the use of heavily reinforced slabs (Farny 2001) or post-tensioned slabs are helpful in reducing the number of joints in areas where joints are undesirable.

Adequate curing—either additional moisture should be supplied to the concrete during the early hardening period or the concrete should be covered with water-retaining materials. In general, curing compounds should not be used on surfaces that are to receive protective surface treatments. If a curing compound is used, it must be completely removed before the surface treatment is applied, or it must be compatible with the surface treatment so as not to impair bond. Concrete should be kept moist and above 10 °C (50 °F) for the first week or until the desired strength is achieved. Longer curing periods increase resistance to corrosive substances by increasing strength and reducing permeability for all concrete mixtures. Concretes made with SCMs may especially benefit from extended curing. Concrete should not be subjected to hydrostatic pressure during the initial curing period. The resistance of air-entrained concrete to freeze-thaw cycles and deicers is greatly enhanced by an air-drying period after initial moist curing. Refer to Kosmatka, et al. 2002 for more information on concrete construction practices.

Nature of Aggressive Chemicals

The rate of attack on concrete may be directly related to the activity of the aggressive chemical. Solutions of high concentration are generally more corrosive than those of low concentration—but in some cases, the reverse is true. The rate of attack may be altered by the solubility of the reaction products of the particular concrete. A lower hydroxide ion concentration generally causes more rapid attack on the concrete surface. Also, since high temperatures usually accelerate chemical attack, better protection is required than for normal temperatures.

Generally there are two ways to mitigate chemical attack, (1) choose the right concrete composition to make it less permeable or isolate it from the environment by using a suitable coating, or (2) modify the environment to make it less aggressive to the concrete (Addis 1994). Kuenning (1966) studied the nature of aggressive chemicals, modes of attack, and reaction products for mortars exposed to acids, aluminates, ammonium salts, borates, carbonates, chlorates, chlorides, chromates, ferrocyanides, fluosilicates, magnesium salts, manganates, molybdates, nitrates, nitrites, phosphates, seawater, stannates, sulfates, alcohols, amino acids, linseed oils, esters, benzene, and sugars. Type I and Type V cements were studied at varying water-cement ratios. He found that resistance of mortar to chemical attack was increased by longer curing time and by a decrease in water-cement ratio. The Type V cement mortar was more resistant to sulfate attack than the other mortars, but not to acidic sulfates or those which contained ammonium or magnesium. The zero-C_3A cement mortar was generally lower in resistance to chemical attack than Type V.

Basson (1989) derives in his publication an aggressiveness index of a water sample, obtained from the chemical analysis of the water and adjusted by factors such as prevailing temperature, flow conditions, or wet and dry cycles of the exposed concrete Guidelines with protective treatments are given in the final index at the end of this publication.

Salts

Many solutions that have little or no chemical effect on concrete, such as brines and salts, may crystallize upon drying. It is especially important that concrete subject to alternate wetting and drying of such solutions be impervious to them. When free water in concrete is saturated with salts, the salts crystallize in the voids near the surface during drying, sometimes exerting sufficient pressure to cause scaling. Sodium sulfate and sodium carbonate, sometimes present in ground water, are known to cause concrete deterioration from salt crystallization, also called physical salt attack (Haynes et al. 1996, ACI 201 2001, and Stark 2002). Physical attack by sulfate salts can be distinguished from conventional, chemical sulfate attack, for example, by evaluating the sulfate content of the concrete. Chemical sulfate attack increases the sulfate content of the concrete whereas physical salt attack most likely does not. Chemical sulfate attack can be evidenced by significant amounts of ettringite and/or gypsum, as well as the characteristic decalcification of the paste and cracking due to expansion. In physical sulfate attack, damage in the form of scaling is usually limited to the exterior surface of the concrete; the concrete is not affected below the surface. Damage due to salt crystallization can occur with a variety of salts; they need not contain sulfate ions. Concrete structures exposed to salt solutions should have a low water-cement ratio (0.45 maximum) to reduce permeability. A vapor barrier system of clean drain rock and plastic sheeting under slabs should be provided along with proper drainage away from the structure (Fig. 2) (Haynes et al. 1996 and Kanare 2005).

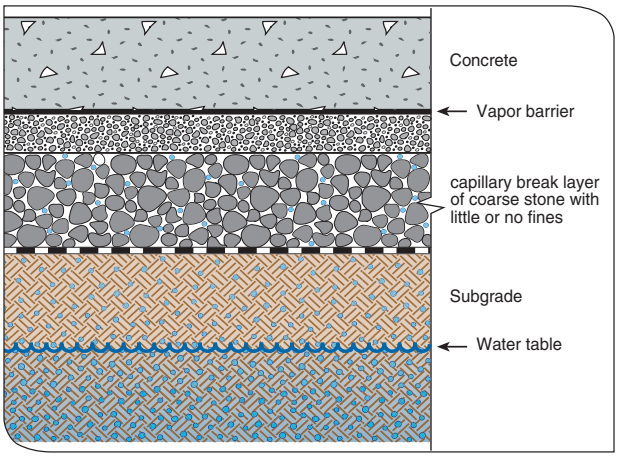


Fig. 2. Low water-cement ratio concrete, a layer of coarse aggregate, and a vapor barrier sheet help prevent concrete deterioration due to salt attack.

Acids

Acids attack concrete by dissolving both hydrated and unhydrated cement compounds as well as calcareous aggregate. Siliceous aggregates are resistant to most acids and other chemicals and are sometimes specified to improve the chemical resistance of concrete, especially with the use of chemically-resistant cement. Siliceous aggregate should be avoided when a strongly basic solution, like sodium hydroxide, is present, as it attacks siliceous aggregate. In certain acidic solutions it may be impossible to apply an adequate protective treatment to the concrete, and the use of a "sacrificial" calcareous aggregate should be considered, particularly in locations where the acidic solution is not flowing. Replacement of siliceous aggregate by limestone or dolomite having a minimum calcium oxide concentration of 50% will aid in neutralizing the acid. The acid will attack the entire exposed surface more uniformly, reducing the rate of attack on the paste and preventing loss of aggregate particles at the surface. The use of calcareous aggregate may also retard expansion resulting from sulfate attack caused by some acid solutions. Within reason, the paste content of the concrete should be minimized—primarily by reducing water content and using a well-graded aggregate—to reduce the area of paste exposed to attack. High cement contents are not necessary for acid resistance. Concrete deterioration increases as the pH of the acid decreases below about 6.5 (Kong 1987 and Fattuhi 1988).

Properly cured concrete with reduced calcium hydroxide contents, such as occur when pozzolans are used, may experience a slightly slower rate of attack from acids. This is because acid resistance is linked to the total quantity of calcium-containing phases, not just the calcium hydroxide content (Matthews 1992). Resistance to acid attack is primarily dependent on the concrete's permeability and water-cement ratio.

Acid rain (often with a pH of 4 to 4.5) can slightly etch concrete surfaces, usually without affecting the performance of exposed concrete structures. Extreme acid rain or strong acids may warrant special concrete designs or precautions, especially in submerged areas. The American Concrete Pressure Pipe Association (ACPPA 2000) provides guidelines for granular soils with a pH below 5 and the total acidity of the soil exeeding 25 meq/100 gm and requires one of the following precautions to be used.

- Backfill in the pipe zone with consolidated clay material or calcareous material;
- Acid resistant membrane on or around the pipe; or
- 8 to 10% silica fume in the mortar coating.

Where soil pH is below 4, the pipe should be installed in an acid resistant membrane or in an envelope of non-aggressive consolidated clay (ACPPA 2000). Natural waters usually have a pH of more than 7 and seldom less than 6. Waters with a pH greater than 6.5 may be aggressive if they contain bicarbonates.

Water that contains bicarbonates also contains dissolved free carbon dioxide (CO_2) and carbonic acid (H_2CO_3) which can dissolve calcium carbonate unless it is saturated. This "aggressive carbon dioxide" acts by acid reaction and can attack concrete and other portland cement products whether or not they are carbonated. Methods are presented in Steinour (1975) for estimating the amount of aggressive carbon dioxide from an ordinary water analysis when the pH is between 4.5 and 8.6, and the temperature is between 0 °C (32 °F) and 65 °C (145 °F). The German Institute of Standardization Specification DIN 4030-2 includes criteria and a test method for assessing the potential of damage from carbonic acid-bearing water.

Calcium-absorptive acidic soil can attack concrete, especially porous concrete. Even slightly acidic (pH of 5 to 6.9) solutions that are lime deficient can attack concrete by dissolving calcium from the paste, leaving behind a deteriorated paste consisting primarily of silica gel. Langelier Saturation Index values for a water solution and calcium-absorption test data on a soil sample can be used to test for this condition (Hime 1986 and Steinour 1975). Negative Langelier Index values indicate a lime deficiency. Hime noted one project with concrete deterioration had index values of -4.2 to -7.1 in the water, and over 90% calcium absorption in the soil (percent calcium removed from a lime solution by an equal weight of soil). Chemical attack by calcium absorptive soil or water can be reduced by using (1) concrete with low permeability and limestone aggregates; (2) limestone fill around the concrete to help prevent deterioration (Hime 1986); and (3) cement- or lime-stabilized soil, flowable fill, grouting, or other techniques to increase the pH around the concrete.

Steinour (1966[a]) discusses the addition of calcium carbonate to weakly and strongly acidic solutions to minimize low pH conditions. Equations are provided to determine the resultant pH and the potential ability of the solution to attack concrete. Organic acids are discussed in Steinour (1966), who notes that organic acids can be aggressive at exceedingly small concentrations if there is good flow or replacement of the solution at the concrete surface.

Table 3 shows parameters that influence the rate and extent of acid attack and resistance.

Table 3. Acid Attack and Resistance of Concrete

Acid attack increases with	Acid resistance increases with
• increase in acid concentration	• decrease in permeability of cement paste (low w/cm-ratio)
• continuous and fast renewal of acidic solution at the concrete/liquid interface	• low proportions of soluble components in concrete
• higher temperatures	• creation of a durable protective layer of reaction products with low diffusion coefficient
• higher pressure	

Sulfates

Protection against sulfate solutions is usually addressed by a low water-cementitious materials ratio and the proper selection of a portland cement, blended cement, or cement plus pozzolan or slag (see Table 1 and Stark 1989). Fig. 3 illustrates the importance of a low water-cement ratio, regardless of cement type. Fig. 4 demonstrates the visual ratings for concrete beams exhibiting various levels of sulfate deterioration. A high water-cement ratio concrete exposed to severe sulfate solutions will still deteriorate rapidly even if a sulfate-resistant cement (like Type V) is used. The importance of cement type is most significant with moderate water-cement ratios (0.40 to 0.50). The effect of water-cementitious materials ratio is similar to water-cement ratio.

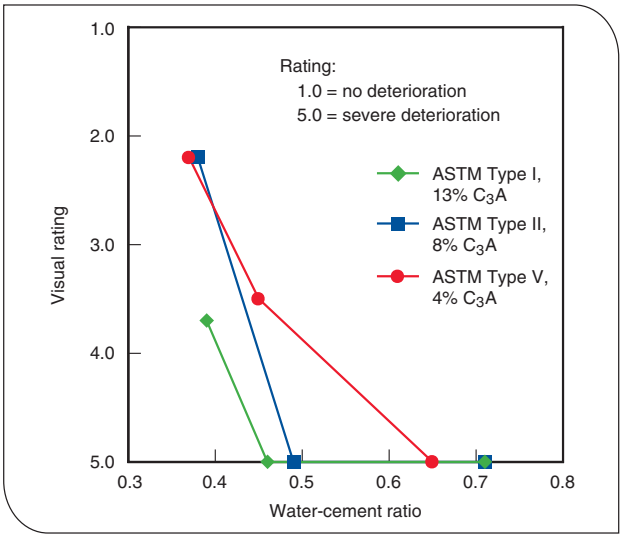


Fig. 3. Average 16-year ratings of concrete beams in sulfate soils for three portland cements at various water-cement ratios (Stark 2002).

Fig. 4. Illustration of durability range corresponding to visual ratings (left to right) of 1.1, 2.5, and 5.0, respectively. (IMG25531)

Sulfates react with hydrated aluminate phases in concretes to form the expansive compound ettringite, the primary destructive compound in sulfate attack. This is why sulfate-resistant cements have low tricalcium aluminate contents. Sulfate can also react with calcium hydroxide in the paste to form gypsum. The crystallization of sodium sulfate salt due to wetting and drying also attacks concrete and appears as surface scaling (Technology Publishing Company 1992); see also section on "Salts" above.

Some sulfate solutions are more aggressive than others; for example, magnesium sulfate can attack calcium silicate hydrate, the primary component of hydrated cement responsible for strength and other properties of concrete (Kosmatka 1988). Kuenning (1966) studied different sulfate solutions. Silica fume (ASTM C1240), Class F fly ash (ASTM C618), and slag (ASTM C989) can improve sulfate resistance. However, one study (Cohen 1988) illustrated that a high concentration of magnesium sulfate solution damaged silica-fume cement paste much more than Type I or Type V cement paste, whereas the silica fume improved resistance to sodium sulfate solutions.

Environmental conditions also have a great influence on durability. Wet/dry cycling is much more severe than continuously wet conditions for sulfate attack. Therefore, testing of concrete mixtures to determine potential sulfate resistance should simulate the conditions to which the structure will be exposed. The sulfate resistance of concrete materials can be evaluated by using a saturated mortar bar test, ASTM C1012. This test is valuable in assessing the sulfate resistance of concrete that will be continuously wet, but it does not evaluate the more aggressive wet-dry cycling environment. The test can be modified to include wet-dry cycling or the U.S. Bureau of Reclamation's (1992) wet-dry concrete prism test for sulfate attack can be used. ASTM C1580 (for Soil), ASTM D516 (AASHTO T 290) (for water), or the U.S. Bureau of Reclamation method (1975) can be used to test soil and/or water for sulfate ion content to determine the severity of the sulfate exposure.

High cement contents, more than 385 kg/m^3 (650 lb/yd^3), with corresponding low water-cement ratios, are very beneficial to sulfate resistance; however, high cement and high paste contents should be avoided if sulfuric or other acid is present (Kong 1987 and Fattuhi 1988). Coatings can also provide protection against sulfate attack (Fig. 5). Refer to Stark (2002) for more information on the performance of concrete in a sodium sulfate environment.

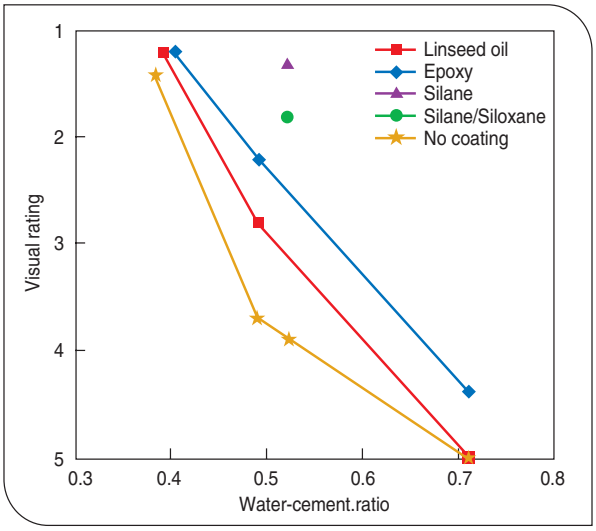


Fig. 5. Effect on sulfate resistance (8 years of very severe exposure) of coatings on concrete. See Fig. 4 for illustration of ratings. (Stark 2002)

Stress Corrosion

Stress corrosion of concrete is a deterioration induced by mechanical stress (load) when concrete is under chemical attack. The flexural strength of concrete or mortar can decrease over 50% due to load applied to concrete when exposed to certain corrosive chemicals, as compared to unloaded samples in the same chemical solution. Stress corrosion occurs only when both chemical attack and load are present simultaneously. The stress accelerates both the dissolving and expansive types of chemical attack. Some substances, such as sodium chloride, that do not attack unstressed concrete, can become destructive when they come in contact with stressed concrete. The amount of stress corrosion increases with the load level and generally increases with the concentration of the corrosive chemical. Substances with which stress corrosion has been observed include ammonium sulfate, ammonium nitrate, sodium sulfate, sodium chloride, magnesium chloride, and magnesium sulfate (Schneider 1987). The chemical resistance of concrete discussed in this publication is aimed at unstressed concrete. More research is needed on stress corrosion of concrete, as little information is available.

Corrosion of Embedded Metals

Corrosion of Reinforcement

The highly basic (alkaline) nature of concrete protects embedded steel from corrosion. The high pH (greater than 12.5) environment provides a protective oxide film on the steel that is passive and non-corrosive. However, carbonation or chloride ions can destroy or penetrate this passive film. Carbonation reduces the pH and allows oxygen access to the steel, thereby developing a potentially corrosive condition. Carbonation is not a problem with good quality concrete. Concrete's resistance to carbonation can be improved by the application of a proper coating. Usually, use of a material having a minimum solids content of 60% and a minimum thickness of 200 micrometers applied in 2 or 3 coats is adequate to resist carbonation (Wei 1990).

Chloride ions aggravate or cause corrosion by (1) reducing resistivity, thereby increasing corrosion currents; (2) increasing the threshold pH required to protect the steel; and (3) penetrating or dispersing the oxide film and combining with iron to form soluble iron chloride that moves iron away from the steel to form expandable iron oxides.

Once chloride ions or carbonation have destroyed or penetrated the passive film and moisture and oxygen are present, an electric cell is formed along the steel or between steel bars and the electrochemical process of corrosion and rust formation begins. Rusting is an expansive process that induces internal stress in the concrete and eventually cracks and spalls the concrete over the reinforcing steel (Fig. 6). Of course, rusting also reduces the cross-sectional area and strength of the reinforcing steel. The rate of corrosion is controlled by the electrical resistivity, chloride-ion concentration, moisture content, and availability of oxygen in the concrete. Conclusions concerning corrosion activity of embedded steel can be made by using the information obtained with ASTM C876, *Test Method for Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete*.

Fig. 6. The damage to this concrete beam, located in a parking structure, resulted from chloride-induced corrosion of steel reinforcement. (IMG25527)

Corrosion of Nonferrous Metals in Contact with Concrete

Nonferrous metals are frequently used in construction in contact with portland cement concrete. Metals such as zinc, aluminum, and lead—and alloys containing these metals—may be subject to corrosion when embedded in, or in surface contact with, concrete.

Since the products of corrosion occupy a greater volume than the metal that has corroded, internal forces of expansion can crack and spall the surrounding concrete. Galvanic corrosion will occur if aluminum and steel or other metals of dissimilar composition are both embedded in concrete and in contact with each other. See PCA (2002) for more information on dissimilar metal corrosion. If aluminum is to be embedded in reinforced concrete, it should be electrically insulated by a permanent coating. Bituminous paint, alkali-resistant lacquer such as methacrylate, or zinc chromate paint can be used. Impervious protective organic coatings such as bitumen, phenolic varnish, chlorinated rubber, or coal-tar epoxies, can also be used on the metal surfaces to prevent galvanic action when it is not possible to separate the metals.

Where it is necessary to embed lead in concrete, protection of the embedded portion with organic coatings is suggested to prevent corrosion of the lead and to prevent galvanic action with reinforcing steel. When copper is used in conjunction with steel, it should be electrically insulated from the steel by means of an impervious organic coating or by use of short lengths of polyethylene tubing slit and slipped over the copper. Copper itself is practically immune to corrosion in chloride-free concrete except where ammonia is present. However, copper, as well as aluminum and lead, should be avoided in concrete containing chlorides. For more information see Woods (1968) and Monfore (1965).

Preventing Reinforcement Corrosion

All concrete structures that will be exposed to a marine environment (saltwater and/or salt air), freezing temperatures, or deicer chemicals require a high-quality air-entrained concrete and ample concrete cover over the reinforcing steel. Concrete cracking should be avoided. Where chlorides and oxygen in the presence of moisture are likely to reach the reinforcing steel, protective treatments are recommended. Chloride-ion-induced corrosion should be of primary concern in bridge decks and parking garages where deicers are used and in marine structures.

The concrete mix design plays an important role in preventing corrosion. In addition to the recommendations for good quality concrete found at the beginning of this document, specific concrete materials and mix proportions should be considered to lower corrosion activity and optimize protection of embedded steel. The first step to maximize chloride (corrosion) resistance is to reduce permeability by specifying a maximum water-cement ratio of 0.40 or less (Stark 1989[a]). Use of fly ash (Class C or Class F), silica fume, water reducers, and high cement contents can lower corrosion activity. These methods can be combined with other corrosion protection methods, including

coatings on the concrete or reinforcement, increasing the cover over the steel, and using corrosion inhibitors. Some additional protective strategies to prevent reinforcement corrosion are discussed below.

Nickel-plated steel will not corrode when embedded in chloride-free concrete. The nickel plate will provide protection to steel as long as no breaks or pinholes are present in the coating. The coating should be about 0.1 mm thick to resist rough handling. Minor breaks in the coating may not be very detrimental in the case of embedment in chloride-free concrete; however, corrosion of the underlying steel could be strongly accelerated in the presence of chloride ions.

Cadmium coatings will satisfactorily protect steel embedded in concrete, even in the presence of moisture and normal chloride concentrations. Stainless steel and galvanized steel reinforcement are also used to reduce corrosion in chloride-free concrete. Galvanized steel should conform to ASTM A767/A767M, *Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement*. Chloride ions will cause corrosion of galvanized steel in concrete and may lead to severe cracking and spalling of the surrounding concrete. The use of chloride admixtures should be avoided in concrete containing galvanized steel exposed to corrosive or wet environments. Stark (1989[a]) illustrates the effect of humidity and chloride content on corrosion of black (untreated) and galvanized steel bars. Special stainless steels or monel may be used in concretes containing chloride if test data support their performance.

Fusion-bonded epoxy-coated reinforcing steel is very popular for the construction of marine structures and pavements, bridge decks, and parking garages exposed to deicer chemicals. The epoxy coating prevents chloride ions and other corrosive chemicals, moisture, and oxygen from reaching the steel. If the epoxy coating is damaged during construction, its protection ability is lost, so epoxy repair kits are available to recoat the damaged portion of the bar. Epoxy-coated bars should conform to ASTM A775/A775M, *Specification for Epoxy-Coated Reinforcing Steel Bars*, and to ASTM D3963/D3963M, *Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.*

Concrete surface sealers, water repellents, surfacings, and overlays stop or reduce chloride-ion or chemical penetration at the concrete surface. Materials commonly used for this include silanes, siloxanes, methyl methacrylates, epoxies, and other compounds.

Latex-modified concrete, low-slump dense concrete, low water-cement ratio superplasticized concrete, silica-fume concrete, and polymer concrete are often used in overlays to reduce chloride-ion or chemical penetration. Concrete with silica fume or super-plasticizers is also used in new and replacement construction monolithically. Impermeable interlayer membranes (primarily used on bridge decks), prestressing for crack control, or polymer impregnation are also available to help protect reinforcement.

Cathodic protection methods may be used to prevent the electrochemical process of corrosion in reinforced concrete. Cathodic protection reverses the natural electric current flow through concrete and reinforcing steel by inserting a non-structural anode in the concrete, forcing the steel to be the cathode by electrically charging the system. Since corrosion occurs where electric current leaves the steel, reinforcement cannot corrode as it is receiving the electric current.

Corrosion inhibitors such as calcium nitrite are used as an admixture to reduce corrosion. Some calcium nitrite corrosion inhibitors are penetrating formulations applied to the surface of hardened concrete. The protective ions migrate through the pore structure towards the steel. Whether used as an admixture or applied as a surface treatment, calcium nitrite corrosion inhibitors block corrosion by chemically reinforcing and stabilizing the passive film on the reinforcing steel. A certain amount of calcium nitrite can stop corrosion up to a certain threshold level of chloride ion. Therefore, increased chloride levels require increased levels of calcium nitrite to stop corrosion. Organic-based corrosion inhibitors, based on amine and amine and fatty ester derivatives, are also available. (Nmai et al. 1992 and Berke et al. 2003).

The threshold level at which corrosion starts in normal concrete with no inhibiting admixture is about 0.15% water-soluble chloride ion (0.20% acid-soluble) by weight of cement. Admixtures, aggregate, and mixing water containing chlorides should be avoided, but in any case, the total acid-soluble chloride content of the concrete should be limited to a maximum of 0.08% and 0.20% (preferably less) by weight of cement for prestressed and reinforced concrete, respectively (ACI 201.2R and ACI 222R). Acid-soluble chloride content of concrete is measured in accordance with ASTM C1152, *Test Method for Acid-Soluble Chloride in Mortar and Concrete*. ACI 318 bases the chloride limit on water-soluble chlorides, with maximum limits of 0.06% for prestressed concrete and 0.15% for reinforced concrete. Testing to determine water-soluble chloride ion content should be performed in accordance with ASTM C1218, *Test Method for Water-Soluble Chloride in Mortar and Concrete* or ASTM C1524 *Test Method for Water-Extractable Chloride in Aggregate* (Soxhlet Method). ASTM C1524 should be used when the aggregates contain a high amount of naturally occurring chloride.

ASTM G109 can be used to determine the effects of chemical admixtures on the corrosion of embedded steel reinforcement in concrete exposed to chloride environments.

Fiberglass-reinforced plastic (FRP) reinforcement can be used to replace part or all of the steel reinforcement in portland cement or polymer concrete exposed to chemicals that are extremely corrosive to metal. Plastic reinforcing bars are available in most conventional bar sizes. The lightweight, nonmagnetic, nonconductive, high-strength (tensile strength greater than 690 MPa or 100,000 psi) bars are chemically resistant to many acids, salts, and gases and are unaffected by electrochemical attack. Commercially available FRP reinforcement is made of continuous aramid, carbon, or glass fibers embedded in a resin matrix. The resin allows the fibers to work

together as a single element. Resins used in FRP reinforcement include polyester, vinyl ester, nylon, or polyethylene.

Consult ACI 441.1R (2006) for special design considerations. Using more than one protection method simultaneously can result in significant savings in maintenance costs and produce a structure with a long, trouble-free life. For example, the advantages of using epoxy-coated reinforcement are obvious; and epoxy coating stops chloride at the reinforcing steel. However, damaged areas in the coating due to handling during transportation and construction or coating imperfections can be a source of corrosion. An additional protection system, such as a corrosion-inhibitor or silica-fume admixture in the concrete, can be used to further protect the steel at coating-damaged areas. With good design and construction practices and one or more available corrosion protection systems, a concrete structure can be built to endure even the severest environment for many years with little maintenance.

Cover over Steel

Sufficient concrete cover must be provided for reinforcement where the surface is to be exposed to corrosive substances. It is good practice to increase the concrete cover over the reinforcing steel above the normal amount specified in ACI 318 *(Building Code Requirements for Reinforced Concrete and Commentary)*. Extra cover slows down the ingress of corrosive chemicals, such as chlorides, that attack reinforcing steel. ACI 201 (2001) recommends a minimum cover of 38 mm (1½ in.) and preferably at least 50 mm (2 in.) for concrete in moderate-to-severe corrosion environments.

Oesterle (1997) and Stark (1989[a]) confirm the need for 65 mm to 75 mm (2½ in. to 3 in.) of cover over reinforcement to provide corrosion protection. Some engineers specify 90 mm (3½ in.) or more of concrete cover over steel in concrete exposed to chlorides or other corrosive solutions. However, large depths of cover on the tension side of concrete members can lead to excessive crack widths. Tolerable crack width for reinforced concrete is 0.41 mm (0.016 in.) with a protective membrane, 0.18 mm (0.007 in.) for deicer exposure, and 0.10 mm (0.004 in.) for water-retaining structures (ACI 224R). Carbon-steel bar supports for reinforcement should not extend to the concrete surface unless noncorrosive plastic-protected bar supports are used. Deep recesses in the concrete (cones) should be provided for form ties, and they should be carefully filled and pointed with mortar or sealed with a plug. In addition to surface treatments, epoxy-coated reinforcing steel, plastic reinforcement, cathodic protection, use of an interlayer membrane, and other techniques should be considered for exposure to chemicals extremely hazardous to reinforcing steel.

Design Considerations

Forms and Curing Membranes

Whenever concrete is to be coated for corrosion protection, the forms should be coated with materials (sealers or form-release agents) that will not impregnate or bond to the concrete after form removal. Hence, forms coated with form oils or waxes should not be used against surfaces to be coated. Many curing membranes will also develop little or no bond to coatings applied over them. If form oils, waxes, or curing membranes are present, they should be removed by sandblasting, scarifying, or other processes. Acid etching or washing should be avoided as it may not remove certain curing compounds or form-release agents. Some curing compounds may provide an adequate surface for some surface treatments, and therefore product manufacturers should be consulted as to product compatibility.

Drainage

Where spillage of corrosive substances is likely to occur, a floor should have a slope to drains of at least 2% to facilitate washing.

Finishes

The finish should be compatible with the intended use. Where floors will carry pedestrian or vehicular traffic, some traction should be provided, especially if the floor will be wet in service. Rough surfaces, however, do not repel moisture or facilitate drainage as well as dense, smooth surfaces. They are also more difficult to clean. With adequate drainage and regular cleaning, smooth-finished floors may require no further protection for exposure to mild solutions. One type of smooth floor surface is a burnished floor. This surface is obtained by additional steel trowelling to densify the surface during finishing (PCA 1996.)

Special Applications

Special Concretes

Some environments may be so severe that a special concrete needs to be used. Special concretes can be used as overlay over regular concrete or to construct the entire element, such as a slab on ground. Special chemical-resistant concretes include sulfur concrete, polymer concrete, and many other types. Polymer-concrete binders include epoxy, methyl methacrylate, polyester, furan resin, and other polymer formulations. Consult product manufacturers as to the applicability of specific materials for particular environments.

Dampproofing and Waterproofing

Dampproofing retards the penetration of moisture into a structure above or below grade when slight to no water pressure (hydrostatic head) is involved. Waterproofing makes the structure impermeable to water when a hydrostatic head is present. When correct drainage has been provided, the groundwater table is low, and no hydrostatic head exists, dampproofing may be adequate. In general, concrete's permeability decreases as its strength increases. Very little water vapor will pass through a high-strength, dense concrete, but concrete of low strength that is poorly consolidated can be quite permeable. Therefore, the first line of defense against water problems is the use of high quality concrete mixtures and good construction practices.

Dampproofing generally consists of spraying or brushing a specified bituminous material on the outside of walls below grade. While many specifications call for only one coat of material, two lighter applications, made at right angles to each other, are recommended.

For floors on ground, roofing felts, plastic films, or rubber-sheet membranes can be used as vapor retarders or barriers. Polyethylene film is low in cost and easily installed, but it is also easily punctured and difficult to seal at the edges. More durable products are polyethylene-coated kraft paper and glass-reinforced waterproof paper, extrusion coated on both sides with polyethylene.

A waterproofing membrane must be impervious to liquid water and have high resistance to the passage of water vapor. Waterproofing materials (Table 4) are brushed, troweled, sprayed, or otherwise applied to a smooth concrete surface. When correctly applied with skill and care, these products can be impervious to water and water vapor. ASTM D6489-99(2006) *Test Method for Determining the Water Absorption of Hardened Concrete Treated With a Water Repellent Coating* provides a procedure for the determination of the water absorption by a core of concrete taken from a surface treated with a water repellent.

Table 4. Materials Used for Moisture Barriers*

Mineral bentonite panels, granules, spray, trowel
Urethane bitumen membranes
Butyl (rubber) sheet membranes
Neoprene membranes
Fabric-reinforced bitumens
Polyurethane-rubber-coated polyethylene sheets
Polyvinyl chloride sheets
Liquid polymers
Hot-applied bitumen (the original waterproofing coating)
Elastomeric chlorosulfonated polyethylene

* An integral waterproofer incorporated in the concrete mixture is not a satisfactory alternative to waterproofing membrane.

In view of the diversity of moisture-barrier products, the best available advice of the manufacturers and waterproofing contractors should be obtained whenever any major waterproofing is needed.

Joints in walls and floors must be sealed to prevent the passage of water or other unwanted substances into or through them. The American Concrete Institute (ACI) Committee 504 Report, *Guide to Joint Sealants for Concrete Structures*, recommends polysulfides, polysulfide coal tars, polyurethanes, rubber asphalts, low-melting-point asphalts, and hot-applied PVC coal tar as suitable field-applied sealants for water-excluding structures. Waterstops also may be used in the joints, or for even more positive protection, both a waterstop and joint sealant may be used. Refer to Kanare (2005) for more information on dampproofing and waterproofing concrete floors.

Architectural Concrete

Many specifiers require that precast and cast-in-place architectural concrete surfaces be protected by a water-repellent coating. Such coatings serve to (1) prevent deterioration of concrete surfaces by industrial airborne chemicals, (2) inhibit soiling of surfaces, (3) facilitate cleaning of surfaces, (4) accentuate the color of aggregate and mortar in exposed-aggregate architectural concrete, and (5) avoid color change of surfaces when wet.

Ideally such coating materials should be water-clear, capable of being absorbed into the concrete surface, long lasting, and not impart a glossy coating effect or discolor on exposure to sunlight or atmospheric contaminants. A great number of products of varied chemical composition are sold for this use.

Laboratory research and analysis of the coatings indicate that low-viscosity acrylic resins based on methyl methacrylate generally offer the best protection for exposed-aggregate surfaces. Silanes and siloxanes are also often used as water repellents on architectural concrete.

Paint

Paints are commonly used for the protection and decoration of concrete surfaces. Paint is formulated to give certain performance under specified conditions. Since there is a vast difference in paint types, brands, prices, and performances, knowledge of composition and performance standards is necessary for obtaining satisfactory concrete paint. The quality of paint for concrete is not solely determined by the merits of any one raw material used in its manufacture. Many low-cost paints with marginal durability are on the market. In order to select proper paints, the user should deal with manufacturers supplying products of known durability and obtain from them, if possible, technical data explaining the chemical composition and types of paints suitable for the specific job at hand.

A clean, dry surface is a prerequisite for the success of most applied decorative or protective coatings. Concrete should be effectively moist cured, and then it should be allowed to air dry before application of a paint. Moisture remaining in the concrete can cause blistering and peeling of some paints.

Many types of paint are used on concrete surfaces. These include portland cement-based paint; emulsions consisting of alkyd and latex; latexes such as acrylics, polyvinyl acetate, and styrene butadiene; and solvent paints consisting of the oil vehicles, styrene butadiene, chlorinated rubber, vinyl, catalyzed epoxies, polyesters, and urethanes. Some are more suitable than others for exterior surfaces.

Portland cement-based paints can be used on either interior or exterior exposures. The surface of the concrete should be damp at the time of application and each coat should be cured by dampening

as soon as possible without disturbing the paint. Damp curing of portland cement paint is essential. On open-textured surfaces the paint should be applied with stiff-bristle brushes such as scrub brushes. Paint should be worked well into the surface. For concrete of smooth or sandy surface, whitewash or Dutch-type calcimine brushes work best.

Latex materials are used in some modified portland cement paints to retard evaporation, thereby retaining the necessary water for hydration of the portland cement. Moist curing is unnecessary with latex-modified cement-based paint and, in fact, may be undesirable.

Latex paints are resistant to alkali and may generally be applied to new concrete after 10 days of good drying weather. The preferred method of application is by long-fiber, tapered nylon brushes 100 mm to 150 mm (4 in. to 6 in.) wide. However, application may also be made by roller or spray. Latex paints may be applied to damp, but not wet, surfaces; if the surface is moderately porous or extremely dry conditions prevail, prewetting of the surface is advisable. Use of a primer, if available, is recommended.

Portland cement paints and latex paints are commonly used for interior or exterior concrete walls in normal climates. Wet environments or sanitary structures may require a polymer paint. Floors require an abrasion-resistant polymer paint (ACI 515.1R and PCA 1992). Refer to ASTM D6237 *Guide for Painting Inspectors (Concrete and Masonry Substrates)* for key elements of surface preparation and coatings application.

Maintenance

Not all exposures are so severe that a barrier system is required. Proper maintenance such as routine sweeping and washing along with wiping up spills immediately can minimize chemical attack from liquids or abrasion from fine materials. For floors, a periodic waxing helps keep materials from being absorbed into the concrete, and proper drainage and joint maintenance can direct these materials off the concrete surface (Mailvaganam 1991).

Cleaning and Surface Preparation

Proper preparation of the concrete surface and good workmanship are essential for the successful application of any protective treatment that must bond to, or be absorbed into, a concrete surface. It is important to have a firm base free of grease, oil, efflorescence, laitance, dirt, and loose particles.

Surface preparation and cleaning are distinct steps in readying a surface for coating or sealing. The first step should be initial cleaning, which removes heavy deposits of oil and grease or other dirt and contaminants. The second step in preparing a surface for coating removes weakened surface layers or laitance, provides a surface profile (roughness), and removes additional contaminants that cleaning does not. A final cleaning should be performed again after surface preparation, immediately before coating or sealing, to remove airborne contaminants and dust. This can be done by vacuuming or blowing down with oil-free compressed air. The best methods of cleaning and preparing the concrete surface depend on job conditions and should be performed only when appropriate safety precautions have been taken.

Surface preparation should be performed in accordance with the guides and standards from the American Society for Testing and Materials (ASTM), American Concrete Institute (ACI), National Association of Corrosion Engineers (NACE), the International Concrete Repair Institute (ICRI), and the Society for Protective Coatings (SSPC), some of which are discussed below.

Concrete should normally be well cured (7 days) and dry before protective treatments are applied. Moisture in the concrete may cause excessive internal vapor pressure that can cause blistering and peeling of certain coatings. However, some sealers, such as certain silanes, actually require some moisture in the slab upon application. The coating manufacturer should be consulted for recommendations. Drying time of concrete varies, and new concrete should dry for at least 30 days before coatings are applied, but longer periods are typically better.

Depending on service conditions and coatings used, concrete is considered dry enough for many coatings when no moisture is indicated for example by test method ASTM D4263, *Test Method for Indicating Moisture in Concrete by the Plastic-Sheet Method.* Kanare (2005) provides extensive information on moisture tests and concerns.

Surface Repair: Patching, Removal of Protrusions

On both new and old concrete, surfaces to be treated should not only be clean and dry, they should be uniform, and have no protrusions or holes—to enable the coating or sealer to achieve optimum performance. Precautions should be taken to eliminate objectionable voids in the surface that might cause pinholes in the protective treatment. Good vibration and placing techniques will reduce the number of surface imperfections in concrete. The concrete surface should be smoothed immediately after removal of forms by applying grout or by grinding the surface and then working grout into it. Protrusions on the concrete surface should be removed by chipping, and the area smoothed with an abrasive material such as a grinding stone. Large voids should be filled or patched. Other surface treatments that have good adhesion to cured concrete, such as latex-modified grouts or mortars, epoxy, or other synthetic resin formulations, can also be used to produce a smooth surface. *The Guide for Selecting and Specifying Materials for Repair of Concrete Surfaces* (International Concrete Repair Institute 1996) can be consulted for additional information.

Patch materials should be suited to the application. Sometimes, the patch itself is the protective treatment. Very low permeability, dense patches, for example, have been used to limit chloride ion ingress

and protect steel reinforcement. However, one study found that this led to increased reinforcement corrosion as a result of differences in chloride and oxygen diffusion rates between the old concrete and the new patch material (PCA 1994). The corrosion then led to spalled patch areas. The study recommends matching the patch material as closely as possible to the existing substrate. This approach minimizes differential chloride ion ingress and oxygen diffusion, and reduces the possibility of spalled patches. If required, the entire surface can then be coated to provide uniform protection and appearance.

Cleaning Methods

Initial cleaning can be done with chemicals, steam, and sometimes, solvents. Chemical cleaning with hot water and TSP (trisodium phosphate) or commercial detergents removes contaminants from the surface. This solution should be thoroughly rinsed to remove residues of the cleaning chemicals. Steam cleaning effectively removes water-soluble contaminants from the surface of concrete; detergents or degreasers added to the water can increase the effectiveness of steam cleaning. De-greasing, if needed, is accomplished by applying a mixture consisting of a cleaner, curing compound remover (a chlorinated, emulsifiable solvent), an industrial grease remover (a highly alkaline, low-phosphate, biodegradable detergent), and liberal amounts of water. The mixture is scrubbed into the concrete surface, repeatedly, if necessary. The surface finally is rinsed, scrubbed with water, and vacuumed to a damp condition. Chemical stripping softens or dissolves cured coatings, but is only for small areas that cannot be prepared more effectively by other means. Additional cleaning or surface preparations must follow chemical stripping to remove contaminants from the chemical cleaning process. Hydrocarbon solvents are not recommended for general cleaning because they dissolve the contaminant, possibly spreading it and carrying it deeper into the concrete pores. (See Holl 1997 for further information on cleaning and preparing the surface.)

Acid treatment is not recommended. It may not provide a proper surface for mechanical bond and may even impair good bond with the coating or sealer if all of the acid is not removed. The acids themselves are hazardous materials. However, acid treatment may be the only option for surface preparation on some jobs, such as sites with limited access to machinery. If acid treatment of the surface is performed, it should be in accordance with ASTM C811 and D4260, and the acid must be thoroughly removed and neutralized so that good bond between the concrete and coating is possible. ASTM D4262 can be used to test the pH of the cleaned surface, which should be around 7 (neutral).

Surface preparation is achieved by scarifying, grinding, shot-blasting, waterblasting, abrasive blasting, or flame cleaning. Grinders or scabblers can be used to remove weak concrete, friable laitance, high spots, and finishing defects. Diamond grinding can improve smoothness and wear resistance of floors. Scarifiers can remove laitance, paint marks, pitch adhesives, and thermoplastic adhesives, level the concrete, and produce nonskid surfaces. The machines have hardened-steel cutting wheels that hammer off the surface. Shotblasting or abrasive blasting removes surface contaminants. Machines with vacuum bags make the operation almost dust-free.

Concrete can also be treated by flame cleaning. An oxyacetylene blowpipe is passed over the surface of concrete, followed by a mechanical after-treatment using rotary brushes or vibratory machines such as scalers. The flame reaches a temperature of about 3100 °C (5600 °F), which is hot enough to damage the top layer of concrete, about 1 mm to 4 mm (0.04 in. to 0.16 in.). This material is then removed by brushing, and the surface is swept or vacuumed to remove the dust. Thoroughly prewetting the slab ensures uniform concrete removal. Materials such as rubber streaks, oil, gasoline, grease, and deicing chemicals can be removed with this method. Flame cleaning is very effective on oil-stained floors, because it does not promote migration of deep-seated oil to the surface. An added benefit of flame cleaning is that it restores alkalinity to the concrete. See Mailvaganam (1991) and Beilner (1990) for further information. Flame-cleaned surfaces should be coated immediately after cleaning.

In some cases, mechanical methods of cleaning have led to poor bond due to a cracked substrate. When mechanical (impact) methods are used, a follow-up with waterblasting can remove any cracked or loose surface material. Waterblasting and flame cleaning, unlike the mechanical methods, minimize cracking of the concrete substrate (Fig. 7). After a concrete surface is cleaned and dried, all residue must be removed. Industrial vacuum machines, air pressure, and water washing are used to remove dust particles from a prepared surface.

Fig. 7. Waterblasting equipment can prepare horizontal surfaces without damaging the concrete substrate. (IMG25539)

Concrete cast against forms is sometimes too smooth for adequate adhesion of protective coatings. Such surfaces should be lightly sandblasted or ground with silicon carbide stones to obtain a slightly roughened surface. See PCA's *Removing Stains and Cleaning Concrete Surfaces* (PCA 1988) for more information.

ASTM International[1] documents on cleaning concrete are listed as follows:

- C811, *Practice for Surface Preparation of Concrete for Application of Chemical-Resistant Resin Monolithic Surfacings*
- D4258, *Practice for Surface Cleaning Concrete for Coating*
- D4259, *Practice for Abrading Concrete*
- D4260, *Practice for Liquid and Gelled Acid Etching Concrete*
- D4261, *Practice for Surface Cleaning Concrete Unit Masonry for Coating*
- D4262, *Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces*

ASTM D7234 *Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers* can be used to determine if a concrete surface is properly cleaned and adequate for a particular coating. ASTM D7234 can also be used as a quality control test to assure that particular coatings meet specified bond-strength requirements.

ACI 515.1R and ACI 503R provide information on surface evaluation including methods, where applicable, to test the bond of the surface treatment to the concrete. Treatment manufacturers' recommendations for surface preparation should be properly executed.

Concrete Protection in Europe

The European concrete standard EN 206-1 classifies exposure classes related to environmental actions such as "chemical attack" and "corrosion induced by chlorides." Based on severity of an exposure condition, types and amount of cementitious materials and maximum water-to-cementitious materials ratio are specified. The European Standard EN 1504 covers *Products and Systems for the Protection and Repair of Concrete Structures*. The 10-part document provides guidelines for maintenance and protection of concrete components. Coatings to be considered as "surface protection systems for concrete" must comply with EN 1504-2. Part 9, contains comprehensive information on the assessment of the actual conditions and on planning the work. Also included are classification of repair methods, how to choose appropriate materials, and how to specify the implementation.

Choosing the Treatment

Protective treatments for concrete are available for almost any degree of protection required (Fig. 8). A "monolithic surfacing" generally means a continuous coating with a thickness of 1 mm (40 mil) or more (National Association of Corrosion Engineers 1991). Coatings vary widely in composition and performance, and some of the generic classifications given here are so broad that they can serve only as a guide. The reader is advised to seek further, more detailed recommendations from the manufacturer, formulator, producer, or material supplier.[2]

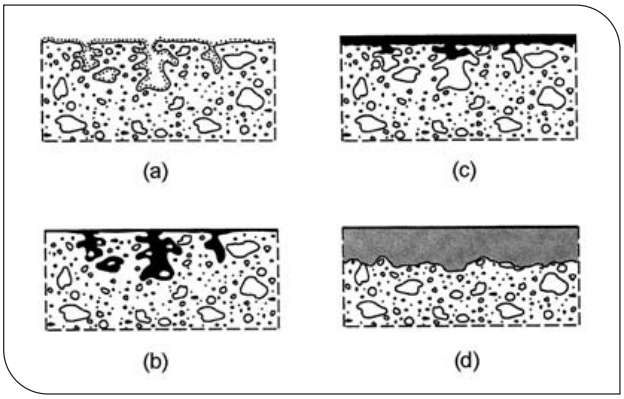


Fig. 8. Four different types of protective treatments for concrete are: (a) hydrophobic (water repelling), (b) sealers, which fill the pores at the surface and can partly be membrane-building, (c) membrane-building coatings, and (d) mortar and concrete coatings.

Every coating is formulated to render a certain performance under specified conditions. Its quality should not be determined solely by the merits of any of its components since the proportioning of ingredients also is very important in determining performance. Coating performance depends as well upon the quality of surface preparation, method and quality of coating application, ambient air conditions during application, and film thickness. Coating failures are most often caused by improper material selection and surface preparation (ICRI 1997). Other reasons for poor performance include inadequacies in film thickness, drying times between coats, curing regimes, and exposure to harsh unsuitable environmental conditions.

Most coatings will perform well if they are placed at mild ambient temperatures, between about 10 °C and 30 °C (about 50 °F and 90 °F). The concrete itself should be above 10 °C (50 °F) when it is being treated. Some treatments such as urethanes and epoxies can be applied at temperatures down to -7 °C (18 °F). Any general discussion of chemical resistance and other properties of coatings must assume optimum formulation, proper methods of applying the coating, and materials suited to the exposure.

Safety is an important consideration in any concrete coating application. Many coatings contain solvents that are fire, explosion, toxic, or environmental hazards. Some materials become volatile only after mixing, so proper handling is very important. In enclosed areas, ventilation should be planned to minimize effects to workers or the public.

[1] ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, Tel. 610.832.9585; Fax 610.832.9555; e-mail: service@astm.org; Website: http://www.astm.org.

[2] These four terms are used interchangeably in this publication.

Application should be planned All employees should be made aware of proper first aid treatment before working with new materials. The producers of the various coatings can provide valuable information—manufacturer literature, Material Safety Data Sheets—on the merits of their products for a particular use and on the proper and safe procedure for application.

Certain materials (thermoplastics) soften at elevated temperatures and may even melt or become ineffective. Various grades of coatings are available for use over a fairly wide temperature range. For concrete coatings, where flavor or odor is important, the U.S. Food and Drug Administration or the Food Directorate of Health and Welfare Canada should be consulted regarding restrictions for materials in contact with food ingredients.

The coating thickness required depends on (1) the exposure, whether continuous or intermittent, (2) the resistance of the material to the chemicals involved, and (3) the ability to form a continuous, pinhole-free surface. As a rule, thin coatings are not as durable as heavier coatings and, hence, are less suitable where there is considerable abrasion. Coating thickness can be measured while the coating is still wet or after it has dried. The following test methods can be used to check coating thickness.

- ASTM C1005, *Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers*
- ASTM D1212, *Measurement of Wet Film Thickness of Organic Coatings*
- ASTM D4138, *Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross-Sectioning Means*
- ASTM D4414, *Measurement of Wet Film Thickness by Notch Gages*
- ASTM D4787, *Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates*
- ASTM D6132, *Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Using an Ultrasonic Gage*

Along with listing the test method for measuring thickness, acceptance criteria should be provided with the procedures. The coating manufacturer/supplier should be able to supply guidance in this area.

The more common protective treatments are listed in the table starting on page 15; the numbers and letters correspond to the descriptions given below in the discussion of "Protective Treatments." For most substances, several treatments are suggested, any of which will provide sufficient protection in most cases. When choosing a type of protection, consider the chemical environment, service condition (that is, splash and spill or immersion), and any mechanical requirements, keeping in mind the consequences of failure and ease of repair.

The information in the guide table is only for determining when to consider various coatings for chemical resistance. Where more specific information is required, particularly to determine whether protection is required for large installations, small mortar prisms representative of the concrete to be used can be immersed in the corrosive liquid and evaluated for resistance as discussed in Kuenning (1966). (See also "Evaluating the Effectiveness of Concrete Surface Protection by Testing.") ASTM C267, *Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings and Polymer Concretes,* can be used to determine the chemical resistance of protective surface treatments when exposed to particular chemicals. ASTM C267 can also be used to determine the relative improvement provided by admixtures.

Where applicable, resin surfacings, especially epoxy, urethane, polyester, and vinyl ester, should meet the requirements of ASTM C722, *Specification for Chemical-Resistant Resin Monolithic Surfacings.* ASTM C722 materials are usually resin-and-filler (fine-aggregate) systems trowel or spray applied to a minimum thickness of 1.5 mm (0.06 in.). ASTM C722 has two types of surfacings—Type A for chemical resistance and moderate-to-heavy traffic, and Type B for mild chemical resistance and severe thermal shock.

Where continuous service over long periods is desirable, it may be more economical to use the higher quality means of protection rather than a lower-first-cost treatment that may be less permanent.

Evaluating the Effectiveness of Concrete Surface Protection by Testing

Surface treatments generally are one of two types: sealers or barriers. A sealer limits the amount of moisture, chlorides, sulfates, or other material that can enter the concrete pores; a barrier provides complete isolation between the concrete and the substance. It may be necessary to test a surface treatment to confirm its ability to protect concrete in a given application. Comparing differences in properties of protected and unprotected concrete allows evaluation of the coating or sealer.

Testing of the concrete could involve the following measurements:

- length change
- weight change
- moisture absorption
- freeze thaw resistance
- chemical ingress
- surface scaling
- bond between coating and substrate
- abrasion

It is also possible to compare concrete properties, such as strength and modulus of elasticity, before and after exposure.

Kuenning (1966) can be used as a guide for developing a test program for concrete protection treatments. In that study, prisms of mortar 15 mm x 15 mm x 100 mm (0.6 in. x 0.6 in. x 3.9 in.) were made at water-cement ratios to represent concrete paste in permeability and strength. Variables in the study included cement type, length and type of curing, and strength and type of exposure solution. Specimens were made in accordance with ASTM C305, and moist cured 3 or 28 days. The initial length, weight, compressive

strength (ASTM C39), and dynamic modulus of elasticity (ASTM C215) were measured. Additional conclusions about the attack mechanisms can be obtained with chemical, X-ray, and petrographic studies of the deteriorated mortars.

Results of a test program might aim to explain the mechanism of attack, the relative resistance to attack, or to predict the resistance to other concentrations of the same chemical or other chemicals.

Suggestions for test variations include different strengths of exposure solution, continuous immersion or alternate wet and dry exposure, and increasing, decreasing, or cycling the storage temperature.

What the Tests Can Reveal

Physical results need interpretation to give meaning to the data. Weight gain or increase in length of the concrete specimen can mean water (or other liquid) absorption or crystal formation. Weight loss or loss in length can mean that compounds are being leached out of the cement paste (binder is dissolving), or water is being replaced by a less dense liquid. An increase in the transverse frequency could mean continued hydration or deposit of crystals within the specimen. A decrease in frequency can mean microcracking or loss of binder or mortar by solution.

The Alberta DOT, Transportation and Utilities, tests sealers using a performance-based procedure (Carter 1994). Six companion cubes are made with concrete representative of field concrete: 300 kg/m^3 (505 lb/yd^3) cement content, 0.5 water-cement ratio, and 6% air content. The cubes, measuring 100 mm (4 in.) on each side, and weighing 2400 g (5.3 lb), are allowed to dry, then three are sealed and three left unsealed before immersion in water for 5 days. After weighing the specimens, results are reported as a reduction in absorption, then 70 g (0.15 lb) of the surface is abraded, and the sample is re-immersed. This cycle of abrading/re-immersing allows determination of effective penetration depth, which also influences sealer effectiveness.

Protective Treatments

A large number of chemical formulations (not listed here) are also available as sealers and coatings to protect concrete from a variety of environments. Product manufacturers should be consulted in the use of these and other protective treatments.

The Society for Protective Coatings (SSPC) and the National Association of Corrosion Engineers offer detailed listings of U.S. Standards and Guides for the use of Protective Coatings on Concrete as well as Coating and Corrosion links to be found on their Internet pages: www.sspc.org, www.paintsquare.com, and www.nace.org. For additional information about the chemical resistance of some concrete surface protection systems, see McGovern (1998).

When applying a coating or lining to concrete, it is best performed when concrete is in a cooling cycle, usually late afternoon or early evening hours. This is when concrete tends to draw air into itself, which helps the coating to penetrate the surface rather than be pushed out of it by warm vapors trying to escape (National Association of Corrosion Engineers 1991).

1. Magnesium Fluosilicate or Zinc Fluosilicate

These chemicals are commonly sold as floor hardeners. The treatment consists generally of three applications.

Either of the fluosilicates may be used separately, but many of the products sold are a mixture; solutions of 20% zinc fluosilicate and 80% magnesium fluosilicate appear to give the best results. For the first application, 0.5 kg (1 lb) of the fluosilicate crystals should be dissolved in 4 l (1 gal) of water; about 1 kg (2 lb) of crystals per 4 l (1 gal) of water are used for subsequent applications.

The solution may be applied efficiently with large brushes for vertical surfaces and mops for horizontal surfaces. The surfaces should be allowed to dry between applications (about 3 or 4 hours are generally required for absorption, reaction, and drying). Brush and wash the surface with water shortly after the last application has dried to remove encrusted salts that may cause white stains.

Treatment with fluosilicates reduces dusting and hardens the surface by chemical action. It increases resistance to attack from some substances but does not prevent such attack. With poor-quality concrete, the treatment is not effective.

Concrete surfaces to be treated with fluosilicates should not contain integral water-repellent agents because these compounds will prevent penetration of the solution. Fluosilicate hardeners should not be used when paints are to be applied because they result in poor adhesion of many coatings. Also, hardened surfaces are difficult to etch properly.

2. Sodium Silicate (Water Glass)

Also sold as a floor hardener, commercial sodium silicate is about a 40% solution. It is quite viscous and must be diluted with water to

secure penetration; the amount of dilution depends on the quality of the silicate and permeability of the concrete. Silicate of about 42.5 degrees Baumé diluted in proportions of 1 part silicate to 4 parts water by volume makes a good solution. Two or three coats should be used. For tanks and similar structures, progressively stronger solutions are often used for the succeeding coats.

Each coat should be allowed to dry thoroughly before the next one is applied. On horizontal surfaces the solution may be liberally poured on and then spread evenly with mops, brooms, or brushes. Scrubbing each coat with stiff fiber brushes or with scrubbing machines and water after it has hardened will assist penetration of the succeeding application. The treatment increases resistance to attack from some substances but does not prevent such attack.

3. Drying Oils

Two or three coats of linseed oil may be used as a protective treatment; boiled linseed oil dries faster than raw oil and is used more commonly. Soybean oil and tung (China wood) oil can also be used. The treatment increases resistance to attack from some substances but does not prevent such attack.

The concrete should be well cured and at least 14 days old before the first application of a drying oil. If this is not possible, the concrete should be neutralized by applying a solution consisting of 24 parts of zinc chloride and 40 parts of orthophosphoric acid (85% phosphoric acid) to 1000 parts of water (24 ml; 40 ml; 1 l or 3 oz; 5 oz; 1 gal). After it is brushed on the concrete, the solution should be allowed to dry for 48 hours. Any crystals that have formed on the surface should then be removed by light brushing. This solution should not be used on prestressed concrete. Sometimes a magnesium fluosilicate treatment is also applied to harden the surface before the oil treatment.

The oil treatment may be applied with mops, brushes, or spray and the excess removed with a squeegee before the oil gets tacky. It is not wise to build up a heavy surface coating, as penetration of the oil into the surface is desirable. Diluting the oil with turpentine or mineral spirits to obtain a mixture of equal parts gives better penetration for the first coat; subsequent coatings may be diluted less. Careful heating of the oil to about 65 °C (150 °F) and hot application to a warm surface also help achieve better penetration. Each coat must dry thoroughly for at least 24 hours before the next application. Drying oils tend to darken concrete.

4. Coumarone-Indene

Available in grades from dark brown to colorless, this synthetic resin is soluble in xylol and similar hydrocarbon solvents and should be powdered to aid dissolving. A solution consisting of about 3 kg coumarone-indene per 1 l xylol plus 20 ml boiled linseed oil (6 lb of coumarone-indene per gal of xylol with 1/2 pt of boiled linseed oil) makes a good coating. Two or more coats should be applied to fairly dry concrete. The coatings have a tendency to yellow with exposure to sunlight but the yellowing does not seem to affect the protective properties.

Coumarone-indene availability has been decreasing for many years, and current substitutes include hydrocarbon resin polymers (hydrocarbon resins) and rosin-based resins.

5. Styrene-Butadiene

Styrene-butadiene copolymer resins are available in various medium-strength solvents, some faster drying than others. Three coats are generally recommended, with the first coat thinned for better penetration. Twenty-four hours should elapse between coats, and a delay of 7 days is necessary for thorough drying before the coated surface is placed in service. These coatings tend to yellow with exposure to sunlight.

Because this coating is solvent-borne, however, it usually is high in volatile organic compounds (VOC) and less and less available, due to state and local VOC content limits.

6. Chlorinated Rubber

Chlorinated rubber cures by solvent evaporation. Chlorinated rubber surface treatment consists of a trowel-applied mastic of heavy consistency up to 3 mm (⅛ in.) thick, or multiple coats of specially formulated lower-viscosity types can be brushed or sprayed on to a maximum thickness of 0.25 mm (10 mils). An absolute minimum of 0.1 mm (5 mils) (applied in two coats) is recommended for chemical exposure.

In general, concrete should age for two months before this treatment. The concrete may be damp but not wet, as excessive moisture may prevent adequate bonding. It is advisable to thin the first coat, using only the producer's recommended thinner (other thinners may be incompatible). A coating dries tack-free in an hour, but a 24-hour interval is recommended between coats.

The applied coating is odorless, tasteless, and nontoxic after it dries. Because it is solvent-borne, however, it usually is high in volatile organic compounds (VOC). It is difficult formulating coatings that are based chlorinated rubber resins and that comply with state and local VOC content limits. Also, its strong solvents, may lift and destroy previously painted and aged coatings of oil or alkyd base. The use of newer surface coating materials has rendered this treatment less and less common.

7. Chlorosulfonated Polyethylene (Hypalon)

Four coats of about 0.05 mm (2 mils) each and an appropriate primer are normally recommended to eliminate pinholes. Thinning is not usually required, but to reduce viscosity for spray application, the producer's recommended thinner should be used up to a limit of 10% of the amount of coating used. Each coat dries dust-free within 10 to 20 minutes, and the treatment cures completely in 30 days at 21 °C (70 °F) and 50% relative humidity. A fill coat of grout or mortar is required since the paint film will not bridge voids in the concrete surface. Moisture on the surface may prevent good adhesion.

These coatings are expensive and must be applied by trained personnel. They are not used where less costly coatings are adequate.

8. Vinyls

Of the vinyls available, polyvinyl chloride, polyvinyl chloride acetate, and polyvinylidene chloride are the ones used extensively in corrosion control. The resins are soluble only in strong solvents. Due to the high viscosity of the resins, only solutions of low solids content can be made. Multiple coats are therefore required for adequate film thickness. Vinyls should generally be sprayed onto dry surfaces, as their fast drying (30 minutes) makes brush application difficult.

Vinyl chloride coatings make good top coatings for vinyl chloride acetate and others, but do not themselves adhere well directly to concrete.

Polyvinyl acetate latex (waterborne) copolymers are widely available as decorative coatings, but like other latexes, they are usually inferior to solvent-system coatings for chemical resistance. In addition, the vinyl acetate latexes (waterborne emulsions) are sensitive to the free alkalinity of concrete and eventually break down.

9. Bituminous Paints, Mastics, and Enamels

Asphalt or coal-tar coatings may be applied cold (paints and mastics in cutback or emulsion form) or hot (mastics and enamels). Two coats are usually applied to surface-dry concrete: a thin priming coat to ensure bond and a thicker finish coat. The priming solution is of thin brushing consistency and should be applied to cover the surface completely; any uncoated spots should be touched up. When the primer has dried to a tacky state, it is ready for the finish coat. Multiple coats should be applied at right angles to each other to ensure continuity and avoid pinholes.

Emulsions are slower drying, more permeable, and less protective than the other coatings. Cutbacks and emulsions, if not completely cured, can impart odor or flavor to materials with which they are in contact. The producer's recommendations on service and application temperatures should be strictly observed.

Bituminous mastics may be applied cold or heated until fluid. Cold mastics are cutbacks or emulsions containing finely powdered siliceous mineral fillers or bitumen-coated fabrics to form a very thick, pasty, fibrous mass. This mass increases the coating's resistance to flowing and sagging at elevated temperatures and to abrasion. Thin mastic layers, about 1 mm (1⁄32 in.) thick, are troweled on and allowed to dry until the required thickness has been obtained. Hot mastics usually consist of about 15% asphaltic binder, 20% powdered filler, and the remainder sand, graded up to 6-mm (¼-in.) maximum size. They should be poured and troweled into place in layers 16 mm to 25 mm thick (⅝ in. to 1 in.).

Enamels should be melted, stirred, and carefully heated until they reach the required application temperature. If an enamel is heated above the producer's recommended temperature, it should be discarded. If application is delayed, the pot temperature should not be allowed to exceed 190 °C (375 °F). When fluid, the enamel should be applied quickly over tacky cutback primer, since it sets and hardens rapidly.

10. Polyester

These resin coatings are two- and three-part systems consisting of polyester, peroxide catalyst, and sometimes a promoter. The amount of catalyst must be carefully controlled because it affects the rate of hardening. The catalyst and promoter are mixed separately into the polyester. Fillers, glass fabrics, or fibers used to reduce shrinkage and coefficient of expansion compensate for the brittleness of resin and increase strength. Polyesters are usually silica filled except for hydrofluoric acid service, which requires non-siliceous fillers such as carbon. (National Association of Corrosion Engineers 1991).

Coatings with a 2- to 3-hour pot life generally cure in 24 to 36 hours at 24 °C (75 °F). Shorter curing periods require reduced pot life because of high heats of reaction. Coatings are sensitive to changes in temperature and humidity during the curing period. Some coatings can be applied to damp surfaces at temperatures as low as 10 °C (50 °F). The alkali resistance of some polyesters is limited. It is recommended that trained personnel apply the coatings. Polyester-and-filler surfacings should conform to ASTM C722.

11. Urethane

These coatings may be one- or two-part systems. A one-part system may be moisture cured or oil modified. The coatings that cure by reacting with moisture in the air must be used on dry surfaces to prevent blistering during the curing period. Oil-modified coatings dry by air oxidation and generally have the lowest chemical resistance of the urethane coatings.

Two types of the two-part system are also available: catalyzed and polyol cured. Catalyzed coatings have limited pot life after mixing and cure rapidly. Elastomeric urethane topcoats have a very quick chemical cure, so they can be exposed to fog, rain, chemical splash, or immersion almost immediately after application. Overnight curing is recommended if the coating will be exposed to traffic in service; several days of curing are needed for high-impact or abrasive applications (National Association of Corrosion Engineers 1991). For polyol-cured coatings, the mixture is stirred well and allowed to stand for about one-half hour before use; it should have a pot life of about 8 to 12 hours. Polyol-cured coatings are the most chemically resistant of the polyurethane coatings but require the greatest care in application.

Polyurethane elastomers are two-component elastomeric coatings that have distinct advantages over rigid floor surfacings: they adhere well to concrete, and are flexible and nonshrink, so they are able to bridge small cracks in the surface.

A newer type of coating, polyurea, normally uses polyamines as coreactants to react with isocyanates and does not require a catalyst. Polyurea is distinguished by its extremely fast gel time (as low as three seconds for a "quick set" polyurea). As a result of the rapid set time, polyurea coatings are not sensitive to moisture and humidity and can be applied in conditions of high ambient humidity. Polyurea should not be applied on wet concrete. Trapped moisture will not

react with the coating as it sets, but it will impair adhesion and ultimately lead to coating failure. Polyurea coatings tend to have a very limited pot life and their recoat time becomes a problem in cases when multiple coats occur (Kenworthy 2003).

All urethane coatings are easily applied by brush, spray, or roller. Rough or porous surfaces may require two coats. For immersion service in water and aqueous solutions, it may be necessary to use a primer and the urethane producer should be consulted. For spray-applied polyether polyurethanes, an epoxy coating applied to the surface closes the pores before the polyurethane is applied (Recker 1994). Satisfactory cure rates of polyurethanes will be attained at relative humidities of 30% to 90% and temperatures between 10 °C and 38 °C (50 °F and 100 °F). Lower temperatures will retard the rate of cure. Polyureas can be applied in extremer conditions of humidity and temperature and will cure at temperatures as low as -20 °C (-4 °F) (Kenworthy 2003).

Aliphatic urethanes have very good abrasion resistance, color and gloss stability, and resistance to ultraviolet light (National Association of Corrosion Engineers 1991). The principal disadvantages of urethane coatings are the very careful surface preparation needed to ensure adhesion and the difficulty in recoating unless the coating is sanded. Multiple coats should be used and an inert filler added if air voids are present on the concrete surface (the coatings are unable to span air voids). Dilute solutions of urethane have been used as floor hardeners (Mailvaganam 1991).

12. Epoxy

These coatings are generally a two-package system consisting of epoxy resin—which may be formulated with flexibilizers, extenders, diluents, and fillers—and a curing agent. The coating properties are dependent on the type and amount of curing agent used. The common curing agents suitable for curing are amines, polyamines, amine adducts, polyamides, polysulfides, and tertiary amines. The polyamide-cured epoxies have less chemical resistance but better physical properties (National Association of Corrosion Engineers 1991).

The single-package coatings are epoxy esters that are generally inferior to the two-package epoxies in chemical resistance. They require an alkali-resistant primer and are not recommended for immersion service. Some epoxy formulations are 100% solids and others are solution coatings. Some water-based epoxies are designed for use as primers over damp or dry concrete prior to application of polyurethane or epoxy topcoats. Solvent-based epoxies are often used as a first coat to penetrate and seal porous concrete. Multiple coats can achieve a dry film thickness of 0.5 mm (20 mils) (National Association of Corrosion Engineers 1991). Two coat, and to a lesser extent one coat, 100% solids epoxy systems are frequently recommended as coatings systems for concrete in aggressive environments (JPCL 2006). The formulator's recommendations should be followed in selecting the right system for the protection needed.

It is also desirable to follow the formulator's recommendations for the best application procedures, temperatures, and allowable working life. Epoxies are usually trowel or roller applied (National Association of Corrosion Engineers 1991). Generally, two coats must be applied to eliminate pinholes, especially on rough or porous surfaces. Epoxy toppings can be low- or high-build; with aggregate added, they can be up to 6 mm (1/4 in.) thick (National Association of Corrosion Engineers 1991).

Epoxy liners may be formed with reinforcement such as woven fabrics, mats, or chopped-glass fiber. The epoxy coating is applied with a roller to a film thickness of 0.25 mm (10 mils). Then fiberglass cloth is spread over the wet epoxy coating and pressed into it. A second epoxy coating is applied immediately to embed the fiberglass.

One class of coatings, based on flexible epoxy copolymers, is available for use over oil contaminated substrates. These oil-tolerant coatings appear to perform well where other materials cannot. In general, the surface should be sound and have as much contamination as possible removed prior to coating (National Association of Corrosion Engineers 1991).

There are epoxy systems that cure at temperatures of 4 °C (40 °F) single coat, but they require a relatively long cure time or less, bond to damp surfaces, and will cure even if flooded with water immediately after application. Water-based epoxy topcoats are durable, give off little odor, are safety oriented, and easy to clean up. Epoxies will experience some chalking on exposure to ultraviolet light (National Association of Corrosion Engineers 1991). Dilute solutions of epoxies have been used as floor hardeners (Mailvaganam 1991).

Contact with epoxy resins or hardeners can cause skin irritation or allergic reactions, and proper protection, as recommended by the manufacturer, is necessary. If skin contact occurs, a dry towel should be used to wipe the epoxy from the skin before washing with soap and water. Epoxy-and-filler surfacings should conform to ASTM C722. Bond can be checked using ASTM C882, *Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear*. (See ACI 503R and National Association of Corrosion Engineers 1991 for more information.)

13. Neoprene

These coatings may be one- or two-part systems. The one-part system is used as a thinner film than the two-part and generally has a lower chemical resistance. It cures slowly at room temperature, and some curing agents may limit its shelf life. The two-part system may require a holding period between mixing and application.

To allow evaporation of water from the concrete, application of either system should not begin for at least 10 days after removal of the forms. Some coatings require primers while others are self priming. Adhesion is often improved by application of a diluted first coat to increase penetration of the surface. Each coat should be sufficiently solvent-dry before the next application; however, if it becomes too fully cured, it may swell and lose adhesion. Three coats, 0.05 mm to 0.08 mm (2 mils to 3 mils) each, are normally recommended to eliminate the possibility of pinholes. For immersion service, minimum dry thickness should be 0.5 mm (20 mils).

14. Polysulfide

These coatings may be one- or two-part systems. They do not harden with age and they remain rubbery over a broad temperature range. Thick coats of 0.5 to 0.6 mm (20 to 25 mils) can be applied at one time. For the one-part system, atmospheric moisture serves as the curing agent; when humidities are low, curing can be hastened by fogging with a fine water mist. The two-part system usually has a pot life of 30 to 45 minutes and becomes tack-free overnight.

15. Coal Tar—Epoxy

These coatings are classified in three main types according to epoxy resin content: high-resin coatings for dry thicknesses of 0.4 mm (15 mils); medium-resin coatings for integral linings of concrete pipe; and low-resin coatings for building nonsagging barriers up to 1 mm (40 mils) thick. The first type requires a special primer, and its thickness is achieved in two coats. The other types do not require primers and may be applied in a Coal tar–epoxy coatings are a two-package system. A combination of coal tar, filler, solvent, and epoxy resin may be in one package and the curing agent (commonly amine, polyamine, amine adduct, polyamide, or tertiary amine) in the other. These two packages are usually mixed in a ratio of 20:1 or 10:1, but the ratio may be lower. The coal tar, filler, solvent, and curing agent may also be blended together to make up one package and the epoxy resin kept separate for the other. These two packages are generally mixed in a ratio of 3:1. The packages must be proportioned correctly to secure proper cure and chemical resistance. Storage life of the blends can vary from six months to two years, depending on formulation.

It is important that the two packages be thoroughly mixed, and power agitation is strongly recommended. Mixing small quantities is not advisable. Insufficient mixing will be revealed only after the coating has cured. For some coatings, a one-half hour waiting period between mixing and application is desired. Pot life is generally 3 to 4 hours at 21 °C (70 °F), but it may vary from several minutes to 8 hours, depending on solvent content and formulation.

Some coal tar-epoxy coatings should not be applied at temperatures below 10 °C (50 °F) or when there is danger of their becoming wet within 24 hours of application. However, there is a coal-tar epoxy that can be applied at temperatures lower than 4 °C (40 °F) that will not be harmed by becoming wet immediately after application and can be recoated even after several weeks. Spray applications generally result in better coverage. However, the sides of a short, stiff bristle brush or a long-nap roller may be used. The second coat should be applied within 48 hours to prevent adhesion problems between coats. If the first coat dries at air temperatures above 24 °C (75 °F), the producer's maximum recommended time between coats must be observed. These coatings should not be put into service until a minimum of 5 days' curing time has elapsed.

Coal tar-epoxies are less commonly used today due largely to health concerns over long term exposure and direct contact (by coating applicators) to the tar. Cleanup and disposal require special precautions to protect the environment

16. Chemical-Resistant Masonry Units, Mortars, Grouts, and Concretes

Chemical-resistant brick and tile are usually solid, kiln-fired masonry units made from clay, shale, or mixtures thereof for masonry construction. Units can also be made from carbon (see ASTM C1106), graphite, or other materials where additional chemical resistance is required. Chemical-resistant brick and tile should conform to ASTM C279, *Specification for Chemical-Resistant Masonry Units*. The three types of masonry units are Type I (formerly Type H) for locations where low absorption and high acid resistance are not required; Type II for locations where low absorption and high acid resistance are required; and Type III (formerly Type L) for locations where minimum absorption and maximum acid resistance are required.

Chemical-resistant industrial floor brick should conform to ASTM C410, *Specification for Industrial Floor Brick*. ASTM C410 Type H brick is used where chemical resistance is a service consideration but low absorption is not required. ASTM C410 Type L brick is used where minimal absorption and high chemical resistance are required. Although highly abrasion resistant, Type L brick usually has limited thermal and impact resistance.

Chemical-resistant mortar or grout must be used to fill the joints between chemical-resistant brick or tile. Mortars are troweled on the sides and bottom (or faces to be bonded) of the brick to about 3 mm (⅛ in.) thickness before the brick is placed. Grouts are usually applied to joints, about 6 mm (¼ in.) wide, after the masonry units are set in place on the floor. The chemical resistance of mortars or grouts may be evaluated by ASTM C267, *Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings and Polymer Concretes*. The most commonly used mortars or grouts are:

a. Asphaltic and bituminous membranes—for use over a limited range of low temperatures. Some are sand filled, others are not. They may be applied either as mastics that depend upon evaporation of solvent or as hot-melt compounds.

b. Epoxy-resin mortars or grouts—two- or three-part systems with either amine or polyamide curing agents. They should conform to *Specification for Chemical-Resistant Resin Mortars* (ASTM C395) or *Specification for Chemical-Resistant Resin Grouts for Brick or Tile* (ASTM C658). For instructions on their use, see *Practice for Use of Chemical-Resistant Resin Mortars* (ASTM C399) or *Practice for Chemical-Resistant Resin Grouts for Brick or Tile* (ASTM C723). ASTM C881, *Specification for Epoxy-Resin-Base Bonding Systems for Concrete,* may also contain helpful information.

c. Furan-resin mortars or grouts—should conform to ASTM C395 or C658. Normally, a membrane of 1.5 mm to 6 mm (1/16 in. to ¼ in.) in thickness is applied to concrete, and then a furan mortar is used as a bond coat or bed joint. Furan-resin mortars have the broadest range of resistance of all resin mortars to both acid and alkali (pH 0 to 14) and temperatures up to about 220 °C (425 °F) (Mailvaganam 1991). For their use, see ASTM C399 or C723.

d. Hydraulic-cement mortars or grouts—For instructions on their use, see *Practice for Use of Hydraulic Cement Mortars in Chemical-Resistant Masonry* (ASTM C398). These include the use of portland, blended, and calcium aluminate cements.

e. Phenolic-resin mortars—should conform to ASTM C395. For instructions on their use, see ASTM C399.

f. Polyester-resin mortars—should conform to ASTM C395. General purpose isophthalic resin systems have limited resistance to strong chemicals, but will withstand mildly oxidizing solutions such as bleaches. Other polyesters are available that are highly chemical resistant, even to strong acids. For instructions on their use, see ASTM C399.

g. Silicate mortars—should conform to *Standard Specification for Chemically Setting Silicate and Silica Chemical-Resistant Mortars* (ASTM C466). For instructions on their use, see *Practice for Use of Chemically Setting Chemical-Resistant Silicate and Silica Mortars* (ASTM C397).

h. Sulfur mortars—should conform to *Specification for Chemical-Resistant Sulfur Mortar* (ASTM C287). For instructions on their use, see *Practice for Use of Chemical-Resistant Sulfur Mortar* (ASTM C386).

i. Vinylester-resin mortars—should conform to ASTM C395. For instructions on their use, see ASTM C399.

A bed of mortar and an impervious membrane lining are usually placed between the masonry lining and the concrete. Rubber and vinyl sheets or properly primed and hot-applied 10-mm, (⅜-in.) thick asphaltic materials, both plain and glass-cloth reinforced, are preferred for the membrane lining, depending on the corrosive substance. The primer should conform to *Specifications for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing* (ASTM D41), except that the asphalt content should not be less than 35% by weight. Floor slabs that are to receive a masonry lining should have a smooth wood-float finish. A slab having a steel-trowel finish may be too smooth for adhesion of the asphaltic membrane.

Monolithic surfacings (often called coatings, toppings, or thin overlays) can also be made with the base materials (cement or resin) in a through i above. Many surfacings were discussed in earlier categories (epoxy, polyester, and so forth). They are used without masonry units to cover a concrete surface. Epoxy, polyester, and other resin-and-filler monolithic surfacings should meet the requirements of ASTM C722, *Specification for Chemical-Resistant Resin Monolithic Surfacings.* Also see ASTM C811, *Practice for Surface Preparation of Concrete for Application of Chemical-Resistant Resin Monolithic Surfacings.*

j. Sulfur concretes—should conform to ACI 548.2R (1993) *Guide for Mixing and Placing Sulfur Concrete in Construction.* A typical mix design by weight is: 38% coarse aggregate, 38% fine aggregate, 8% mineral filler, and 16% sulfur cement (McGovern 1992).

k. Polymer concretes—should conform to *Standard Specification for Latex and Powder Polymer Modifiers for Hydraulic Cement Concrete and Mortar* (ASTM 1438) and to ACI 548.3R (2003), *Polymer-Modified Concrete*.

l. Silicate-based concretes—used in precast concrete elements. Class F fly ash, silicate solution, and an alkaline activator are the most commonly used cementitious materials (Oswald 1998).

17. Sheet Rubber

Soft natural and synthetic rubber sheets 3 mm to 13 mm (⅛ in. to ½ in.) thick may be cemented to concrete with special adhesives. Sometimes two layers of soft rubber are used as a base, with a single layer of hard rubber over them.

Chemical-resistant synthetics available as sheeting are neoprene, polyvinylidene chloride-acrylonitrile, plasticized polyvinyl chloride, polyisobutylene, butyl, nitrile, polysulfide, and chlorosulfonated polyethylene rubbers.

18. Resin Sheets

Synthetic resins, particularly polyester, epoxy, and polyvinyl chloride, are available as sheet materials. These sheets are not referred to in the guide for selecting protective treatments, but may be used wherever comparable resin coatings are recommended. They are often glass fiber reinforced and may be cemented to concrete with special adhesives. Types of resin sheets include acrylic; polyethylene and polypropylene; polystyrene; polyvinyl chloride. ABS sheet, fiberglass-reinforced plastic sheet, and polycarbonate sheet.

19. Lead Sheet

In the United States, lead sheet used for chemical resistance is called chemical lead. The sheets should be as large as possible (to minimize the number of joints) but not too heavy to handle—the thinnest sheet may be as large as 2.5 m x 6.0 m (8 ft. x 20 ft). Thicknesses range from 0.4 mm to 13 mm (1/64 in. to ½ in.). Lead may be cemented to concrete with an asphaltic paint. Each sheet should be overlapped and the seam welded by conventional lead-burning techniques. If the lead is to be subjected to high temperatures, it may be covered with chemical-resistant masonry to reduce thermal stresses.

20. Glass

Two types have been used for corrosion resistance: high-silica glass and borosilcate glass. Borosilicate glass, the more alkali-resistant material, is recommended because alkalies in concrete may cause glass etching. Glass may be cemented to the concrete. Thermal shock is often a cause of failure in glass-lined structures.

21. Acrylics, Methyl Methacrylate, and High Molecular Weight Methacrylate (HMWM)

Methyl methacrylates, acrylic polymers, and their modified forms are often applied with squeegees and rollers to concrete to reduce water, chloride-ion, and chemical ingress. They are often used on bridge and parking-garage surfaces and on architectural concrete. Pure methyl

methacrylate systems can be made impermeable or breathable depending on their formulation. Some formulations are also considered to be both penetrating and crack repairing. Methacrylates are often used in conjunction with non-skid aggregate.

Acrylic copolymers may also be added to portland cement mortars and concretes in breathable overlay systems. Some acrylic formulations are solvent free, so they experience no shrinkage upon curing. Varying the formulations allows for either flexible or hard materials. Some acrylics can be used at temperatures as low as -10 °C (14 °F) and cure very quickly at low temperatures (Mailvaganam 1991). In one study, acrylic rubber coatings showed excellent resistance to weathering. The three-coat system of primer, base coat, and a top coat of acrylic urethane had an overall thickness of 1 mm (40 mils). The base coat maintained its elasticity over a wide temperature range, from -50 °C to +70 °C (-58 °F to +158 °F). After 2½ years in severe exposure, crack widths of up to 14 mm (0.55 in.) were bridged. Crack bridging ability improved with time: the surface coating was in excellent condition after 8 years of exposure. The adhesion strength was as much as 1 MPa (145 psi), and the coating prevented salt intrusion (Swamy 1993).

22. Silane and Siloxane (Organosilicon Compounds)

The most commonly used organosilicon compounds are silane, siloxane, and mixtures of the two. They are available in both solvent-borne or water-borne formulations. Silane- and siloxane-based materials are single-component penetrating materials commonly used to reduce chloride-ion ingress into concrete bridges and parking garages, thereby reducing corrosion of reinforcing steel. They are also used to reduce water permeance on concrete and concrete masonry. They may offer some protection to concrete in sulfate exposures (Stark 1997 and 2002).

Currently commercially available water repellents contain a carrier such as alcohol and can be classified according to their active ingredient content by weight, up to 100%. Performance usually increases with an increase in solids content; however, higher percentages of active ingredients might darken the concrete. Most siloxane-based water repellents currently on the market have much less than 10% active ingredient; available silanes may have 40% active ingredient (Fliedner 1996). Siloxanes are less volatile than silanes, and therefore there is less loss of active ingredient during application. For this reason, siloxanes are usually used with a lower percentage active ingredient than silanes.Silanes and siloxanes are applied with low pressure, 100 kPa to 200 kPa (15 psi to 30 psi), at a rate of 2.5 to 3.7 sq m per liter (100 to 150 sq ft per gallon) (Fig. 9). They can be applied with brush, roller, or pump-up or airless sprayer. Silanes and siloxanes are breathable materials that allow water vapor to pass through the concrete. The advantages of these materials are that they do not discolor the concrete, and they have no effect on the coefficient of friction.

Silanes, which have a smaller molecular size, penetrate better than siloxanes when the substrate is dry, but the two have comparable levels of penetration on moist or damp surfaces (McGill 1990). In one study (Fliedner 1996), an almost linear relationship between penetration depth and silane concentration (% active ingredient) was found. The more concentrated the silane solution, the greater the penetration depth: 100% concentrations penetrated about 8 mm (0.3 in.) into concrete (w/c of 0.6). Silanes require more care during application; they can evaporate under hot or windy conditions, reducing the amount that remains on the surface and decreasing the effectiveness of the treatment. Siloxanes are heavier, and even warm ambient temperatures or high winds little affect the amount that remains on the surface.

Fig. 9. 100% silane sealer is being applied to a parking garage. (IMG25538)

Silane penetration depth and waterproofing effectiveness improve as the permeability and water-cement ratio of the concrete decreases. Silanes do not need to be diluted with alcohol, and 100% silanes without carrier penetrate better and are more effective sealers than 40% silane sealers. Surfaces previously treated can be retreated with silane, and the depth of penetration generally improves if the concrete has had sufficient time to dry (Carter 1994). Salt-exposed concrete of good quality should have increased service life when sealed with 100% silane materials. Silanes may not be the best choice for concrete subjected to prolonged submerged conditions in the presence of freezing and deicing chemicals.

23. Metalizing

Corrosion-resistant metals can be applied to concrete surfaces by using flame-spray or arc-spray techniques. The flame-spray process melts the metalizing wire with a combustible gas, and compressed air atomizes the molten metal and projects the metal spray onto the prepared concrete surface. The liquid metal is impinged onto the concrete and cools. After cooling, the metal can be ground, polished, and finished as desired.

Thermal-arc spraying uses an electric arc to melt the metalizing wire. The molten metal is then blown onto the concrete surface by compressed air to form the metal coating.

Aluminum, copper, bronze, stainless steel, chrome, nickel, monel, tin, zinc, and other metals and alloys can be used. Ceramics such as zirconium oxide can also be applied.

Guide to the Effect of Substances on Concrete and Selecting Protective Treatments

This guide refers only to common protective treatments. More exotic treatments, such as lead sheet, glass, or metalizing, are not referred to unless necessary, but they should be considered for extreme or unusual circumstances. Different treatments provide different degrees of protection and therefore product manufacturers listed on pages 28 to 31 should be consulted as to the applicability of particular treatments.

The guide is adapted with a few modifications from ACI 515.1R. Footnotes appear at the end of each section of the table. Readers are encouraged to submit information on materials and protective treatments not listed.

Acids

Material	Effect on concrete	Protective treatments
Acetic		
<10%	Slow disintegration	1, 2, 9, 10, 12, 14, 16 (b, c, e, f, g, h)
30%	Slow disintegration	9, 10, 14, 16 (c, e, f, g)
100% (glacial)	Slow disintegration	9, 16 (e, g)
Acid waters (pH of 6.5 or less)	Slow disintegration.* Natural slightly acid waters may erode surface mortar but then action usually stops. Disintegration increases as pH decreases. See "Acids" under "Design Considerations."	1, 2, 3, 6, 8, 9, 10, 11, 12, 13, 16 (b, c, e, f, g, h), 17
Arsenious	None	
Boric	Negligible effect	2, 6, 7, 8, 9, 10, 12, 13, 15, 16 (b, c, e, f, g, h), 17, 19
Butyric	Slow disintegration	3, 4, 8, 9, 10, 12, 16 (b, c, e, f)
Carbolic	Slow disintegration	1, 2, 16 (c, e, g), 17
Carbonic (soda water)	0.9 to 3 ppm of carbon dioxide dissolved in natural waters disintegrates concrete slowly	2, 3, 4, 8, 9, 10, 12, 13, 15, 16 (b, c, e, f, h), 17
Chromic		
5%	None*	2, 6, 7, 8, 9, 10, 16 (f, g, h), 19
50%	None*	16 (g), 19
Formic		
10%	Slow disintegration	2, 5, 6, 7, 10, 12, 13, 16 (b, c, e, g), 17
90%	Slow disintegration	2, 7, 10, 13, 16 (c, e, g), 17
Humic	Slow disintegration possible, material depending on humus	1, 2, 3, 9, 10, 12, 15, 16 (b, c, e)
Hydrochloric		
10%	Rapid disintegration, including steel	2, 5, 6, 7, 8, 9, 10, 12, 14, 16 (b, c, e, f, g, h), 17, 19, 20
37%	Rapid disintegration, including steel	5, 6, 8, 9, 10, 16 (c, e, f, g, h)
Hydroflouric		
10%	Rapid disintegration, including steel	5, 6, 7, 8, 9, 12, 16 (carbon and graphite brick; b, c, e, h), 17
75%	Rapid disintegration, including steel	16 (carbon and graphite brick; e, h), 17
Hypochlorous		
10%	Slow disintegration	5, 8, 9, 10, 16 (f, g)
Lactic		
5%–25%	Slow disintegration	3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, g, h), 17, 21
Nitric		
2%	Rapid disintegration	6, 8, 9, 10, 13, 16 (f, g, h), 20
40%	Rapid disintegration	8, 16 (g)
Oleic, 100%	None	
Oxalic	No disintegration. It protects concrete against acetic acid, carbon dioxide, and salt water. POISONOUS, it must not be used on concrete in contact with food or drinking water.	
Perchloric, 10%	Disintegration	8, 10, 16 (e, f, g, h)

Phosphoric		
10%	Slow disintegration	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 (b, c, e, f, g, h), 17, 19
85%	Slow disintegration	1, 2, 3, 5, 7, 8, 9, 10, 13, 14, 15, 16 (c, e, f, g, h), 17, 19
Stearic	Slow disintegration	5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, g, h), 17
Sulfuric		
10%	Rapid disintegration	5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16 (b, c, e, f, g, h), 17, 19, 20
100% (oleum)	Disintegration	16 (g), 19
Sulfurous	Rapid disintegration	6, 7, 9, 10, 11, 12, 13, 16 (b, c, e, h), 19, 20
Tannic	Slow disintegration	1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 16 (b, c, e, g), 17
Tartaric, solution	None. See wine under "Miscellaneous."	

* In porous or cracked concrete, it attacks steel. Steel corrosion may cause concrete to spall.

Salts and Alkalies (Solutions)*

Material	Effect on Concrete	Protective treatments
Acetate		
Calcium magnesium	Slow disintegration†	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, g, h), 17
Potassium Sodium	None†† See "Deicers" under "Miscellaneous."	
Bicarbonate		
Ammonium Sodium	None	
Bisulfate		
Ammonium** Sodium	Disintegration	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 (b, c, e, f, h), 17
Bisulfite		
Sodium	Disintegration	5, 6, 7, 8, 9, 10, 12, 13, 16 (b, c, e, f, h), 17
Calcium (sulfite solution)	Rapid disintegration	7, 8, 9, 10, 12, 13, 16 (b, c, e, f, h), 17
Bromide		
Sodium	Slow disintegration	1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16 (b, c, e, f, h), 17
Carbonate		
Ammonium Potassium Sodium	None	
Chlorate sodium	Slow disintegration	1, 4, 6, 7, 8, 9, 10, 16 (f, g, h), 17, 19
Chloride		
Calcium† Potassium Sodium† Strontium	None, unless concrete is alternately wet and dry with the solution.** However, concentrated $CaCl_2$ solutions disintegrate concrete, whereas weak solutions do not.	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, g, h), 17, 21
Ammonium Copper Ferric (iron) Ferrous Magnesium† Mercuric Mercurous Zinc	Slow disintegration**	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, g, h), 17
Aluminum	Rapid disintegration**	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, h),17
Chromate, sodium	None	
Cyanide		
Ammonium Potassium Sodium	Slow disintegration	7, 8, 9, 10, 12, 13, 16 (b, c), 17

Dichromate		
Sodium	Slow disintegration with dilute solutions	1, 2, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, h), 17
Potassium	Disintegration	1, 2, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, h), 17
Ferrocyanide, sodium	None	
Fluoride		
Ammonium Sodium	Slow disintegration	3, 4, 8, 9, 10, 13, 16 (a, c, e, h), 17
Fluosilicate, magnesium	None	
Fromate		
Potassium Sodium	None†† See "Deicers" under "Miscellaneous."	
Hexametaphosphate, sodium	Slow disintegration	5, 6, 7, 8, 9, 10, 12, 13, 15, 16 (b, c, e), 17
Hydroxide		
Ammonium Barium Calcium Potassium, 15%†† Sodium, 10%††	None	
Potassium, 25% Sodium, 20%	Disintegration. Use of calcareous aggregate lessens attack.	5, 7, 8, 10, 12, 13, 14, 15, 16 (carbon and graphite brick; b, c), 17
Nitrate		
Calcium Ferric Zinc	None	
Lead Magnesium Potassium Sodium	Slow disintegration	2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16 (b, c, e, f, g, h), 17, 20
Ammonium	Disintegration**	2, 5, 6, 8, 9, 10, 11, 12, 13, 16 (b, c, e, f, g, h), 17, 20
Nitrite, sodium	Slow disintegration	1, 2, 5, 6, 7, 8, 9, 10, 12, 13, 16 (b, c), 17
Orthophosphate, sodium (dibasic and tribasic)	None	
Oxalate, ammonium	None	
Perborate, sodium	Slow disintegration	1, 4, 7, 8, 9, 10, 13, 16 (d, f, g, h), 17
Permanganate, potassium	None unless potassium sulfate is present	
Persulfate, potassium	Disintegration of concrete with inadequate sulfate resistance	1, 2, 5, 7, 8, 9, 10, 12, 13, 16 (b, c, e, f, h), 17
Phosphate, sodium (monobasic)	Slow disintegration	5, 6, 7, 8, 9, 10, 12, 15, 16 (b, c), 17
Pyrophosphate, sodium	None	
Stannate, sodium	None	
Sulfate		
Ammonium	Disintegration**	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 (b, c, e, f, g, h), 17
Aluminum Calcium Cobalt Copper Ferric Ferrous (iron vitriol) Magnesium (epsom salt) Manganese Nickel Potassium Potassium aluminum (alum) Sodium Zinc	Disintegration of concrete with inadequate sulfate resistance. Concrete products cured in high-pressure steam are hightly resistant to sulfates.	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, g, h), 17

Sulfide		
Copper Ferric Potassium	None unless sulfates are present	7, 8, 9, 10, 12, 13, 15, 16 (b, c, e, f, h), 17
Sodium	Slow disintegration	6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c), 17
Ammonium	Disintegration	7, 8, 9, 10, 12, 13, 15, 16 (a, b, c, e), 17
Sulfite		
Sodium	None unless sulfates are present	1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e), 17
Ammonium	Disintegration	8, 9, 10, 12, 15, 16 (b, c, e, h), 17
Superphosphate, ammonium	Disintegration**	8, 9, 10, 12, 13, 15, 16 (b, c, e), 17,19
Tetraborate, sodium (borax)	Slow disintegration	5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, g, h), 17
Tetrachloride, carbon	Impervious concrete is required to prevent loss from penetration. Sometimes used in food/processing and requires compatible coating. See tetrachloride, carbon under "Solvents and Alcohols."	
Thiosulfate		
Sodium	Slow disintegration of concrete with inadequate sulfate resistance.	1, 2, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, (b, c, e), 17
Ammonium	Disintegration	8, 9, 12, 13, 15, 16 (c, e), 17

* Dry materials generally have no effect.

** In porous or cracked concrete, it attacks steel. Steel corrosion may cause concrete to spall.

† Frequently used as deicer for concrete pavements. Any material used as a deicer on concrete can cause scaling if the concrete contains insufficient entrained air or has not been air dried for at least 30 days after completion of curing. For more information see Deicers under "Miscellaneous" and Cody (1994); National Cooperative Highway Research Program (2007); and Kozikowski et al. (2007).

†† If concrete is made with reactive aggregates, disruptive expansion may occur.

Petroleum Oils

Material	Effect on concrete	Protective treatments
Heavy oil below 35 °Baumé* Paraffin (should not be used on masonry)	None	
Gasoline Kerosene Light oil above 35 °Baumé Ligroin Lubricating oil* Machine oil* Mineral spirits	None. Impervious concrete is required to prevent loss from penetration, and surface treatments are generally used.	1, 2, 3, 8, 10, 11, 12, 14, 16 (b, c, e, f), 17, 19
Mineral oil	Slow disintegration if fatty oils are present	
Gasoline, high octane	None. Surface treatments are generally used to prevent contamination with alkalies in concrete.	10, 11, 14, 17

* May contain some vegetable or fatty oils and the concrete should be protected from such oils.

Coal Tar Distillates

Material	Effect on concrete	Protective treatments
Alizarin Anthracene Carbazole Chrysen Pitch	None	
Benzol (benzene) Cumol (cumene) Phenanthrene Toluol (toluene) Xylol (xylene)	None. Impervious concrete is required to prevent loss from penetration, and surface treatments are generally used.	1, 2, 11, 12, 16 (b, c, e, f, g), 19
Creosote Cresol Dinitrophenol Phenol, 5%–25%	Slow disintegration	1, 2, 16 (c, e, g), 17, 19

Solvents and Alcohols

Material	Effect on concrete	Protective treatments
Carbon tetrachloride	None*,**	1, 2, 10, 12, 16 (b, c, e, g)
Ethyl alcohol	None† (see deicers under "Miscellaneous")	1, 2, 5, 7, 10, 12, 13, 14, 16 (b, c, e, f, g, h), 17, 19
Ethyl ether	None*	11, 12, 16 (c, e), 19
Methyl alcohol	None*	1, 2, 5, 7, 10, 12, 13, 14, 16 (b, c, e, f, g, h), 17, 19
Methyl ethyl ketone	None*	16 (c, e), 17, 19
Methyl isoamyl ketone	None*	16 (c, e), 17
Methyl isobutyl	None*	16 (c, e), 17
Perchloroethylene	None*	12, 16 (b, c, e)
t-Butyl alcohol	None*	1, 2, 5, 7, 10, 12, 13, 14, 16 (b, c, e, f, g, h), 17, 19
Trichloroethylene	None*	1, 2, 12, 16 (b, c, e, g)
Acetone	None.* However, acetone may contain acetic acid as impurity (see under "Acids").	1, 2, 16 (c, e, g), 17, 19
Carbon disulfide	Slow disintegration possible	1, 2, 11, 16 (c, e, g)
Glycerin (glycerol)	Slow disintegration possible	1, 2, 3, 4, 7, 10, 11, 12, 13, 16 (b, c, e, f, g), 17
Ethylene glycol†	Slow disintegration	1, 2, 7, 10, 12, 13, 14, 16 (b, c, e, f, g, h), 17

* Impervious concrete is required to prevent loss from penetration, and surface treatments are generally used.

** Sometimes used in food processing or as food or beverage ingredient. Check with Food and Drug Administration regarding coatings for use with food ingredients.

† Frequently used as deicer for airplanes. Heavy spillage on concrete containing insufficient entrained air may cause surface scaling.

Vegetable Oils

Material	Effect on Concrete	Protective treatments
Rosin and rosin oil	None	
Turpentine	Mild attack and considerable penetration. Impervious concrete is required to prevent loss from penetration, and surface treatments are generally used.	1, 2, 10, 11, 12, 14, 16 (b, c, e)
Almond Linseed* Olive Peanut Poppyseed Soybean* Tung* Walnut	Slow disintegration For expensive cooking oils, use 20	1, 2, 8, 10, 11, 12, 14, 16 (b, c, e, f), 17.
Margarine	Slow disintegration, faster with melted margarine	1, 2, 8, 10, 11, 12, 13, 16 (b, c, e, f)
Castor Cocoa bean Cocoa butter Coconut Cottonseed Mustard Rapeseed	Disintegration, especially if exposed to air	1, 2, 8, 10, 11, 12, 14, 16 (b, c, e, f), 17

* Applied in thin coats, the material quickly oxidizes and has no effect. The effect indicated above is for constant exposure to the material in liquid form.

Fats and Fatty Acids (Animal)

Material	Effect on concrete	Protective treatments
Fish liquor	Disintegration	3, 8, 10, 12, 13, 16 (b, c, e, f), 17
Fish oil	Slow disintegration with most fish oils	1, 2, 3, 8, 10, 12, 13, 16 (b, c, e, f), 17
Whale oil	Slow disintegration	1, 2, 3, 8, 10, 12, 13, 16, (b, c, e, f), 17
Neatsfoot oil Tallow and tallow oil	Slow disintegration	1, 2, 3, 8, 10, 12, 13, 16 (b, c, e, f), 17

Beef fat Horse fat Lamb fat	Slow disintegration with solid fat, faster with melted	1, 2, 3, 8, 10, 12, 13, 16 (b, c, e, f), 17
Lard and lard oil	Slow disintegration, faster with oil	1, 2, 3, 8, 10, 12, 13, 16 (b, c, e, f), 17
Slaughterhouse wastes	Disintegration due to organic acids	8, 10, 12, 13, 16 (b, c, e)

Miscellaneous

Material	Effect on concrete	Protective treatments
Alum	See sulfate, potassium aluminum, under "Salts and Alkalies"	
Ammonia		
Liquid	None, unless it contains harmful ammonium salts (see under "Salts and Alkalies")	
Vapors	Possible slow disintegration of moist concrete and steel attacked in porous or cracked moist concrete	8, 9, 10, 12, 13, 16 (a, b, c, f), 17
Ashes		
Cold	Harmful if wet, when sulfides and sulfates leach out (see sulfate, sodium, under "Salts and Alkalies")	1, 2, 3, 8, 9, 10, 13, 16 (b, c, e)
Hot	Thermal expansion	16 (calcium aluminate cement, fire-clay, and refractory-silicate-clay mortars)
Automobile and diesel exhaust gases	Possible disintegration of moist concrete by action of carbonic, nitric, or sulfurous acid (see under "Acids")	1, 5, 8, 10, 12, 16 (b, c, e)
Baking Soda	None	
Beer	No progressive disintegration, but in beer storage and fermenting tanks a special coating is used to guard against beer contamination. Beer may contain, as fermentation products, acetic, carbonic, lactic, or tannic acids (see under "Acids").	8, 10, 12, 16 (b, c, f), 17
Bleaching solution	See the specific chemical, such as hypochlorous acid, sodium hypochlorite, sulfurous acid, etc.	
Borax (salt)	See tetraborate, sodium, under "Salts and Alkalies"	
Brine	See chloride, sodium, or other salts under "Salts and Alkalies"	
Bromine	Disintegration if bromine is gaseous, or if a liquid containing hydrobromic acid and moisture	10, 13, 16 (f, g)
Buttermilk	Slow disintegration due to lactic acid	2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 16 (b, c, e, f), 17
Butyl stearate	Slow disintegration	8, 9, 10, 16 (b, c, e)
Carbon dioxide	Gas may cause permanent shrinkage or carbonation.* See carbonic acid under "Acids."	1, 2, 3, 6, 8, 9, 10, 11, 12, 13, 15, 16 (b, c, e, f, h), 17
Caustic soda	See hydroxide, sodium, under "Salts and Alkalies"	
Chile saltpeter	See nitrate, sodium, under "Salts and Alkalies"	
Chlorine gas	Slow disintegration of moist concrete	2, 8, 9, 10, 16 (f, g), 17
Chrome plating solutions	Slow disintegration	7, 8, 9, 10, 16 (f, g), 20
Cider	Slow disintegration. See acetic acid under "Acids."	1, 2, 9, 10, 12, 14, 16 (b, c, e, f, g), 17
Cinders cold and hot	See ashes above	
Coal	None, unless coal is high in pyrites (sulfide or iron) and moisture. Sulfides leaching from damp coal may oxidize to sulfurous or sulfuric acid, or ferrous sulfate (see under "Acids" and "Salts and Alkalies"). Rate is greatly retarded by deposit of an insoluble film.	1, 2, 3, 6, 7, 8, 9, 10, 12, 13, 16 (b, c, e, h), 17
Coke	Sulfides leaching from damp coke may oxidize to sulfurous or sulfuric acid (see under "Acids")	1, 2, 3, 6, 7, 8, 9, 10, 12, 13, 16 (b, c, e, h)
Copper plating solutions	None	
Corn syrup (glucose)	Slow disintegration	1, 2, 3, 7, 8, 9, 10, 12, 13, 16 (b, c, e), 17

Deicers and anti-icers†	Chlorides (calcium, magnesium, and sodium), and non-chlorides (calcium magnesium acetate, potassium and sodium acetates and formates, urea, and ethyl alcohol) cause scaling of non-air-entrained concrete. Air-entrained concrete does not need added protection from deicers.	50% solution of boiled linseed oil in kerosene, soybean oil, modified castor oil, cottonseed oil, sand-filled epoxy, coal-tar epoxy, 21**
Distiller's slop	Slow disintegration due to lactic acid	1, 8, 9, 10, 12, 13, 15, 16 (b, c, e, f, h), 17
Fermenting fruits, grains, vegetables, or extracts	Slow disintegration. Industrial fermentation processes produce lactic acid (see under "Acids").	1, 2, 3, 8, 9, 10, 12, 16 (b, c, e), 17
Flue gases	Hot gases (200 °C–600 °C; 400 °F–1100 °F) cause thermal stresses. Cooled, condensed sulfurous, hydrochloric acids disintegrate concrete slowly.	9 (high melting), 16 (g, fireclay mortar)
Formaldehyde, 37% (formalin)	Slow disintegration due to formic acid formed in solution	2, 5, 6, 8, 10, 11, 12, 13, 14, 16 (b, c, e, f, g, h), 17, 20
Fruit juices	Little if any effect for most fruit juices as tartaric and citric acids do not appreciably affect concrete. Sugar and hydrofluoric and other acids cause disintegration.	1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 16 (b, c, e), 17
Gas water	Ammonium salts seldom present in sufficient quantity to disintegrate concrete	9, 10, 12, 16 (b, c)
Glyceryl tristearate	None	
Honey	None	
Hydrogen sulfide	Slow disintegration in moist oxidizing environments where hydrogen sulfide converts to sulfurous acid	1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16 (b, c, e, f, g, h), 17, 19
Iodine	Slow disintegration	1, 2, 6, 10, 12, 13, 16 (b, c, e, g), 17
Lead refining solution	Slow disintegration	1, 2, 6, 8, 9, 10, 12, 16 (carbon and graphite brick; b, c, e, h), 17, 20
Leuna saltpeter	Disintegration. See ammounium nitrate and ammonium sulfate	5, 6, 8, 9, 10, 11, 12, 13, 16 (b, c, e, f, g, h), 17
Lignite oils	Slow disintegration if fatty oils present	1, 2, 6, 8, 10, 12, 16 (b, c, e, f)
Lye See hydroxide, sodium and potassium, under "Salts and Alkalies"		
Manure	Slow disintegration	1, 2, 8, 9, 10, 12, 13, 16 (b, c, e)
Marsh, fermenting	Slow disintegration due to acetic and lactic acids and sugar	1, 8, 9, 10, 12, 13, 16 (b, c)
Milk	None, unless milk is sour. Then lactic acid disintegrates concrete slowly.	3, 4, 8, 9, 10, 11, 12, 13, 16 (b, c, f), 17
Mine water, waste	Sulfides, sulfates, or acids present disintegrate concrete and attack steel in porous or cracked concrete	1, 2, 5, 8, 9, 10, 12, 13, 15, 16 (b, c, e, f, h), 17
Molasses	Slow disintegration at temperatures of 50 °C (120 °F) or more	1, 2, 7, 8, 9, 10, 12, 13, 16 (b, c, e), 17
Nickel plating solutions	Slow disintegration due to nickel ammonium sulfate	2, 5, 6, 7, 8, 9, 10, 13, 16 (c, e, f), 17
Niter	See nitrate, potassium, under "Salts and Alkalies"	
Ores	Sulfides leaching from damp ores may oxidize to sulfuric acid or ferrous sulfate (see under "Acids" and "Salts and Alkalies")	2, 9, 10, 12, 13, 15, 16 (b, c, e, f, g), 17
Pickling brine	Steel attacked in porous or cracked concrete. See salts, boric acid, or sugar.	1, 7, 8, 9, 10, 12, 13, 16 (b, c, e, h), 17
Sal ammoniac	See chloride, ammonium, under "Salts and Alkalies"	
Sal soda	See carbonate, sodium, under "Salts and Alkalies"	
Saltpeter	See nitrate, potassium under "Salts and Alkalies"	
Sauerkraut	Slow disintegration possible due to lactic acid. Flavor impaired by concrete.	1, 2, 8, 9, 10, 12, 13, 16 (b, c, e, f), 17
Seawater	Disintegration of concrete with inadequate sulfate resistance and steel attacked in porous or cracked concrete	1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 (b, c, e, f), 17

Sewage and sludge	Usually not harmful. See hydrogen sulfide above.	
Silage	Slow disintegration due to acetic, butyric, and lactic acids, and sometimes fermenting agents of hydrochloric or sulfuric acids	3, 4, 8, 9, 10, 12, 16 (b, c, e, f)
Sodium hypochlorite	Slow disintegration	7, 8, 9, 10, 13, 16 (d, f), 17
Sugar (sucrose)	None with dry sugar on thoroughly cured concrete. Sugar solutions may disintegrate concrete slowly.	1, 2, 3, 7, 8, 9, 10, 12, 13, 15, 16 (b, c, e, f), 17
Sulfite liquor	Disintegration	1, 2, 3, 5, 6, 8, 9, 10, 12, 13, 16 (b, c, e, f, h), 17, 19
Sulfur dioxide	None if dry. With moisture, sulfur dioxide forms sulfurous acid.	2, 5, 6, 8, 9, 10, 12, 13, 16 (b, c, e, f, g, h), 17, 19
Tanning bark	Slow disintegration possible if damp. See tanning liquor below.	1, 2, 3, 6, 8, 9, 10, 11, 12, 13, 16 (b, c, e), 17
Tanning liquor	None with most liquors, including chromium. If liquor is acid, it disintegrates concrete.	1, 2, 3, 5, 6, 8, 9, 10, 11, 12, 13, 16 (b, c, e), 17
Tobacco	Slow disintegration if organic acids present	1, 8, 9, 10, 12, 13, 16 (b, c, e, f), 17
Trisodium phosphate	None	
Urea	None (see deicers)	
Urine	None, but steel attacked in porous or cracked concrete	7, 8, 10, 12, 13, 16 (b, c, e)
Vinegar	Slow disintegration due to acetic acid	9, 10, 12, 16 (b, c, e, h), 17
Washing soda	None	
Water, soft (<75 ppm of carbonate hardness)	Leaching of hydrated lime by flowing water in porous or cracked concrete	2, 3, 4, 8, 9, 10, 12, 13, 16 (b, c, e, f, h), 17
Whey	Slow disintegration due to lactic acid	3, 4, 5, 7, 8, 9, 10, 12, 13, 16 (b, c, e, f, h), 17
Wine	None—but taste of first wine batch may be affected unless concrete has been given tartaric acid treatment. Solutions from wine-making process can cause slow disintegration.	For fine wines, 2 or 3 applications of tartaric acid solution, 320 g of tartaric acid in 1 liter of water (1 lb tartaric acid in 3 pints of water), 2, 8, 10, 12, 16 (b), 20
Wood pulp	None	
Zinc refining solutions	Disintegration if hydrochloric or sulfuric acids present	8, 9, 10, 12, 13, 16 (b, c, e, f, h), 17
Zinc slag	Zinc sulfate (see under "Salts and Alkalies") may be formed by oxidation	8, 9, 10, 12, 13, 16 (b, c, e, f, h), 17

* Carbonation will not harm plain (nonreinforced) concrete; however, steel embedded in carbonated concrete is prone to corrosion. See "Corrosion of Reinforcement" under "Design Considerations."

** Impermeable materials, such as most epoxies, should not be used on exterior slabs on ground or other concrete where moisture can freeze under the coating. The freezing water can cause surface delamination under the impermeable coating.

† Potassium acetate deicers or anti-icers and to a lesser extent potassium formate and sodium acetate or formate may accelerate alkali-silica reaction when reactive aggregates are present (Rangaraju and Olek 2007).

Sources of Products

The Society for Protective Coatings (SSPC) and Paintsquare.com, the webportal to the Journal of Protective Coatings and Linings, and Journal for Architectural Coatings, publish a buyers guide for Coatings and Linings for Industrial and Marine Applications http://www.paintsquare.com/bg/buyers_guide.cfm. Coatings and manufacturers can be searched for by application/environment, system, or generic coating type.

NACE International also publishes an annual a Buyers Guide on its website http://www.nace.org/nace/index.asp. Corrosion control products can be searched for by category or company name.

Additional information on chemical suppliers can be obtained from *Hanley-Wood's Industry Sourcebook*, which is available online at http://www.concreteconstructiononline.com/industry-sourcebook-search.asp or *R&D Magazine Product Source Guide*, website http://www.rdmag.com/BuyersGuide.aspx.

ASTM Standards

American Society for Testing and Materials* documents related to concrete that are relevant to or referred to in the text are listed as follows:

A767/A767M *Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement*

A775/A775 M *Specification for Epoxy-Coated Reinforcing Steel Bars*

C39 *Test Method for Compressive Strength of Cylindrical Concrete Specimens*

C150 *Specification for Portland Cement*

C215 *Test Method for Fundamental Transverse, Longitudinal and Torsional Frequencies of Concrete Specimens*

C260 *Standard Specification for Air-Entraining Admixtures for Concrete*

C267 *Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings*

C279 *Specification for Chemical-Resistant Masonry Units*

C287 *Specification for Chemical-Resistant Sulfur Mortar*

C305 *Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency*

C386 *Practice for Use of Chemical-Resistant Sulfur Mortar*

C395 *Specification for Chemical-Resistant Resin Mortars*

C397 *Practice for Use of Chemically Setting Chemical-Resistant Silicate and Silica Mortars*

C398 *Practice for Use of Hydraulic Cement Mortars in Chemical-Resistant Masonry*

C399 *Practice for Use of Chemical-Resistant Resin Mortars*

C410 *Specification for Industrial Floor Brick*

C466 *Specification for Chemically Setting Silicate and Silica Chemical-Resistant Mortars*

C494 *Specification for Chemical Admixtures for Concrete*

C595 *Specification for Blended Hydraulic Cements*

C618 *Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete*

C658 *Specification for Chemical-Resistant Resin Grouts for Brick or Tile*

C722 *Specification for Chemical-Resistant Resin Monolithic Surfacings*

C723 *Practice for Chemical-Resistant Resin Grouts for Brick or Tile*

C811 *Practice for Surface Preparation of Concrete for Application of Chemical-Resistant Resin Monolithic Surfacings*

C876 *Test Method for Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete*

C881 *Specification for Epoxy-Resin-Base Bonding Systems for Concrete*

C882 *Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear*

C989 *Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars*

C1005 *Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers*

C1017 *Specification for Chemical Admixtures for Use in Producing Flowing Concrete*

C1106 *Test Method for Chemical Resistance and Physical Properties of Carbon Black*

C1152 *Test Method for Acid-Soluble Chloride in Mortar and Concrete*

C1157 *Performance Specification for Blended Hydraulic Cement*

C1218 *Test Method for Water-Soluble Chloride in Mortar and Concrete*

C1240 *Specification for Silica Fume for Use in Hydraulic-Cement Concrete and Mortar*

C1438 *Specification for Latex and Powder Polymer Modifiers for Hydraulic Cement Concrete and Mortar*

C1524 *Test Method for Water-Extractable Chloride in Aggregate (Soxhlet Method)*

C1580 *Test Method for Water-Soluble Sulfate in Soil*

D41 *Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing*

D1212 *Measurement of Wet Film Thickness of Organic Coatings*

D1973 *Guide for Design of a Liner System for Containment of Wastes*

D3963/D 3963M *Specification for Epoxy-Coated Reinforcing Steel*

D4138 *Method for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive Means*

D4258 *Practice for Surface Cleaning Concrete for Coating*

D4259 *Practice for Abrading Concrete*

D4260 *Practice for Acid Etching Concrete*

D4261 *Practice for Surface Cleaning Concrete Unit Masonry for Coating*

D4262 *Method for pH of Chemically Cleaned or Etched Concrete Surfaces*

D4263 *Method for Indicating Moisture in Concrete by the Plastic Sheet Method*

D4414 *Practice for Measurement of Wet Film Thickness by Notched Gages*

D4541 *Method for Pull-Off Strength of Coatings Using Portable Adhesion-Testers*

D4787 *Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates*

D6132 *Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Using an Ultrasonic Gage*

D6237 *Guide for Painting Inspectors (Concrete and Masonry Substrates)*

D7234 *Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers*

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References

Abrams, D. A., *Effect of Tannic Acid on the Strength of Concrete*, Structural Materials Research Laboratory Bulletin 7, Lewis Institute, Chicago, 1920, 30 pages.

Abrams, D. A., *Tests of Impure Waters for Mixing Concrete*, Structural Materials Research Laboratory Bulletin 12, Lewis Institute, Chicago, 1924, 46 pages. [Available through PCA library.]

ACI Committee 201 Report, *Guide to Durable Concrete*, ACI 201.2R, American Concrete Institute, Farmington Hills, Michigan, 2001, 41 pages.

ACI Committee 222 Report, *Corrosion of Metals in Concrete*, ACI 222R, American Concrete Institute, Farmington Hills, Michigan, 2001, 41 pages.

ACI Committee 224 Report, *Control of Cracking in Concrete Structures*, ACI 224R, 2001, American Concrete Institute, Farmington Hills, Michigan, 46 pages.

ACI Committee 318 Report, *Building Code Requirements for Reinforced Concrete and Commentary*, ACI 318/318R, American Concrete Institute, Farmington Hills, Michigan, 2005, 436 pages.

ACI Committee 440 Report, *Guide for the Design and Construction of Structural Concrete Reinforced with FRP Bars*, ACI 440.1R-06, American Concrete Institute, Farmington Hills, Michigan, 44 pages.

ACI Committee 503 Report, *Use of Epoxy Compounds with Concrete*, ACI 503R, American Concrete Institute, Farmington Hills, Michigan, 1993, 28 pages.

ACI Committee 515 Report, *A Guide to the Use of Waterproofing, Dampproofing, Protective, and Decorative Barrier Systems for Concrete*, ACI 515.1R, American Concrete Institute, Farmington Hills, Michigan, 1986, 44 pages.

ACI Committee 548 Report, *Guide for Mixing and Placing Sulfur Concrete in Construction* (Reapproved 1998), ACI 548.2R-93, American Concrete Institute, Farmington Hills, Michigan, 1993, 12 pages.

ACI Committee 548 Report, *Polymer Modified Concrete,* ACI 548.3R-03, American Concrete Institute, Farmington Hills, Michigan, 2003, 140 pages.

ACPPA, *External Protection of Concrete Cylinder Pipe,* American Concrete Pressure Pipe Association, Reston, Virginia, 2000, 12 pages, http://www.acppa.org/documents/external.pdf.

Addis, B. J., *Fulton's Concrete Technology*, Portland Cement Institute, South Africa, 1994, pages 160 to 164.

Alfred, J. M., "HPI Concrete," *Concrete International*, American Concrete Institute, Farmington Hills, Michigan, November 1988, pages 52 to 57.

American Society for Testing and Materials, *Chloride Corrosion of Steel in Concrete*, STP 629, Philadelphia, 1977.

American Concrete Pipe Association, *Guidelines for the Protection of Concrete Cylinder Pipe in Adverse Environments*, Vienna, Virginia, 1988, 10 pages.

Basson, J. J., *Deterioration of concrete in aggressive waters—measuring aggressiveness and taking countermeasures*, Portland Cement Institute, South Africa, 1989, 21 pages.

Bealey, M., "Durability Considerations—Precast Concrete Pipe," *Concrete Durability*, SP-100, American Concrete Institute, Farmington Hills, Michigan, 1987, pages 496 to 498.

Beilner, O., and Engblom, G., "Flame Cleaning as a Corrosion Protection Measure for Steel and Concrete Surfaces," *Welding in the World*, Pergamon Press, Oxford, 1990, pages 144 to 156.

Berke, N. S., "Resistance of Microsilica Concrete to Steel Corrosion, Erosion, and Chemical Attack," *Fly Ash, Silica Fume, Slag and Natural Pozzolans in Concrete*, SP-114, American Concrete Institute, Farmington Hills, Michigan, 1989, pages 861 to 886.

Berke, N. S.; Aldykiewicz, A.J. Jr.; and Li, L.,"What's New in Corrosion Inhibitors," *Structure*, July/August 2003, pages 10 to 12.

Biczok, I., *Concrete Corrosion and Concrete Protection*, Akademai Kiado, Budapest, 1972.

Browne, F. P., and Cady, P. D., "Deicer Scaling Mechanisms in Concrete," *Durability of Concrete*, ACI Publication SP-47, American Concrete Institute, Farmington Hills, Michigan, 1975.

Carter, P. D., "Evaluation of Dampproofing Performance and Effective Penetration Depth of Silane Sealers in Concrete," *Concrete Bridges in Aggressive Environments*, Philip D. Cady International Symposium, SP-151, American Concrete Institute, Farmington Hills, Michigan, 1994.

Cody, R. D., *Concrete Deterioration by Deicing Salts: An Experimental Study*, Semisesquicentennial Transportation Conference Proceeding, 1996 www.ctre.iastate.edu/pubs/semisesq/index.htm.

Cohen, M. D., and Bentur, A., "Durability of Portland Cement-Silica Fume Pastes in Magnesium Sulfate and Sodium Sulfate Solutions," *ACI Materials Journal*, American Concrete Institute, Farmington Hills, Michigan, May–June 1988, pages 148 to 157.

EN 1504, *Products and systems for the protection and repair of concrete structures*—Definitions, requirements, quality control and evaluation of conformity—Parts 1 to 10.

Farny, J. A., *Concrete Floors on Ground*, EB075, Portland Cement Association, 2001, 136 pages.

Farny, J. A., and Kerkhoff, B., *Diagnosis and Control of Alkali-Aggregate Reactions in Concrete*, IS413, Portland Cement Association, Skokie, Illinois, 2007, 26 pages.

Fattuhi, N. I., and Hughes, B. P., "Ordinary Portland Cement Mixes with Selected Admixtures Subjected to Sulfuric Acid Attack," *ACI Materials Journal*, American Concrete Institute, Farmington Hills, Michigan, November–December 1988, pages 512 to 518.

Fintel, M., *Handbook of Concrete Engineering*, Van Nostrand Reinhold Co., New York, 1985, pages 238 to 242.

Fliedner, Ch. "Concrete Protection with Organosilicon Compounds," *ConChem Journal*, No. 1 1996, H. Ziolkowsky GmbH, Augsburg, Germany, January 1996, pages 3 to 8.

Haynes, H.; O'Neill, R.; and Mehta, P. K., "Concrete Deterioration from Physical Attack by Salts," *Concrete International*, American Concrete Institute, Farmington Hills, Michigan, January 1996, pages 63 to 68.

Hime, W. G.; Erlin, B.; and McOrmond, R. R., "Concrete Deterioration Through Leaching with Soil-Purified Water," *Cement, Concrete, and Aggregates*, American Society for Testing and Materials, Philadelphia, Summer 1986, pages 50 to 51.

Holl, C. H., and O'Connor, S. A., "Cleaning and Preparing Concrete Before Repair," *Concrete International*, Vol. 19 No. 3, American Concrete Institute, Farmington Hills, Michigan, March 1997, pages 60 to 63.

International Concrete Repair Institute, *Guide for Selecting and Specifying Materials for Repair of Concrete Surfaces*, Guideline No. 03733, Sterling, Virginia, January 1996.

International Concrete Repair Institute, *Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays*, Guideline No. 03732, Sterling, Virginia, January 1997.

Johnston, C. D., "Deicer Salt Scaling Resistance and Chloride Permeability," *Concrete International*, August 1994, pages 48 to 55.

JPCL Staff, "Coating Systems for Concrete", *Journal of Protective Coatings & Linings*, January 2006, pages 50 to 57.

Kanare, Howard M., *Concrete Floors and Moisture*, EB119, Portland Cement Association, Skokie, Illinois, and National Ready Mixed Concrete Association, Silver Spring, Maryland, USA, 2005, 168 pages.

Kenworthy, T., "100 % Solids Polyurethane and Polyurea: A Comparison of Properties and Uses," *Journal of Protective Coatings & Linings*, May 2003, pages 58 to 63.

Kleinlogel, A., *Influences on Concrete*, Federick Ungar Publishing Co., New York, 1950.

Kong, H., and Orbison, J. G., "Concrete Deterioration Due to Acid Precipitation," *ACI Materials Journal*, American Concrete Institute, Farmington Hills, Michigan, March–April 1987, pages 110 to 116.

Kosmatka, S. H., "Corrosion Protection of Concrete Parking Decks," *Concrete Technology Today*, PL882, Portland Cement Association, Skokie, Illinois, 1983, 3 pages.

Kosmatka, S. H., "Floor-Covering Materials and Moisture in Concrete," *Concrete Technology Today*, PL853, Portland Cement Association, Skokie, Illinois, September 1985, 2 pages.

Kosmatka, S. H., "Sulfate-Resistant Concrete," *Concrete Technology Today*, PL883, Portland Cement Association, Skokie, Illinois, October 1988, 3 pages.

Kosmatka, S. H.:, Kerkhoff, B.; and Panarese, W. C., *Design and Control of Concrete Mixtures*, EB001, 14th edition, Portland Cement Association, Skokie, Illinois, 2002, 372 pages.

Kozikowski, Ronald; Taylor, Peter; and Pyc, W. Agata, *Evaluation of Potential Concrete Deterioration Related to Magnesium Chloride (MgCl2) Deicing Salts,* SN2770, Portland Cement Association, Skokie, Illinois, USA, 2007, 30 pages.

Kuenning, W. H., *Resistance of Portland Cement Mortar to Chemical Attack—A Progress Report*, Research Bulletin RX204, Portland Cement Association, Skokie, Illinois, 1966, 44 pages.

Lea, F. M., *The Chemistry of Cement and Concrete,* Chemical Publishing Co., Inc., New York, 1970, pages 553 to 556.

Litvin, A., *Clear Coatings for Exposed Architectural Concrete*, Development Department Bulletin, DX137, Portland Cement Association, Skokie, Illinois, 1968.

Luther, M. D., "Microsilica (Silica Fume) Concrete Durability in Severe Environments," *Seventh Annual Structures Congress*, American Society of Civil Engineers, New York, 1989.

Mailvaganam, N. P., Rep*air and Protection of Concrete Structures*, Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, 1991.

Marcías, A., and Goñi, S., "Acid Attack on High-Alkali Cement Paste: Another Cause for Delayed Ettringite Formation," *Journal of the American Ceramic Society*, Vol. 81, No. 11, November 1998, pages 2894 to 2900.

Matthews, J. D., "The Resistance of PFA Concrete to Acid Groundwaters," *9th International Congress/India, Vol. V*, 1992, Building Research Establishment, Watford, England, page 355.

McGill, L. P., and Humpage, M., "Prolonging the Life of Reinforced Concrete Structures by Surface Treatment," *Protection of Concrete,* E. & F.N. Spon, London, 1990, pages 191 to 200.

McGovern, M. S., "Sulfur Concrete, Chemical-resistant, thermoplastic material reaches its ultimate strength in 1 day," *Concrete Repair Digest*, October / November 1992, pages 215 to 217.

McGovern, M. S., "Protecting floors from chemical attack," *Concrete Construction*, October 1998, pages 901 to 907.

Mehta, P. K., "Studies on Chemical Resistance of Low Water-Cement Ratio Concrete," *Cement and Concrete Research*, Vol. 15, 1985, Pergamon Press, Ltd., Fairview Park, Elmsford, New York, pages 969 to 978.

Monfore, G. E., and Ost, B., *Corrosion of Aluminum Conduit in Concrete*, Research Department Bulletin RX173, Portland Cement Association, Skokie, Illinois, 1965, 14 pages.

Munshi, S., and Millstein, L., *Low Cost Bridge Deck Surface Treatment*, Report No. FHWA/RD-84/001, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., April 1984.

National Association of Corrosion (NACE), *Engineers Concrete: Surface Preparation, Coating and Lining, and Inspection*, Houston, 1991.

National Cooperative Highway Research Program, *Guidelines for the Selection of Snow and Ice Control Materials to Mitigate Environmental Impacts*, NCHRP Report 577, Transportation Research Board, Washington D.C., 2007.

Nmai, C. K.; Farrington, S.; and Bobrowski, G. S., 1992, "Organic-Based Corrosion-Inhibiting Admixture for Reinforced Concrete," *Concrete International*, V. 14, No. 4, Apr., pages 45 to 51.

Neville, A. M., "Behavior of Concrete in Saturated and Weak Solutions of Magnesium Sulphate or Calcium Chloride," *Journal of Materials*, American Society for Testing and Materials, Philadelphia, March, 1969.

Oesterle, R. G., *The Role of Concrete Cover in Crack Control Criteria and Corrosion Protection*, Serial No. 2054, Portland Cement Association, Skokie, Illinois, 1997, 88 pages.

Ost, B., and Monfore, G. E., *Penetration of Chloride into Concrete*, Research Department Bulletin RX192, Portland Cement Association, Skokie, Illinois, 1966, 8 pages.

Oswald, T., "Resistant Concrete," *Concrete Engineering International*, July/August 1998, page 62.

PCA, *Concrete Slab Surface Defects: Causes, Prevention, Repair*, IS177, Portland Cement Association, Skokie, Illinois, 2001, 16 pages.

PCA, *Corrosion of Nonferrous Metals in Contact with Concrete*, IS136, Portland Cement Association, Skokie, Illinois, 1970, 3 pages.

PCA, "Dense, Low-Permeability Patches May Not Be Best," *Concrete Technology Today*, PL943, Portland Cement Association, Skokie, Illinois, November 1994, 2 pages.

PCA, *Painting Concrete*, IS134, Portland Cement Association, Skokie, Illinois, 1992, 8 pages.

PCA, "Specifying a Burnished Floor Finish," *Concrete Technology Today*, PL963, Portland Cement Association, Skokie, Illinois, December 1996, 1 page.

PCA, *Guide Specification for Concrete Subject to Alkali-Silica Reactions*, IS415, Portland Cement Association, Skokie, Illinois, 2007.

PCA, *Removing Stains and Cleaning Concrete Surfaces*, IS214, Portland Cement Association, Skokie, Illinois, 1988, 16 pages.

PCA, *Types and Causes of Concrete Deterioration*, IS536, Portland Cement Association, Skokie, Illinois, 2002, 16 pages.

Pfeifer, D. W., and Scali, M. J., *Concrete Sealers for Protection of Bridge Structures,* National Cooperative Highway Research Program Report 244, Transportation Research Board, Washington, D.C., 1981.

Rangaraju, P. R., and Olek, J., *Potential for Acceleration of ASR in the Presence of Pavement Deicing Chemicals*, IPRF-01-G-002-03-9, Innovative Pavement Research Foundation, Skokie, IL, March 2007.

Recker, "Waterproofing of Concrete Structures—10 Years of Experience with Spray-Applied PU Elastomers" *Concrete Bridges in Aggressive Environments*, Philip D. Cady International Symposium, SP-151, American Concrete Institute, Farmington Hills, Michigan, 1994.

Schneider, U.; Nagele, E.; and Dujardin, N., "Microstructural Aspects of Stress Corrosion of Cementitious Materials," *Microstructural Development During Hydration of Cement,* Vol. 85, Materials Research Society, Pittsburgh, Pennsylvania 1987, pages 161 to 166.

Sennour, M. L.; Wheat, H. G.; and Carrasquillo, R. L., "The Role of Concrete Mix Design in the Corrosion of Steel in Reinforced Concrete," *Concrete Bridges in Aggressive Environments*, Philip D. Cady International Symposium, SP-151, American Concrete Institute, Farmington Hills, Michigan, 1994.

Stark, D., *Galvanized Reinforcement in Concrete Containing Chlorides*, Serial No. 1464, Portland Cement Association, Skokie, Illinois, 1978.

Stark, D., "Continuing Studies of Concrete in Sulfate Soils," *Concrete Technology Today*, PL972, Portland Cement Association, Skokie, Illinois, July 1997, 3 pages.

Stark, D., *Durability of Concrete in Sulfate-Rich Soils*, RD097, Portland Cement Association, Skokie, Illinois, 1989.

Stark, D., *Influence of Design and Materials on Corrosion Resistance of Steel in Concrete*, RD098, Portland Cement Association, Skokie, Illinois, 1989[a].

Stark, David C., *Performance of Concrete in Sulfate Environments*, RD129, Portland Cement Association, Skokie, Illinois, USA, 2002, 28 pages.

Steinour, H. H., *Concrete Mix Water—How Impure Can It Be?* Research Department Bulletin RX119, Portland Cement Association, Skokie, Illinois, 1960, 20 pages.

Steinour, H. H., *Influence of the Cement on the Corrosion Behavior of Steel in Concrete*, Research Department Bulletin RX168, Portland Cement Association, Skokie, Illinois, 1964, 14 pages.

Steinour, H. H., *Acidic Organic Agents*, Serial No. 1232, Portland Cement Association, Skokie, Illinois, 1966.

Steinour, H. H., *Estimation of Aggressive CO2 and Comparison with Langelier Saturation Index*, Serial No. 1905, Portland Cement Association, Skokie, Illinois, 1975.

Steinour, H. H., *Minimizing Acid Conditions by Adding Calcium Carbonate*, Serial No. 1244, Portland Cement Association, Skokie, Illinois, 1966[a].

Steinour, H. H., *The Ultimate Products of the Carbonation of Portland Cement*, Serial No. 1136, Portland Cement Association, Skokie, Illinois, 1957.

Swamy, R. N., and Tanikawa, S., "A High Performance Surface Coating for Long Term Protection and Rehabilitation of Concrete," *Durability of Building Materials and Components* 6, E. & F.N. Spon, London, 1993, pages 421 to 430.

Technology Publishing Company, "Oregon DOT Uses Zinc Metallizing with Cathodic Protection on Concrete Bridges," *Journal of Protective Coatings & Linings*, Pittsburgh, August 1992.

U.S. Bureau of Reclamation, *Concrete Manual*, 8th ed., Denver, Colorado, 1975, page 11.

U. S. Bureau of Reclamation, "USBR 4908: Procedure for Length Change of Hardened Concrete Exposed to Alkali Sulfates," *Concrete Manual Part 2,* 1992, pages 20 to 30.

Verbeck, G., and Klieger, P., *Studies of "Salt" Scaling of Concrete*, Research Department Bulletin RX083, Portland Cement Association, Skokie, Illinois, 1956, 13 pages.

Wei, W.; Rothwell, G. W.; and Davies, H., "Investigation of the Gas and Vapour Resistance of Surface Coatings on Concrete and Effects of Weathering on Their Carbonation Protective Performance," *Corrosion of Reinforcement in Concrete*, edited by C. L. Page, Treadaway, K. W. J., and Bamforth, P. B., Society of Chemical Industry by Elsevier Applied Science, London; New York, 1990, pages 397 to 408.

Whiting, D. A., "Influence of Concrete Materials, Mix, and Construction Practices on the Corrosion of Reinforcing Steel," *Materials Performance*, Vol. 17, No. 12, National Association of Corrosion Engineers, Katy, Texas, December 1978, pages 9 to 15. Also available as PCA Serial No. 1588.

Woods, H., *Corrosion of Embedded Material Other Than Reinforcing Steel*, Research Department Bulletin RX198, Portland Cement Association, Skokie, Illinois, 1968.

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IS001.11

Appendix E

Soil Acceptance Agreement

Appendix F

Soil Tracking Log

Appendix G

HDOH Correspondence

Submit This Form to Request Approval of Preparation of an Addendum Instead of a Complete C-EHMP
The Addendum Will Only Be Accepted If HDOH Approves of This Path Forward

Request to Use A Construction Environmental Hazard Management Plan Addendum

Site Name	Hilo International Airport (ITO), Hilo, Hawaii
Site Address:	2450 Kekuanaoa Street
Site TMK(s):	(3) 2-1-012:009
HDOH-Approved Site-Specific, Area-Wide, or Programmatic EHMP already exists for site?	Yes, Programmatic EHE/EHMP State of Hawaii Department of Transportation Airports Division
Date Site-Specific or Programmatic EHMP last updated:	10/21/2019
Is there a current HDOH Remedial Project Manager assigned to the site/release?	Yes
If so, please provide name	Thomas Gilmore

Angela Peltier — 06/15/2022

Name of Requestor — Date

Element Environmental, LLC

Company of Requestor

**********For HEER Office Use Only**********

Thomas Gilmore — 

Printed HEER Office RPM — RPM Signature

6/15/2022 — Yes

Date — Approved (Yes/No)

DAVID Y. IGE
GOVERNOR OF HAWAII

ELIZABETH A. CHAR, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:
196995 - TG

September 19th, 2022

Ms. Stacy Paquette
Department of Transportation – Airports Division
400 Rogers Boulevard, Suite 700
Honolulu, HI 96819

Facility/Site: Hilo International Airport South Hilo, Hawaii: Project AH1021- 20

Subject: Review of: *Project-Specific Construction EHMP Addendum for EHMP Addendum for an Existing Programmatic EHMP Hilo International Airport Drainage & Wind Cone Improvements South Hilo, Hawaii, State Project* AH1021- 20 dated July 2022.

Dear Ms. Paquette:

The Hawaii Department of Health (HDOH), Hazard Evaluation and Emergency Response (HEER) Office has reviewed the above-mentioned document and approves the C-EHMP Addendum. Please keep in mind that environmental contamination has been confirmed in concentrations above the DOH Tier 1 EAL. Please use the outlined controls and BMPs while handling contaminated media. DOH looks forward to reviewing the closeout report (detailing handling of contaminated media) listed in the section 4.1.1 when the project is completed.

If conditions at the site change, please communicate those changes to DOH. Should you have any questions concerning the above, please feel free to contact me at thomas.gilmore@doh.hawaii.gov or at (808) 586-4353.

Sincerely,

Thomas Gilmore
Remedial Project Manager
Hazard Evaluation and Emergency Response Office

ECC: Angela Peltier Element Env.

SECTION 01562 – PHASE II ENVIORNMENTAL SITE ASSESSMENT REPORT; APPENDIX B

The following is the Phase II Environmental Site Assessment report associated with the project. The Contractor shall be aware of the location and type of identified contamination within the limits of the project area.

Limited Pre-Construction Assessment
Sampling and Analysis Plan
Hilo International Airport
Drainage & Wind Cone Improvements
South Hilo, Hawaii, Hawaii

Prepared for:
Hawaii State Department of Transportation – Airports Division
State Project AH1021-20
Prepared by:

element environmental llc
environmental · engineering · water resources
98-030 Hekaha Street
Aiea, Hawaii 96701

July 2021

Table of Contents

Table of Contents (Continued)

Section **Page**

Figures

Tables

ATTACHMENTS

List of Acronyms and Abbreviations

%D	percent difference
%R	percent recovery
°C	degree Celsius
AC	asphaltic concrete
AIR	Airports Division
bgs	below ground surface
BS	blank spike
C-EHMP	Construction Environmental Hazard Management Plan
COPC	contaminant of potential concern
cy	cubic yard
DQO	data quality objectives
DRO	diesel range organics
DU	decision unit
E2	Element Environmental, LLC
EAL	Environmental Action Level
EHE	Environmental Hazard Evaluation
EHMP	Environmental Hazard Management Plan
EPA	United States Environmental Protection Agency
ft	feet
GRO	gasoline range organics
AIR	Airports Division
HDOH	State of Hawaii Department of Health
HDOT	State of Hawaii Department of Transportation
HEER	Hazard Evaluation and Emergency Response
IDW	investigation-derived waste
ITO	Hilo International Airport
LCS	laboratory control sample
LD	laboratory duplicate
mL	milliliter
MS	matrix spike
MSD	matrix spike duplicate
OCl	organochlorine
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyls
PPE	personal protective equipment

List of Acronyms and Abbreviations (Continued)

QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
RRO	residual range organics
SAP	Sampling and Analysis Plan
SOW	scope of work
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

Section 1 Introduction and Purpose

1.1 Project Identification

Project Name and Location	Limited Pre-Construction Soil Assessment Drainage & Wind Cone Improvements Project Hilo International Airport, South Hilo, Hawaii
Project Owner:	Department of Transportation, State of Hawaii (HDOT)-Airports Division (AIR)
Contract Number:	State Project AH1021-20
Date of Issue:	July 2021
Effective Dates:	August 2021 - Project Completion

1.2 Introduction and Purpose

Element Environmental, LLC (E2) has prepared this Sampling and Analysis Plan (SAP) to conduct a Limited Pre-Construction Soil Assessment to characterize *insitu* soil for on-site reuse and/or off-site disposal for the *Hawaii Department of Transportation – Airports Drainage & Wind Cone Improvements* project (State Project AH1021-20) at the Hilo International Airport (ITO) where soil removal is anticipated during planned construction. The ITO is located in South Hilo on the east central coast of the Big Island of Hawaii, Hawaii. Plan Sheet G-1 and G-2, attached, show the project Site Plan.

This assessment is considered to be ***limited*** because of sampling restrictions/limitations due to 1) Airport Operations requirements to maintain a 5-foot (ft) minimum buffer around existing signage and lighting, underground utilities, and other structures and 2) the presence of shallow basalt rock beneath the site surface.

The purpose of this SAP is to identify the contaminants of potential concern (COPCs), present the soil assessment rationale and sampling design, and describe the work procedures and methods that will be implemented. Previous environmental reports for the project area do not exist or were not available for review.

The scope of work described in this SAP is based on information obtained from the following documents:

- *Programmatic Environmental Hazard Evaluation and Environmental Hazard Management Plan*, *State of Hawaii Department of Transportation, Airports* (HDOT-AIR 2019).
- *80% Plans for Drainage & Wind Cone Improvements at Hilo International Airport, South Hilo, Hawaii, HDOT-AIR Project No. AH1021-20* (HDOT-AIR 2021).

The work will be conducted in accordance with the following Hawaii Department of Health (HDOH) guidance:

- *Technical Guidance Manual for the Implementation of the Hawai'i State Contingency Plan, Interim Final*. Hazard Evaluation and Emergency Response Office, November 12, 2009 and updates (HDOH 2009 and updates).

- *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material.* Hazard Evaluation and Emergency Response Office, October 2017 (HDOH 2017).

This SAP deviates from HDOH guidance in that replicate soil samples will be collected from the same soil borings as the primary samples.

1.3 Limited Pre-Construction Soil Assessment Tasks

Representative soil samples will be collected using *MULTI INCREMENT®*[1] sampling methodology to characterize fill for onsite reuse and/or offsite disposal at a permitted landfill in accordance with HDOH HEER Office guidance (HDOH HEER 2017). Analytical results will be compared to HDOH Environmental Action Levels (EALs) for unrestricted and site-specific commercial/industrial land use.

The Limited Pre-Construction Soil Assessment consists of the following primary tasks:

- Project planning and coordination: Includes preparation of this SAP, attending meetings, and coordination with property owners, tenants, and subcontractors.
- Field work: Includes underground utility clearance and surface and subsurface soil sampling.
- Management of investigation-derived wastes (IDW): Includes managing wastes generated during the investigation (e.g., contaminated soil cores/cuttings and personal protective equipment [PPE]).
- Laboratory analysis of soil samples to be performed by off-site analytical laboratories.
- Data management: Data from field investigation activities and laboratory analyses will be managed, as appropriate.
- Report preparation: A report will be prepared that briefly discusses the sampling rationale, methodology, and sample locations and results; summarizes the findings; and presents conclusions and recommendations.

[1] *MULTI INCREMENT® is a registered trademark of EnviroStat, Inc.*

Section 2 Background

2.1 Site Location and Description

The ITO is located on the eastern coast of the Big Island of Hawaii, just east of South Hilo (Plan Sheet G-1, attached). In general, the airport is bordered to the north and west by commercial businesses and residences, to the east by vacant land, and to the south by commercial businesses and vacant land. The nearest major body of surface water is the Pacific Ocean, located less than 0.1-mile from the northwest side of the airport. There is also a drainage canal within the airport.

The project site is located throughout the west and northeast areas of the ITO. The scope of work (SOW) is broken down into six phases. Figure 2-1 shows the locations of the six project phases.

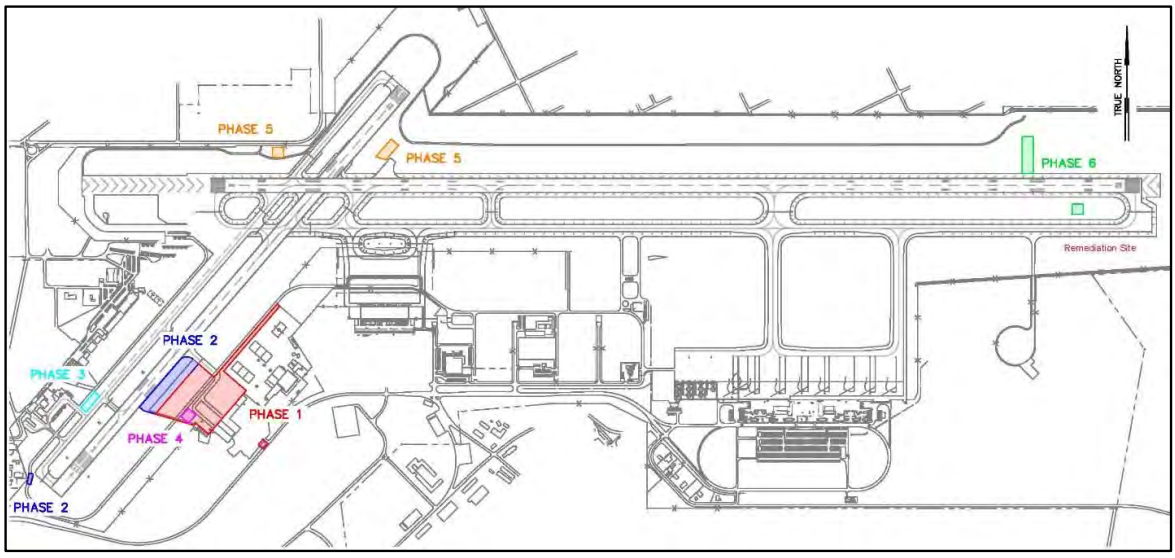

Figure 2-1 – Project Construction Phases

2.2 General Site Setting

2.2.1 Climate

The geographic location of the Hawaiian Islands and surrounding ocean moderate the subtropical climate, so temperatures are relatively uniform throughout the year. The site is near the windward coastline where moderate northeast trade winds generally prevail and produce substantial rainfall. Daytime temperatures are commonly in the 70s to 80s in degrees Fahrenheit, and nighttime temperatures are commonly in the 60s and 70s in °F. Mean annual rainfall is approximately 130± inches (Giambelluca et al. 2013).

2.2.2 Topography, Elevation, and Surface

The site is located on the flanks of the Mauna Loa Volcano, an active volcano that erupted most recently in 1881. The elevation at the site is approximately 30 feet (ft) above mean sea level. The topography of the site is relatively flat with a slight regional slope toward Hilo Harbor, located approximately 0.5 miles to the north of the site.

2.2.3 Geology and Soils

According to the United States Department of Agriculture National Resource Conservation Service, the soil at the site is classified as Papai-Urban land complex, 2 to 10 percent slopes. A typical profile for this soil type consists of extremely cobbly and highly decomposed plant material from 0 to 10 inches, cobbles from 10 to 53 inches, and bedrock from 53 to 63 inches. Additionally, this soil type is described as well-drained with low runoff.

Soil at the site is primarily Pahoehoe lava flow basaltic rock, cobbles and cinder. There are some intermittent occurrences of volcanic soil (silty clay).

2.2.4 Surface Water

The closest surface water body to the site is Reeds Bay in Hilo Harbor which is approximately 0.5 miles to the north of the site. Waiakea Pond is located approximately 0.75 miles to the west of the site.

2.2.5 Groundwater

The site is located within the Hilo Aquifer System of the Northeast Mauna Loa Aquifer Sector, which is described as an unconfined, basal aquifer occurring in flank lavas (John, F. Mink; L., Stephen Lau; 1993). However, because the site is located below (makai of) the Underground Injection Control line, the underlying groundwater is not considered a drinking water source. The salinity of the aquifer is considered fresh (less than 250 milligrams per liter chlorides). The aquifer also has a high vulnerability to contamination. No surface water bodies are located within 150 meters of the site. Groundwater is likely found at a depth of approximately 20-30 ft below ground surface (bgs).

2.3 Historical Site Use

The ITO was known as General Lyman Field until 1989. The airport was first constructed as a single airstrip in 1929 and was expanded and used by the military until just after World War II. The current terminal opened in 1953.

2.4 Previous Investigations

Records regarding previous investigations in the project area were not provided. Based on the available information, neither soil or groundwater contamination has been observed in the immediate project area; however, there are areas adjacent to the project areas where contaminated soil has been identified. These areas are listed below with their contaminants.

- Former Hawaiian Pacific Aviation; Underground Storage Tank (UST) Facility 9-601794: Total petroleum hydrocarbons (TPH) as diesel range organics [DRO] in soil (HDOH 2021).
- Lockheed Air Terminal; UST Facility 9-601295: TPH as gasoline range organics (GRO), benzene, toluene, ethylbenzene, and total xylenes, and lead. A No Further Action status was issued in 1993 (Fuel Oil Polishing Company 1993).
- Summary Report, Soil Sampling at Hilo Airport West Ramp, Hilo, Hawaii (E2 2020).

2.5 Contaminants of Potential Concern

Due to former and current operations at the ITO, COPCs may be encountered in soil during construction activities. Potential sources of COPCs in the project area may include current and historic airport operations and maintenance facilities, aboveground storage tanks/fuel tank farms, and fuel pipelines and former military operations (HDOT-AIR 2019).

There are no known contaminants present in the soil within the project areas. In order to pre-characterize the soil for onsite reuse and/or disposal soil will be tested for the following broad suite of COPCs:

- TPH-GRO (limited to subsurface samples)
- TPH-DRO
- TPH as residual range organics (RRO)
- Volatile organic compounds (VOCs) (limited to subsurface samples)
- Polynuclear aromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)
- Organochlorine (OCl) pesticides (limited to surface soil samples)
- Resource Conservation and Recovery Act (RCRA) 8 metals (barium, cadmium, total chromium, lead, mercury, selenium, and silver)
- Toxicity Characteristic Leaching Procedure (TCLP) for applicable contaminants with Tier 1 Soil EALs that exceed the “20X TCLP” minimum concentration “Rule of 20”

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Section 3 Project and Data Quality Objectives

The data quality objectives (DQOs) for this project are based on an effort to pre-characterize soil contamination (if any) within soil slated for removal within the planned project areas. Guidance used in the development of the project-specific DQOs is included in the *Guidance for the Data Quality Objectives Process* (United States Environmental Protection Agency [EPA] QA/G-4) (EPA 2006) and *Guidance for Data Quality Assessment* (EPA QA/G9) (EPA 2000).

3.1 Problem Definition

Based on the purpose of this project, E2 formulated the following problem statement:

HDOT-AIR requires that soil slated for removal during construction activities be pre-characterized insitu to determine its suitability for onsite reuse and/or disposal at an on-island landfill.

3.2 The Decision

The primary objective of this project is to answer the following questions:

1. Are COPCs present in soil at concentrations exceeding screening levels for on-site reuse and/or on-island disposal?
2. If COPC concentrations exceed screening levels, what are the potential environmental hazards associated with the contamination?
3. If potential environmental hazards are identified, what mitigation measures may be required to manage contaminated soil during construction (i.e., remediation prior to construction, adherence to a Construction Environmental Hazard Management Plan [C-EHMP])?

3.3 Decision Inputs

3.3.1 Analysis of *MULTI INCREMENT* Soil Samples

Soil samples will be analyzed for COPCs using EPA SW-846 methods by an accredited analytical laboratory, as follows:

- TPH-GRO using EPA Method 8015 LUFT (excluding surface soil samples);
- TPH-DRO and - RRO using EPA Method 8015;
- VOCs, including naphthalene, using EPA Method 8260 (excluding surface soil samples);
- 18 Priority Pollutant PAHs using EPA Method 8270-SIM;
- PCBs using EPA Method 8082 (aroclors only);
- OCl pesticides, including Technical Chlordane, using EPA Method 8081 (surface soil samples only);
- RCRA 8 metals using EPA Methods 6020/7470; and
- TCLP RCRA 8 metals (for metals exceeding the 20% rule) and
- Ignitibility (for disposal purposes if petroleum is detected).

3.3.2 Soil Screening Criteria

This Limited Pre-Construction Soil Assessment is being conducted to characterize *insitu* soil slated for removal. The following screening criteria will be used to determine appropriate on-site reuse and/or disposal options.

Unrestricted Use Screening involves comparing the soil sample results to the HDOH Tier 1 EALs for sites located within 150 meters of a surface water body that overlie a current or potential drinking water source (HDOH HEER 2017 [Table A-2]) (i.e., the most conservative HDOH EALs).

Site-Specific Screening involves comparing the soil sample results to Commercial/Industrial (C/I) EALs for sites located greater than 150 meters from a surface water body that do not overlie a current or potential drinking water source (HDOH HEER 2017 [Table A-2].

Hazardous Waste Screening involves determining whether the waste is classified as a hazardous waste in accordance with Code of Federal Regulations Title 40, Part 261.

3.4 Decision Units and Soil Borings

Environmental sampling will be conducted in five of the six phases of the Drainage & Wind Cone Improvements project planned for the ITO. Construction Plan Sheet G-3, attached, shows the locations of the construction phases and highlights the construction scope of work that includes environmental sampling. Soils planned for removal will be characterized *insitu* using *MULTI INCREMENT* sampling methodology.

Decision unit (DU) designations are based upon information provided in the 80% Design Submittal dated March 1, 2021 (HDOT-AIR 2021). All DU boundaries will be recorded using GPS before completion of sampling activities. Any areas outside of the DU boundaries will be considered 'uncharacterized' and should not be assumed to be similar to characterized areas without additional sampling. If precision locations of project boundaries are not provided to E2 prior to commencement of field work, E2 will make its best effort to accurately lay out the required sample areas. Any changes in design or data gaps arising from limitations in information provided to E2 may result in additional sampling requirements and are not included in the current SOW. All borings will be backfilled with original contents and surfaces will be repaired to match surrounding where applicable (excluding broken asphalt pavement in DU-1).

As required by Airport Operations, a 5-ft buffer around existing signage and lighting, underground utilities, and other structures will be excluded from sampling.

3.4.1 Phase 1 and 2 Construction

Phase 1 construction includes installation of three dry wells (Dry Wells 1, 2, and 3) near the Army National Guard Aviation Ramp. Phase 2 construction activities include demolition of broken asphaltic concrete (AC) pavement in front of the Army National Guard Aviation Ramp, grading, and grassing between Runway 3/21 and the vehicle service road to the southeast, installation of three dry wells along the perimeter road behind Runway 3 (Dry Wells 4, 5, and 6), and installation of one dry well located within the Vehicle Service Road on the west side of Runway 21 (Dry Well 7).

DU-1: DU-1 and its three sub-DUs are shown on Figure 3-1, on the following page, and on Plan Sheet C-13, attached. This DU is bounded by the asphalt pavement edge of Runway 3/21 to the northwest, 10 ft short

of the Taxiway L edge striping to the northeast, 10 ft short of the vehicle service road edge striping to the southeast, and the edge of visible broken asphalt pavement (line perpendicular to Runway 3/21 and the vehicle service road to the southwest. This area will be graded to depths that vary from 1 to 4 feet; therefore, DU-1 was divided into three sub-DUs by grading depth as shown in Figure 3-1.

DU-1 Exclusion - A 14-ft by 14-ft area around each of the three planned dry well center points *will be excluded* from DU-1 and included with DU-2 (Figure 3-1 and Plan Sheet C-13).

Grading activities will reportedly generate approximately 5,000 cubic yards (cy) of soil. Refusal is anticipated at depths shallower than 4 ft bgs and may limit sample collection.

Figure 3-1 shows that DU-1 is divided into three sub-DUs based on their maximum anticipated grading depths. A total of 90 soil borings will be advanced in DU-1; 30 in each of the three sub-DUs.

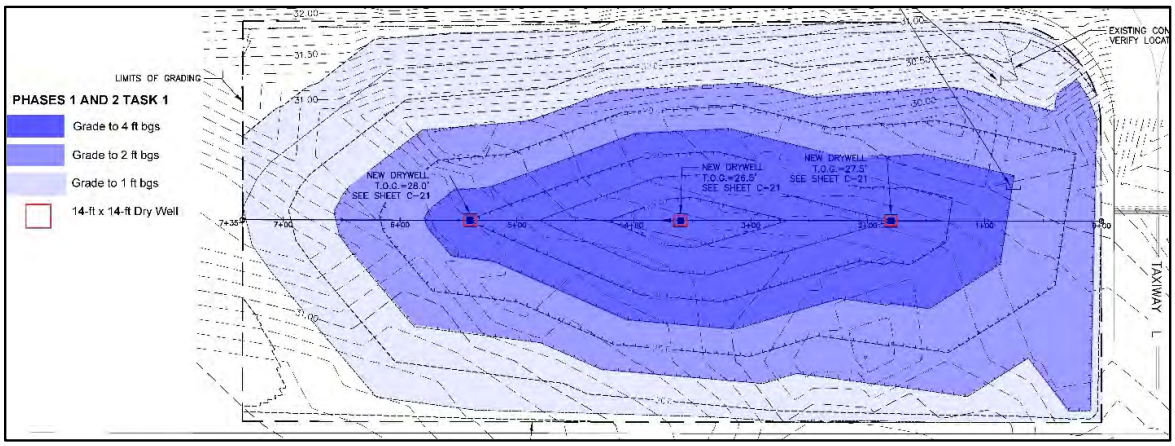

Figure 3-1 - DU-1 and Portion of DU-2 (Dry Wells 1, 2, and 3)

DU-2: DU-2 is shown on Figures 3-1 through 3-4 on the following pages and consists of a 14-ft by 14-ft by 5-ft deep area around the center point of each of the eight dry wells in Phases 1, 2, and 3 (also shown on Plan Sheets C-13, -15, -16, and -4).

Dry well construction consists of the following:

- 0 ft to 1.5 ft below ground surface (bgs) - construction of a 14 ft square concrete drain slab.
- 1.5 ft to 6 ft bgs - construction of a 5 ft square shaft lined with 10-inch concrete walls and an 11 ft square concrete slab.
- 6 ft to 20 ft bgs- construction of a 10 ft square shaft (minimum).

Construction activities will reportedly generate approximately 288 cy of soil; 36 cy of soil from each dry well. Refusal is anticipated at depths shallower than 5 ft bgs and may limit sample collection.

A total of 32 soil borings will be advanced in DU-2; four in each of the eight dry wells.

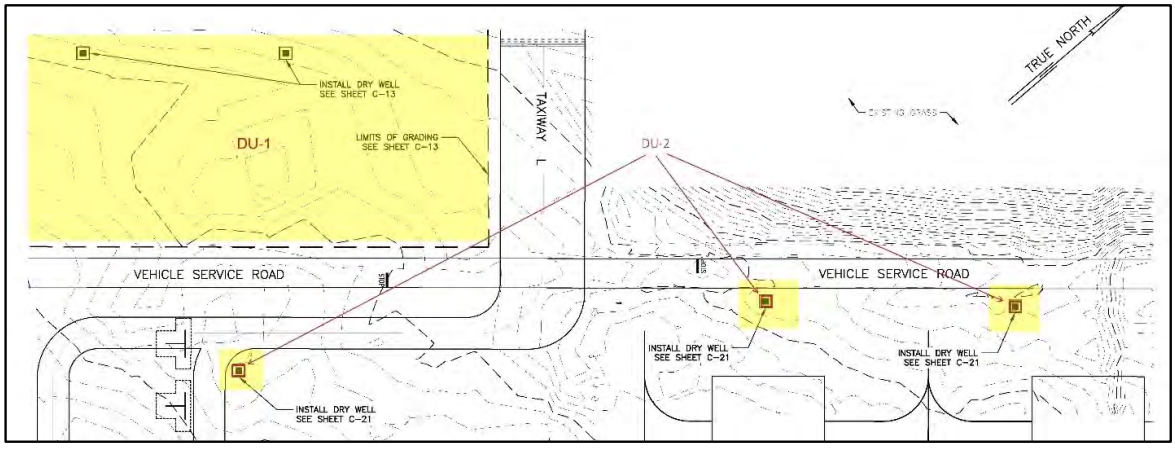

Figure 3-2 –DU-2 (Dry Wells 4, 5, and 6)

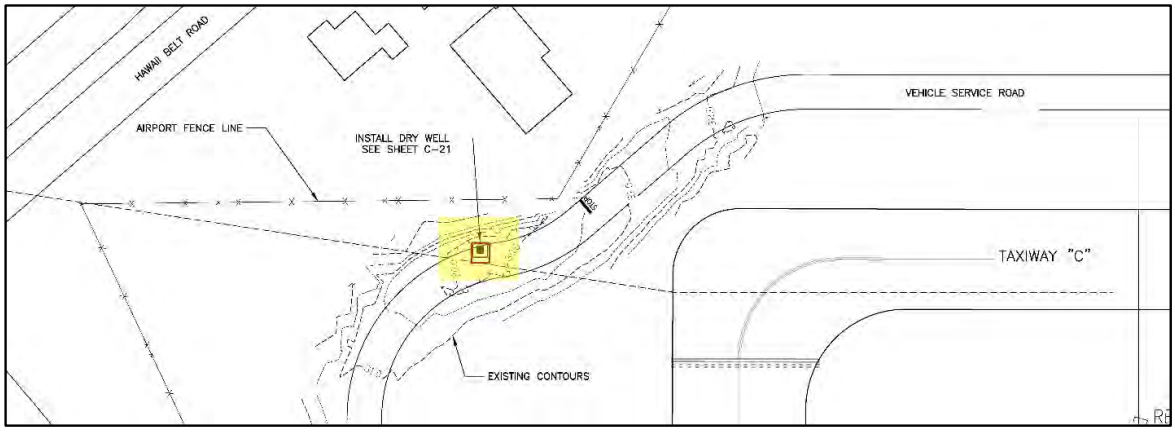

Figure 3-3 –DU-2 (Dry Well 7)

3.4.2 Phase 3 Construction

Phase 3 construction includes the installation of one dry well (Dry Well 8) and grading to a maximum of three feet bgs and grassing the surrounding area.

DU-3: DU-3 is shown on Figure 3-4 and is bounded by the vehicle service road asphalt pavement edge to the northwest, the northwest ramp asphalt pavement edge to the northeast, the Taxiway C asphalt pavement edge to the southeast, and the Taxiway J asphalt pavement edge to the southwest (Plan Sheet C-4, attached).

DU-3 Exclusion - A 14-ft by 14-ft area around the planned dry well center point will be excluded from DU-3 and included with DU-2 (Figure 3-4 and Plan Sheet C-4).

Construction activities will reportedly generate approximately 400 cy of soil. Refusal is anticipated at depths shallower than 3 ft bgs and may limit sample collection.

A total of 30 soil borings will be advanced in DU-3.

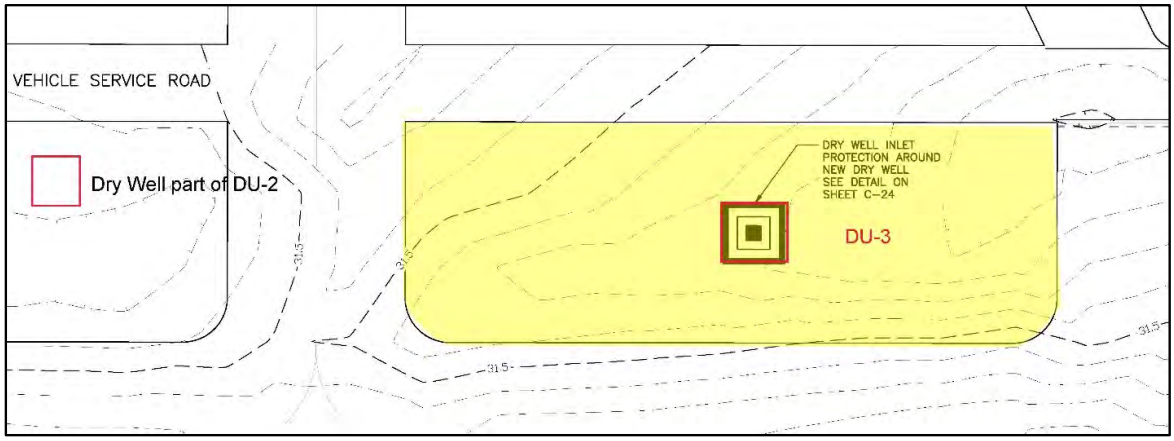

Figure 3-4 - DU-3 and Portion of DU-2 (Dry Well 8)

3.4.3 Phase 4 Construction

Planned construction includes installation of a compass calibration pad. Construction activities are not reported to disturb soil and no samples will be collected.

3.4.4 Phase 5 Construction

Planned construction for Phase 5 includes:

- Demolition and *relocation of the Runway 8 supplemental wind cone*.
- Demolition of the segmented circle.
- Demolition and *relocation of the Runway 21 supplemental wind cone*.
- Installation of a new segmented circle.

Plans for soil removal were not reported for any of the demolition activities or installation of the new segmented circle; therefore, no soil samples will be collected.

DU-5 Exclusion - Relocation of the Runway 8 supplemental wind cone requires installation of a short length of electrical conduit and may generate up to 3 cy of soil. However, the new conduit section is located directly over the active electrical conduit servicing the existing Runway 8 supplemental wind cone, and asphalt pavement covers the excavation area; therefore, *sampling will not be conducted at this location due to the close proximity of the electric line*.

DU-5: DU-5 is shown on Plan Sheet E-4, attached, and includes relocation of the Runway 21 wind cone. Relocation requires excavation of a 210 ft x 1 ft x 3 ft deep trench to install electrical conduit (Figure 3-5 on the following page). The width of DU-5 will be expanded to 16 ft to allow for potential design changes. The estimated volume of soil to be characterized is 374 cy.

A total of 30 soil borings will be advanced in DU-5.

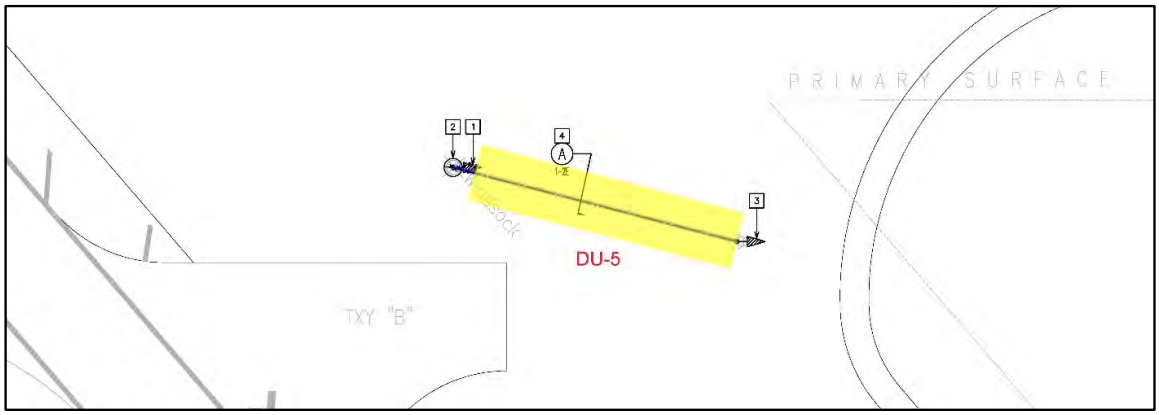

Figure 3-5 - DU-5

3.4.5 Phase 6 Construction

Planned construction for Phase 6 includes demolition and relocation of relocation of the Runway 26 supplemental wind cone. The existing wind cone will be removed, and its associated electrical conduit will be abandoned in place.

Plans for soil removal were not reported for the demolition activities.

DU-6: DU-6 is shown on Plan Sheet E-5, attached and includes relocate the Runway 26 supplemental wind cone includes excavation of a 330 ft x 1 ft x 3 ft deep trench to install electrical conduit (Figure 3-6, below). The width of DU-6 will be expanded to 10 ft to allow for potential design changes. The estimated volume of soil to be characterized is 367 cy.

A total of 30 soil borings will be advanced in DU-6.

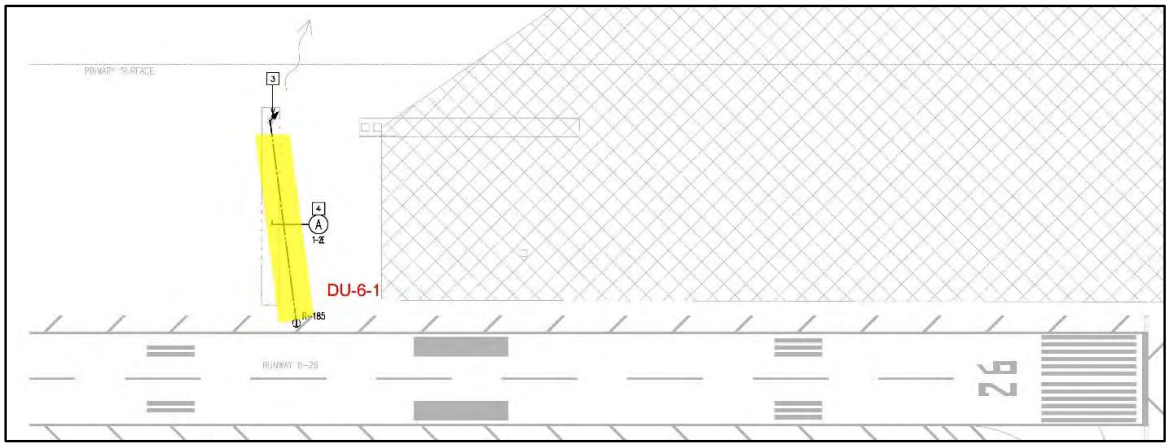

Figure 3-6 - DU-6

3.5 Decision Statements

The following decision rules will apply following completion of pre-characterization sampling:

- If any of the COPCs exceed the HDOH EALs:
  - Additional investigation should be completed on adjacent land areas to complete the delineation of contamination;
  - An Environmental Hazard Evaluation (EHE) should be prepared to identify potential environmental hazards and evaluate appropriate response actions, and submitted to the HDOH for review and comment;
  - A C-EHMP should be prepared for the planned construction work;
  - If identified environmental hazards can be managed in place, an area-specific Environmental Hazard Management Plan (EHMP) should be completed;
  - If identified environmental hazards cannot be managed in place, other mitigation actions (i.e., removal of contaminated media) should be reviewed and implemented as necessary.
- If COPCs do not exceed the HDOH EALs, the data will be used to support on-site reuse and/or disposal of the soil, as appropriate.

3.6 Limiting Decision Error

Errors are possible in any sampling event due to a variety of variables, including but not limited to: site conditions, unknown subsurface conditions, influence from adjacent sites, sample locations, etc. In an effort to limit errors, this project will be conducted using strict sampling protocol and careful scrutiny of data generated through the use of industry standard quality assurance (QA)/quality control (QC) protocol.

3.7 Project Boundaries

The field effort is anticipated to begin in August 2021, and will be completed within approximately one week, based on access to the site and conditions at the time of the field effort.

Physical boundaries are shown on Plan Sheet G-3, attached, and include multiple areas throughout the airport.

3.8 Optimizing the Design for Obtaining Data

This SAP has been designed to collect data in an efficient manner while generally meeting the requirements of HDOH HEER guidance (HDOH HEER 2017) and recommendations.

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Section 4 Sampling and Analysis Plan

This section describes soil sample collection and analysis activities to be completed during this project. In order to pre-characterize *insitu* soil for on-site reuse and/or disposal, E2 will collect up to 20 *MULTI INCREMENT* soil samples; 16 primary samples and four replicate samples, as summarized in the sections below. The total number of soil samples may vary as hard rock is anticipated at shallow depths and may limit sample collection.

4.1 Proposed Soil Samples

DU-1 is further broken down into three sub-DUs (DU-1-1, DU-1-2, and DU-1-3) based on the final depth to which each area will be graded (Figure 3-1). DU-1 includes collection of a total of up to 16 *MULTI INCREMENT* soil samples. Up to 12 primary samples will be collected from six different depth intervals (A through F), depending on the depth(s) at which basalt rock is encountered. Replicate samples will be collected from two of the 12 sub-DUs for quality assurance purposes. Each *MULTI INCREMENT* sample will consist of 30 increments (one from each of 30 soil borings per sub-DU). Samples for volatile analysis will not be collected from Sub-DU A, which represents the surface soil depth interval.

DU-2 includes collection of one (1) *MULTI INCREMENT* soil sample from one depth interval (0 to 5 ft bgs or refusal), consisting of 32 increments (one from each of the 32 soil borings) (Figures 3-1 through 3-4). Borings placed within the paved vehicle service road southwest of Taxiway C along the airport fence line (Dry Well 7) will be repaired with asphalt patch (Figure 3-3).

Sample collection details for DU-1 and DU-2 are summarized in Table 4-1, below.

Table 4-1: DU-1 and DU-2 Sample Collection to Characterize Soil

DU-1 (5,000 cy)	Grading to 1 ft bgs	Grading to 2 ft bgs	Grading to 4 ft bgs
Depth Intervals	DU-1-1 (30 borings)	DU-1-2 (30 borings)	DU-1-3 (30 borings)
A	Surface to 0.5 ft bgs	Surface to 0.5 ft bgs	Surface to 0.5 ft bgs
B	0.5 ft to 1 ft bgs	0.5 ft to 1 ft bgs	0.5 ft to 1 ft bgs
C	No Sample Collection	1 ft to 1.5 ft bgs	1 ft to 1.5 ft bgs
D	No Sample Collection	1.5 ft to 2 ft bgs	1.5 ft to 2 ft bgs
E	No Sample Collection	No Sample Collection	2 ft to 3 ft bgs
F	No Sample Collection	No Sample Collection	3 ft to 4 ft bgs
Volatile samples	(120) 5 g = 600 g		
Non-volatile samples	(30) 35 g = 1,050 g		
(Increments) Increment mass in grams = Total sample mass in grams			
DU-2 (288 cy)	Construction Phase	32 Increments	Depth Interval
Dry Wells 1 through 6	Phase 1	4 each, 24 total	0 to 5 ft bgs
Dry Well 7	Phase 2	4	
Dry Well 8	Phase 3	4	
Volatile samples	(96) 5 g = 480 g (3 x 5g plugs/soil core)		
Non-volatile samples	(32) 35 g = 1,120 g		
(Increments) Increment mass in grams = Total sample mass in grams			

DU-3, DU-5, and DU-6, shown on Figures 3-4, 3-5, and 3-6, include collection of one (1) *MULTI INCREMENT* soil sample from one depth interval (0 to 3 ft bgs or refusal), each consisting of 30 increments (one from each of the 30 soil borings). Sample collection details are summarized in Table 4-2, below.

Table 4-2: DU-3 and DU-5 Sample Collection to Characterize Soil

DU-3 (400 cy)	Depth Interval = 0 to 3 ft bgs
Volatile samples	(90) 5 g = 450 g (3 x 5g plugs/soil core)
Non-volatile samples	(30) 35 g = 1,050 g
DU-5 (374 cy)	Depth Interval = 0 to 3 ft bgs
Volatile samples	(90) 5 g = 450 g (3 x 5g plugs/soil core)
Non-volatile samples	(30) 35 g = 1,050 g
DU-6 (367 cy)	Depth Interval = 0 to 3 ft bgs
Volatile samples	(90) 5 g = 450 g (3 x 5g plugs/soil core)
Non-volatile samples	(30) 35 g = 1,050 g
	(Increments) Increment mass in grams = Total sample mass in grams

4.1.1 Mobilization, Decision Unit Layout and Underground Utility Clearance

E2 and GeoTek Hawaii, Inc. will mobilize to the site to mark the DU boundaries and tentative soil boring locations. Representative samples will be collected from at least 30 systematic random locations within each DU, if possible; however, final soil boring locations will be determined in the field during underground utility clearance activities and/or during sampling activities.

The Hawaii One Call Center (1-866-423-7287) will be contacted at least one week prior to the commencement of intrusive sampling activities. Prior to conducting intrusive, subsurface activities, toning for underground utilities will be conducted at the site by a professional utility locating firm in order to ensure that subsurface sample locations are clear. Utility clearance activities will include 1) review of appropriate maps and drawings of the area as provided by the client and 2) screening the boring locations using an electromagnetic utility locating device ("toner") and geophysical survey methods, including ground-penetrating radar and/or resistivity. Suspected underground utilities will be marked with brightly colored spray paint. If obstructions are encountered during drilling activities, the nature of the obstruction will be determined before proceeding. Appropriate actions will be taken to protect the safety and health of workers.

4.1.2 Soil Sample Collection

MULTI INCREMENT samples will be collected following HDOH HEER Office guidance. Samples collected for volatile analysis will be collected separately from samples collected for semi-volatile and non-volatile analysis. Samples collected for volatile analysis (i.e., TPH-GRO and VOCs including naphthalene) will be preserved in methanol in the field. Samples collected for semi-volatile analysis (i.e., TPH-DRO, TPH-RRO and PAHs) will not be preserved.

4.1.2.1 *MULTI INCREMENT Sample Collection and Preparation for Volatile Analysis*

For samples collected for volatile analysis, soil samples/cores will be collected from each decision unit layer using a direct-push drill rig equipped with Macro-Core® samplers with clear plastic liners. Following removal of the soil samples/cores, one 5-gram increment will be collected from each soil sample/core at the

respective decision unit layer. Sub-sampling of each soil sample/core is necessary to reduce the *MULTI INCREMENT* sample to a reasonable mass that can be submitted to the laboratory. Increment sub-sampling for volatile analysis will be collected prior to collecting increment sub-samples for volatile and non-volatile analysis to minimize the loss of volatiles. Increment sub-samples will be collected using 5-gram Terra-Core samplers. The total *MULTI INCREMENT* sample mass will be 150 grams.

Sub-samples collected from all borings (or increment locations) of a single DU layer will be dispensed into a pre-weighed amber bottle containing methanol. The sample containers for volatile analysis will be prepared by the laboratory with the required amount of methanol preservative. The ratio of methanol preservative to soil is 1:1 (i.e., 1-milliliter [mL] of methanol per 1-gram of soil). Except during active sub-sampling, the container will be sealed and stored in a cooler with wet ice. Following collection of all sub-samples for a DU layer, the sample container will be sealed and placed in a cooler with wet ice and chilled to approximately 2 to 4 degrees Celsius [°C] and the samples delivered to the laboratory. Chain-of-custody procedure will track the samples from collection to final disposition.

4.1.2.2 *MULTI INCREMENT Sample Collection and Preparation for Non-Volatile Analysis*

For samples collected for volatile and non-volatile analysis, soil samples/cores will be collected from aboveground, surface, near-surface, and subsurface DU layers using hand tools, or a direct-push drill rig equipped with Macro-Core® samplers with clear polyvinyl chloride liners. Following removal of the soil samples/cores, approximately 35 grams of soil will be collected from each soil sample/core at the respective DU layer using a stainless-steel trowel. The trowel will be used to collect soil in such a manner as for the collected soil to be representative of the entire vertical interval of soil for the DU layer. The total *MULTI INCREMENT* sample mass will be approximately 1 kg. The stainless-steel trowel will be cleaned with Alconox and water prior to and after sampling, between samples, and/or if it should become contaminated from another source.

For DUs in which increments for both volatile and non-volatile analysis will be collected, increments for volatile and non-volatile analysis will be collected from the same soil samples/cores that the increments for volatile analysis were collected from. Increments for semi-volatile and non-volatile analysis will be collected following the sampling for volatile analysis.

Increment samples collected from all borings (or increment locations) of a single DU layer will be dispensed into a Ziploc bag. Following collection of all increment samples for a DU layer, the bag will be sealed, labeled, and placed in a cooler with wet ice and chilled to approximately 2 to 4 °C and the samples shipped to the laboratory. Chain-of-custody procedure will track the samples from collection to final disposition.

Soil samples will be analyzed for COPCs identified in Section 3.3.

4.1.2.3 *Field Replicate* MULTI INCREMENT *Sample Collection and Preparation*

Replicate *MULTI INCREMENT* samples will be collected to provide a measure of contaminant heterogeneity for a DU layer. Replicate *MULTI INCREMENT* samples will consist of *MULTI INCREMENT* samples collected from the same borings (or increment locations) that the primary samples are collected from.

4.1.3 Sample Identification, Sample Logs, and Chain-of-Custody

Field notebooks will be maintained by the Field Manager to provide daily records of significant events, observations, and measurements during field investigations.

E2 will log the soil condition encountered in each DU and annotate the areas where obviously contaminated soil was encountered.

Each sample container sent to the laboratory shall have its own sample identification label. The following information may be included on the sample label and/or the chain-of-custody:

- Site name;
- Sample ID Number;
- Date and time of sample collection;
- Type of sample matrix;
- Initials of the sampling personnel;
- Sample preservative used; and
- Types of analyses to be performed.

4.2 General Activities

4.2.1 Field Procedures

A copy of this SAP will be maintained in the field by the E2 site personnel during sample collection activities.

If required, project personnel will establish a safe perimeter around each work area. Prior to starting work, a safety and health meeting will be conducted by the E2 personnel.

Project personnel will be responsible for collecting samples and decontaminating the sampling equipment. To avoid cross-contamination of the samples and to protect worker safety and health, the person performing the sample collection will don a new pair of disposable gloves while collecting each sample.

Field notes will be maintained by E2 personnel recording the location, sample media, number, date, and time for each sample collected as well as any appropriate observations. Digital color photographs will be taken to document the field investigation, with select photographs to be included in the report.

4.2.2 Decontamination

Decontamination of sampling equipment may be necessary for this project if disposable sampling tools are not used to collect the samples. In the event that decontamination is necessary, the process will consist of the following steps:

1. Potable water with phosphate-free detergent scrub;
2. Potable water double rinse; and
3. Air dry.

4.2.3 Sample Handling, Sample Packing and Sample Shipment

Upon collection, samples will be labeled, bagged in individual sealable plastic bags, and placed in insulated coolers packed with ice for preservation following industry standards. Samples will be stored in coolers for the duration of transport and shipment to the analytical laboratory located on the mainland.

HDOT regulations will be followed for packaging and shipment of samples.

All samples will be kept at approximately 4 ± 2 °C in insulated coolers packed with frozen gel packs or wet ice. In the event that samples are analyzed after hold times are exceeded, data will include proper qualifier flags indicating the validity of the data.

Chain-of-custody forms will be placed inside sealable plastic storage bags and placed inside the sample cooler for shipment, while project copies will be maintained on-site. Coolers will then be closed, sealed with waterproof tape, and the lid sealed with two custody seals to enable detection of tampering. Coolers will be delivered directly to the FedEX shipping office in Hilo by the E2 field crew.

4.2.4 Laboratory Processing and Testing

The laboratory will process the *MULTI INCREMENT* soil samples in accordance with HDOH guidance (HDOH HEER Office 2008 and updates), including air drying, sieving to less than two mL (if not completed in the field), and *MULTI INCREMENT* subsampling in order to collect a minimum sub-sample size of 10 grams. Upon completion of processing, sub-samples will be analyzed using the standard EPA methods listed in Section 3.3.

4.2.5 Investigation-Derived Waste

Soil cuttings will be placed back in the soil borings in the same DU and/or soil boring. E2 will be responsible for the proper disposal of all IDW generated during field work. Potential IDW for this project includes decontamination water, which will be temporarily stored onsite in 55-gallon HDOT-rated open top drums until disposal can be coordinated. All disposable equipment and trash will be disposed of as municipal solid waste.

4.3 Limited Pre-Construction Soil Assessment Report

Upon receipt of analytical data from the laboratory, E2 will complete a report that will document the sample collection activities and laboratory analyses. The report will include a description of field activities completed (including sample locations), select field photographs and a summary of the analytical results for the soil samples collected.

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Section 5 Quality Assurance Project Plan

5.1 Introduction

This section presents the Quality Assurance Project Plan (QAPP) for environmental sampling activities. The field activities will consist of the collection of soil samples from project area. This QAPP is intended to be used in conjunction with the SAP in order to ensure that all activities included with this project are conducted in a manner consistent with industry standard methods and techniques in order to provide data representative of conditions present at the site. The QAPP includes discussions of the following:

- Laboratory and field quality assurance measurements and acceptable criteria
- Field and laboratory documentation and data management
- Data validation requirements
- Data evaluation procedures
- Performance and system audits
- Preventative maintenance
- Corrective actions
- QA/QC reporting

The E2 Project Manager will be responsible for ensuring that the appropriate project personnel have the most current version of this QAPP.

The usability of the data collected during this project will depend on its quality. A large number of factors along the sample collection and analysis process have the potential to impact the overall quality of the data generated during this project. Adhering to proper sample collection techniques, observing, and documenting chain-of-custody procedures and using certified laboratories and approved analytical methods will ensure that the quality of data generated during the project will accurately represent conditions at the site.

5.2 Sample Collection and Sample Handling Procedures

Prior to sampling, the Project Manager or the QA/QC Officer will inspect all supplies and consumables to ensure that they are acceptable for use. Sample containers and equipment will be used only if they have been certified pre-cleaned or if their packaging or seals have not been broken. Sampling and sample handling procedures are designed to ensure that samples are consistently collected, labeled, preserved, and transported in a manner that maintains their integrity for their intended purposes. Copies of this SAP and appropriate field procedures will be carried by field personnel during field data collection.

5.2.1 Sample Collection Method

Samples will be collected in accordance with the procedures detailed in Section 4.

5.2.2 Field Instrumentation

Field equipment that may be used during field activities for monitoring purposes may include:

- Digital cameras
- Photoionization detector

Preventative maintenance of field equipment will be performed in accordance with the requirements of the specified manufacturer. Equipment will be periodically cleaned, checked for operability, and repaired as necessary. Equipment will be properly stored when not in use.

Field equipment will be calibrated prior to and during use as specified by the manufacturer. All calibration activities will be noted in the field logbooks. Field sampling personnel are responsible for ensuring that the manufacturer's guidelines are on-site with the equipment and that the equipment is tested, calibrated, and found to be in good working condition prior to use. Field personnel will also ensure that the instruments are stored properly and protected against excess heat, dust, and moisture. Field equipment preventative maintenance frequencies will be determined based on the manufacturer's recommendations and the anticipated use of the equipment.

5.2.3 Acceptance of Supplies and Consumables

All field consumables will be inspected by the Project Manager prior to use and discarded if the integrity has been altered and there is any possibility of the use of the consumable will sacrifice the integrity of the sampling effort.

5.3 Sampling Quality Control and Corrective Action

Laboratory QC samples may be analyzed in accordance with industry standard methods and practices.

5.3.1 Field Quality Control

QA of samples collected in the field will be ensured through the use of trained sampling personnel, documented and standardized procedures, and second-party review of field logs and notes.

5.4 Laboratory Analytical Procedures

The laboratory selected to perform the analyses has a QA/QC program in place. All analyses will be conducted according to the guidance outlined in EPA SW-846 (EPA Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIB (2005), IV (2008), and V (2015)).

5.5 Laboratory Analysis Quality Assurance Objectives

Laboratory control samples (LCSs) will be analyzed by the laboratory concurrently with the samples collected during this investigation.

Laboratory QC checks may include the following QC samples:

- Method blanks and reagent blanks
- Matrix spike (MS) samples
- Matrix spike duplicate (MSD) samples
- Surrogates (applicable to organic analyses only)
- Blank spike (BS) or LCSs

5.5.1 Matrix Spike/Matrix Spike Duplicate

A MS sample is an aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A MS sample is used to document the bias of a method in

a given sample matrix. MSD samples are internal laboratory split samples spiked with identical concentrations of target analyte(s). The spiking occurs prior to sample preparation and analysis. They are used to document the precision and bias of a method in a given sample matrix.

5.5.2 Laboratory Duplicate (Surrogate)

A laboratory duplicate (LD) sample is an internal laboratory split sample that is prepared and analyzed in a manner identical to that of the original project sample. The results will be used to evaluate the precision of the laboratory analyses. Results will be expressed as relative percent difference (RPD) between analytical results for the duplicate and the original sample.

5.5.3 Laboratory Control Sample

An LCS is a well-characterized sample matrix spiked with compound(s) representative of the target analytes that documents laboratory performance. LCSs are used to monitor the accuracy of the analytical process independent of project sample matrix and to identify potential background interference or contamination of the analytical system. LCSs will be analyzed and reported for each analytical batch. Duplicate LCS is an internal laboratory split of an LCS. Accuracy (recovery) and batch precision are determined using LCS/duplicate LCS.

Controlling laboratory operations with LCSs (as opposed to MS/MSD samples) offers the advantage of being able to differentiate recoveries due to procedural or errors from those due to sample matrix effects.

5.5.4 Laboratory Equipment Calibration and Preventative Maintenance

Laboratory equipment will be maintained in accordance with the approved laboratory QA program and as specified by the analytical method employed for sample analyses.

The laboratory equipment will be calibrated following the procedures and frequency specified by the analytical methods used. The laboratories are required to document calibration procedures and preventative maintenance in accordance with industry standard guidance and their established QA/QC program. A control system indicating the date of required maintenance, the person maintaining the equipment, and the next maintenance date will be used by laboratory personnel for laboratory equipment requiring routine maintenance. Most of the major instruments found in laboratories are covered by service agreements. Information pertaining to historical maintenance will be recorded in individual logs for each instrument.

5.5.5 Documentation and Deliverables

The laboratory will provide reports that include a case summary and the QC reports. The laboratory will also provide data deliverables in a specified electronic format.

5.5.6 Intended Laboratory Standard Operating Procedures Deviations

No deviations are intended for the analytical methods specified in this plan. Use of the laboratory QC data will be consistent with the procedures for data evaluation. The laboratory QC data will assist in evaluating the usability of the data for the project objectives.

5.5.7 Reporting Limits Objectives

Detection limits will be the lowest possible by the contracted laboratory per analytical method. The detection limits listed may not be achievable in individual samples for any of the following reasons:

- When analytes are present in the sample at concentrations that exceed the calibration range, dilutions may be necessary, resulting in elevated reporting limits for all analytes. The laboratory will report both the diluted and undiluted sample results to allow acceptance of the lower detection limits for analytes not detected from the undiluted sample.
- If matrix problems occur, dilutions may be necessary and the listed detection limits may not be met for each sample for each analyte.

Compounds detected above the detection limit but below the reporting limit may be qualified as estimated with a “J” qualifier.

5.6 Data Validation

5.6.1 Data Quality Assessment

Data quality will be assessed by evaluating the precision, accuracy, representativeness, completeness, and comparability parameters both qualitatively and quantitatively.

5.6.1.1 *Precision*

Precision is defined as the agreement between a set of replicate measurements without assumption or regard about the true value. Precision limits for laboratory measurements will be evaluated from the sample/sample duplicate analyses results.

LD samples, MS/MSD or LCS/duplicate LCS analyses results will be used to assess analytical precision by the laboratory.

5.6.1.2 *Accuracy*

Accuracy is defined as the degree of agreement of a measurement to an accepted reference or true value. When applied to a set of observed values or measurements, accuracy will be a combination of random and systematic (bias) error. Analytical accuracy will be defined as the percent recovery (%R) of an analyte in a reference standard or spiked sample. Accuracy limits for LCS and MS/MSD samples are established by individual laboratories. The acceptance criteria for accuracy are dependent on the analytical method, and are based on historical laboratory data.

The percent differences (%Ds) of the continuing calibration is also an indication of accuracy. Sample results are qualified "UJ" for non-detects and "J" for detects, if the %D for a continuing calibration is out of control.

5.6.1.3 *Representativeness*

Representativeness is the degree that data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness will be achieved by conducting sampling in compliance with the sample collection procedures described in the Section 5.

5.6.1.4 *Completeness*

Completeness is defined as the overall percentage of valid analytical results (including estimated values) compared to the total number of analytical results reported by the laboratory. The completeness goal for this project will be 90%. Successful completion of data acquisition can only be accomplished if both the field and laboratory portions of the project are performed according to the procedures described in the QAPP.

5.6.1.5 *Comparability*

Comparability expresses the confidence with which one data set can be compared to another. Comparability can be related to accuracy and precision because these quantities are measures of data reliability. Data are considered comparable if collection techniques, measurement procedures, methods, and reporting are equivalent for the samples within a sample set. Comparability for sampling will be determined to be acceptable based on the following criteria:

- A consistent approach to sampling was applied throughout the program and
- Samples were consistently preserved.

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Section 6 References

Element Environmental, Inc. [E2]. 2020. "Summary Report, Soil Sampling at Hilo Airport West Ramp, Hilo Hawaii." September.

Fuel Oil Polishing Company. 1993. "Underground Storage Tank Closure Report, Lockheed Air Terminal, Hilo Hawaii." June 4.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte. 2013: Online Rainfall Atlas of Hawai'i. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1, http://rainfall.geography.hawaii.edu.

John, F. Mink; L., Stephen Lau;. 1993. "Aquifer Identification and Classification for the island of Hawaii: Groundwater Protection Strategy for Hawaii, Technical Report No. 191." Water Resources Researh Center, University of Hawaii at Manoa, May.

State of Hawaii Department of Health [HDOH]. 2021. "State of Hawaii Environmental Health Administration. 2021. EHA CONNECT https://eha-cloud.doh.hawaii.gov/iheer/Fall." May.

State of Hawaii Department of Health [HDOH] Hazard Evaluation and Emergency Response [HEER] Office. 2009 and updates. "Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan." http://www.hawaiidoh.org/tgm.aspx.

—. 2017. "Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material." October.

—. 2017. "Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater, Volume 1: User's Guide, Hawaii Edition." Fall.

State of Hawaii Department of Transportation [HDOT] Airports Division [AIR]. 2019. "Programmatic Environmental Hazard Evaluation and Environmental Hazard Management Plan, State of Hawaii Department of Transportation, Airports."

—. 2021. "80% Plans for Drainage & Wind Cone Improvements at HIlo International Airport, South Hilo, Hawaii, HDOT-AIR Project No. AH1021-20."

United States Environmental Protection Agency [EPA]. Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIB (2005), IV (2008), and V (2015). "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA publication SW-846, Third Edition." https://www.epa.gov/hw-sw846.

—.2000. "Guidance for Data Quality Assessment: Practical Methods for Data Analysis: EPA QA/G9:QA00 Update." July. https://www.epa.gov/sites/production/files/2015-06/documents/g9-final.pdf.

—. 2006. "Guidance on Systematic Planning Using the Data Quality Objectives Process: EPA QA/G-4." February. https://www.epa.gov/sites/production/files/2015-06/documents/g4-final.pdf.

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ATTACHMENTS

Airports Division

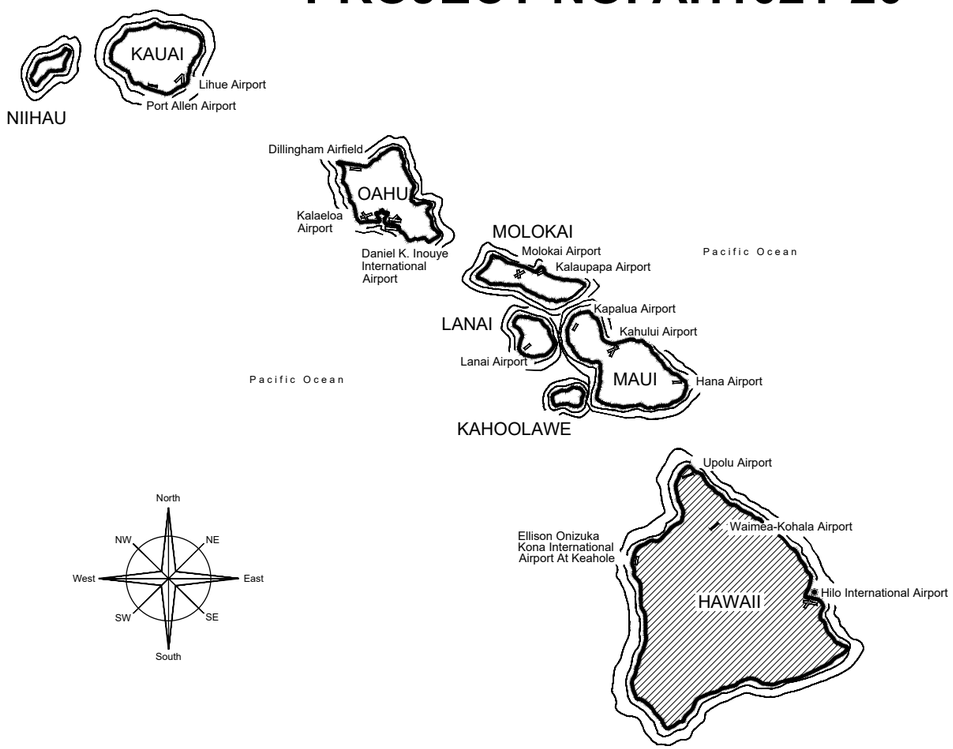
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

PLANS FOR

DRAINAGE & WIND CONE IMPROVEMENTS

AT

HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII
PROJECT NO. AH1021-20



PROJECT TEAM

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NEAL FUKUMOTO
CIVIL ENGINEER

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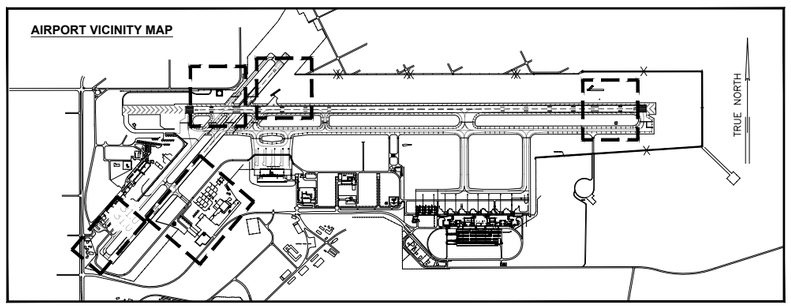
SUITE 201
HONOLULU, HAWAII 96819
808-941-0577

BRYCE KANEMURA
ELECTRICAL ENGINEER

AIRPORT VICINITY MAP



CHANGES MADE DURING CONSTRUCTION THAT WERE PROVIDED TO THE DESIGNER HAVE BEEN INCORPORATED ON THESE PLANS

SUBMITTED BY:
COMPANY NAME DATE

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

APPROVED:

DIRECTOR OF TRANSPORTATION DATE

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:

NO.	DATE	REVISIONS

80% DESIGN SUBMITTAL
MARCH 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

TITLE SHEET

DATE :	DWG. NO.
MARCH 2021	G-1
SHEET :	
1 OF 49 SHEETS	

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DRAINAGE AND WIND CONE IMPROVEMENTS
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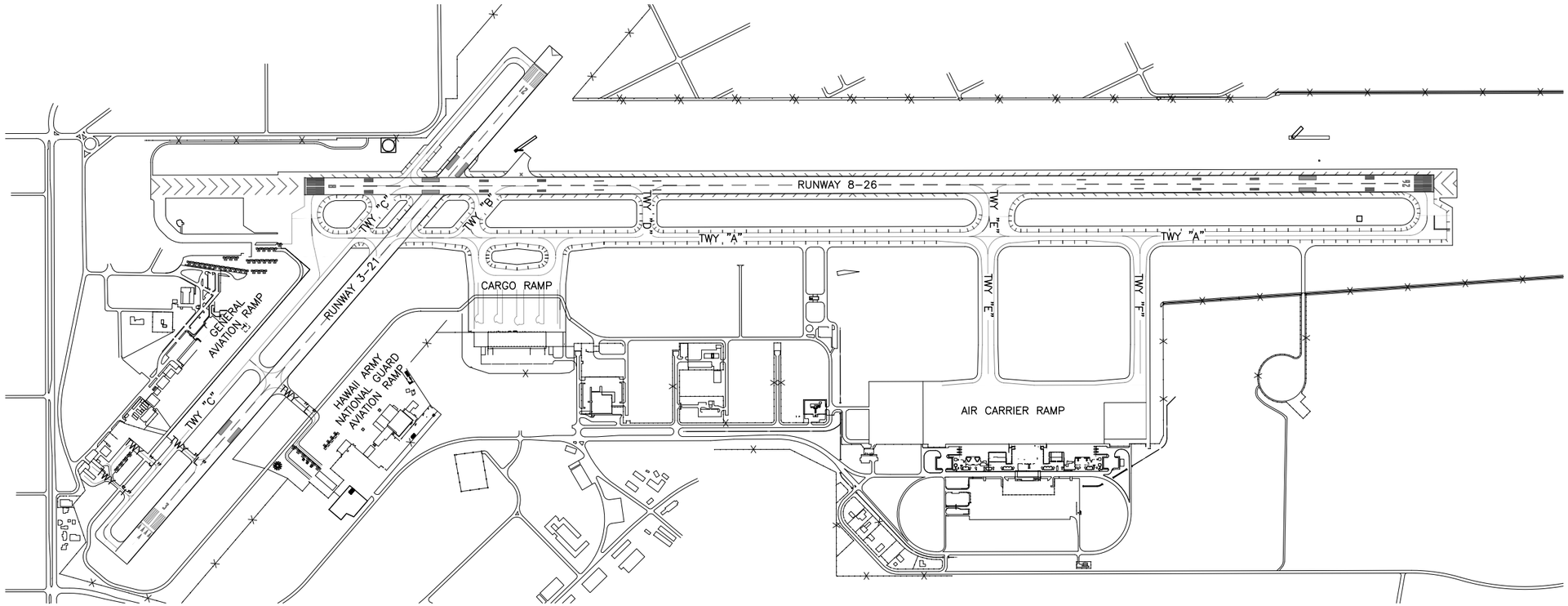

HILO INTERNATIONAL AIRPORT SITE PLAN
SCALE: 1"=500'

ABBREVIATIONS:

@	AT
AC	ADVISORY CIRCULAR
AIR-EE	DEPARTMENT OF TRANSPORTATION, AIRPORTS DIVISION, ENGINEERING ENVIRONMENTAL SECTION
AOA	AIR OPERATIONS AREA
ARFF	AIRCRAFT RESCUE AND FIREFIGHTING
ASOS	AUTOMATED SURFACE OBSERVING SYSTEM
ATCT	AIR TRAFFIC CONTROL TOWER
AWOS	AUTOMATED WEATHER OBSERVING SYSTEMS
BMP	BEST MANAGEMENT PRACTICE
C.A.P.	CIVIL AIR PATROL
C/L	CENTERLINE
CSPP	CONSTRUCTION SAFETY AND PHASING PLAN
CLR	CLEAR
DME	DISTANCE MEASURING EQUIPMENT
DOH	DEPARTMENT OF HEALTH
GPS	GLOBAL POSITIONING SYSTEM
HDOTA	HAWAII DEPARTMENT OF TRANSPORTATION AIRPORTS DIVISION
ILS	INSTRUMENT LANDING SYSTEM
LHA	LIGHT HOUSING ASSEMBLY
LIH	LIHUE AIRPORT
MALSR	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS
MAX	MAXIMUM
NAVAID	NAVIGATIONAL AID
OTS	OUT OF SERVICE
PAPI	PRECISION APPROACH PATH INDICATORS
RNAV	AREA NAVIGATION
RRP	RUNWAY REFERENCE POINT
RSA	RUNWAY SAFETY AREA
ROFA	RUNWAY OBJECT FREE AREA
RWY	RUNWAY
TCH	THRESHOLD CROSSING HEIGHT
TSA	TAXIWAY SAFETY AREA
TOFA	TAXIWAY OBJECT FREE AREA
RWY	RUNWAY
SSBMP	SITE SPECIFIC BMP PLAN
SSC	SYSTEM SUPPORT CENTER
SWMPP	STORM WATER MANAGEMENT PROGRAM PLAN
TWY	TAXIWAY
TYP.	TYPICAL
W/	WITH
WEF	WIND EQUIPMENT F-420

INDEX OF DRAWINGS

SHEET NO.	DWG NO.	SHEET TITLE
1	G-1	TITLE SHEET
2	G-2	GENERAL SITE PLAN
3	G-3	OVERALL PHASING PLAN
4	G-4	CSPP – PHASE 1
5	G-5	CSPP – PHASE 2
6	G-6	CSPP – PHASE 3
7	G-7	CSPP – PHASE 4
8	G-8	CSPP – PHASE 5
9	G-9	CSPP – PHASE 6
10	C-1	NOTES, ABBREVIATIONS, LEGEND, AND DRAWING INDEX
11	C-2	Erosion Control
12	C-3	Erosion Control
13	C-4	Erosion Control
14	C-5	Erosion Control
15	C-6	Erosion Control
16	C-7	Erosion Control
17	C-8	Erosion Control
18	C-9	EXISTING CONDITIONS PLAN
19	C-10	EXISTING CONDITIONS PLAN
20	C-11	EXISTING CONDITIONS PLAN
21	C-12	DEMOLITION PLAN
22	C-13	GRADING PLAN
23	C-14	GRADING PLAN
24	C-15	DRAINAGE IMPROVEMENTS PLAN

INDEX OF DRAWINGS

SHEET NO.	DWG NO.	SHEET TITLE
25	C-16	DRAINAGE IMPROVEMENTS PLAN
26	C-17	WIND CONE REPLACEMENT PLAN
27	C-18	WIND CONE REPLACEMENT PLAN
28	C-19	WIND CONE REPLACEMENT PLAN
29	C-20	COMPASS CALIBRATION PAD INSTALLATION PLAN
30	C-21	DRY WELL DETAILS
31	C-22	DRY WELL DETAILS
32	C-23	DETAILS
33	C-24	DETAILS
34	C-25	CROSS SECTIONS
35	C-26	CROSS SECTIONS
36	C-27	CROSS SECTIONS
37	C-28	CROSS SECTIONS
38	C-29	CROSS SECTIONS
39	C-30	CROSS SECTIONS
40	C-31	CROSS SECTIONS
41	C-32	CROSS SECTIONS
	E-1	
	E-2	
	E-3	
	E-4	

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:

NO.	DATE	REVISIONS

80% DESIGN SUBMITTAL
MARCH 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS
AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

GENERAL SITE PLAN

DATE :
MARCH 2021
SHEET :
2 OF 49 SHEETS

DWG. NO.
G-2

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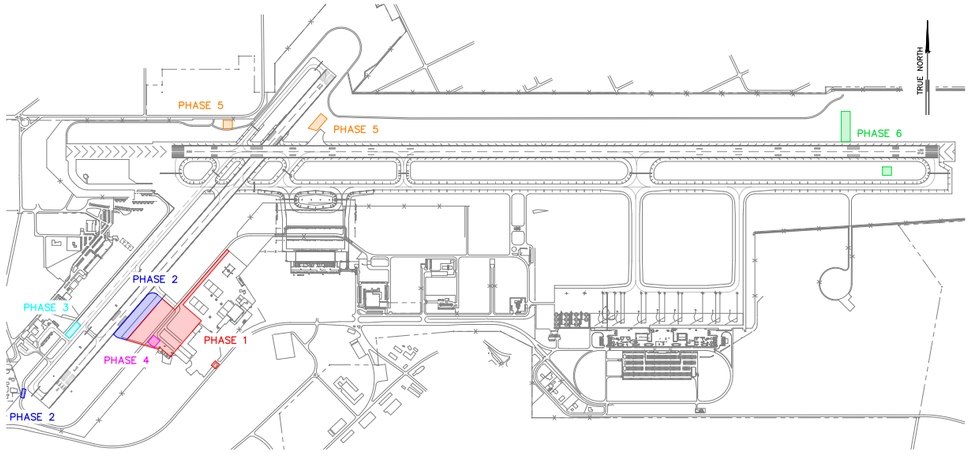
DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDAIS
01562-196



SCOPE OF WORK:

PHASE 1
- INSTALLATION OF DRY WELLS NEAR THE ARMY NATIONAL GUARD AVIATION RAMP.
- REPAIR OF AC PAVEMENT AT THE CIVIL AIR PATROL DRIVEWAY ENTRANCE ON AIRPORT ROAD.

PHASE 2
- DEMOLITION OF BROKEN AC PAVEMENT IN FRONT OF THE ARMY NATIONAL GUARD AVIATION RAMP.
- INSTALLATION OF DRY WELLS.
- GRASS AND GRADE DEMOLISHED AC PAVEMENT AREAS.
- INSTALLATION OF DRY WELLS ALONG THE PERIMETER ROAD BEHIND RUNWAY 3.

PHASE 3
- INSTALLATION OF DRY WELL.
- GRADE AND GRASS SPECIFIED AREAS.

PHASE 4
- INSTALLATION OF COMPASS CALIBRATION PAD

PHASE 5
- DEMOLITION OF RUNWAY 8 SEGMENTED CIRCLE.
- DEMOLITION AND RELOCATION OF THE RUNWAY 8 WIND CONE.
- DEMOLITION AND RELOCATION OF THE RUNWAY 21 WIND CON.

PHASE 6
- DEMOLITION AND RELOCATION OF THE RUNWAY 26 WIND CONE.

TENTATIVE CONSTRUCTION SCHEDULE:

PHASE 1: 90 CALENDAR DAYS
PHASE 2: 30 CALENDAR DAYS (RUNWAY 3–21 CLOSED)
PHASE 3: 14 CALENDAR DAYS
PHASE 4: 14 CALENDAR DAYS
PHASE 5: 28 CALENDAR DAYS
PHASE 6: 28 CALENDAR DAYS (RUNWAY 8–26 CLOSED)

TENTATIVE PHASE WORK HOURS:

PHASES 1–5: 0600 TO 1600 HOURS
PHASE 6: 2100 TO 0600 HOURS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
Airports Division

DSGN.	DRWN.	CHKD.	APPD.
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KEY PLAN / NOTES:

NO.	DATE	REVISIONS

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT

HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

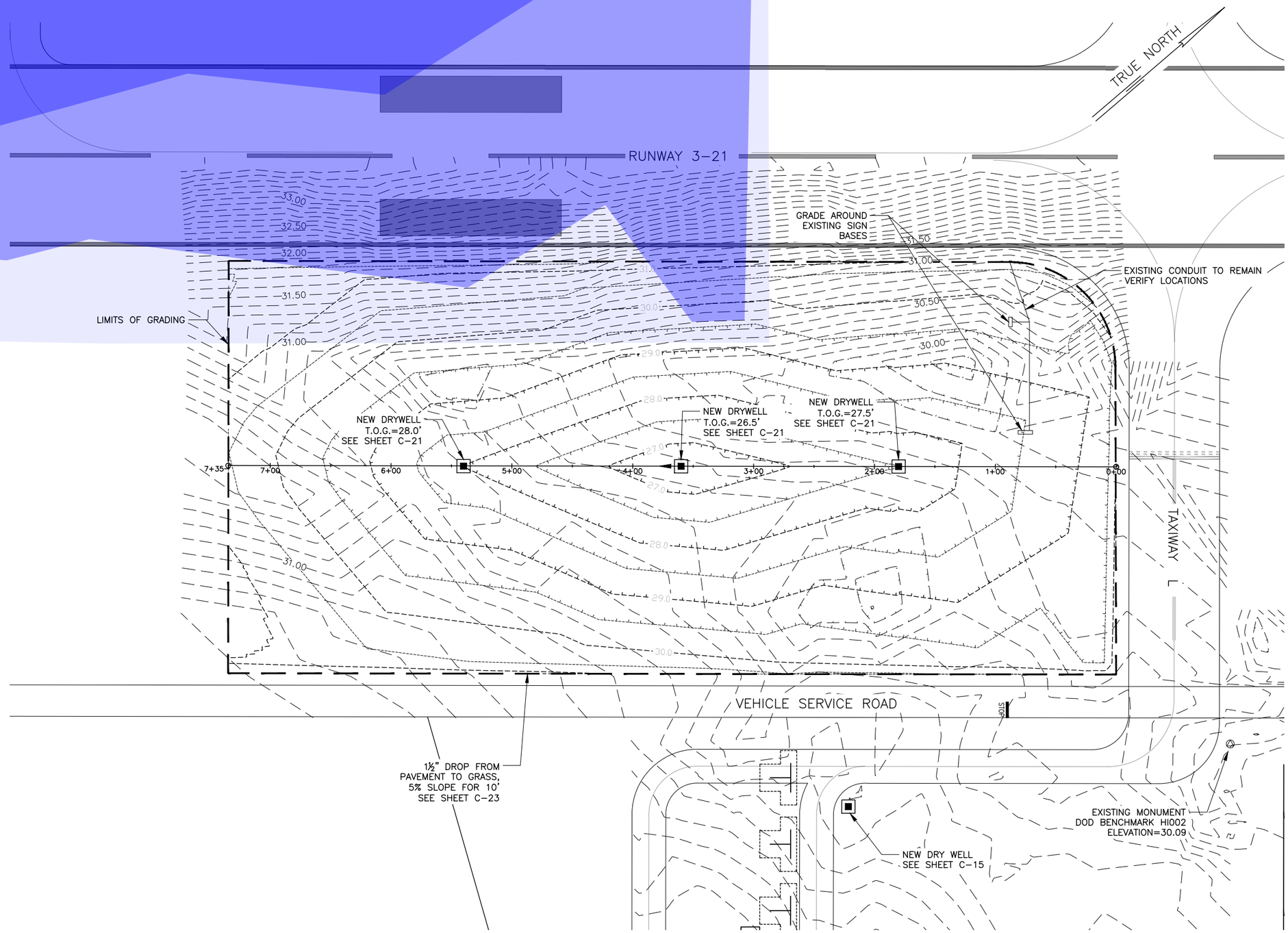
SHEET TITLE:

OVERALL PHASING PLAN

DATE	DWG. NO.
MARCH 2021	G-3
SHEET	
3 OF 49 SHEETS	

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDAIS
01562-197

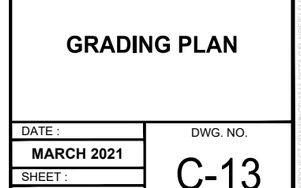


GRADING PLAN – ARMY NATIONAL GUARD AVIATION RAMP
SCALE: 1"=40'

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

80% DESIGN SUBMITTAL
MARCH 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

GRADING PLAN

DATE :	DWG. NO.
MARCH 2021	C-13
SHEET :	
22 OF 49 SHEETS	

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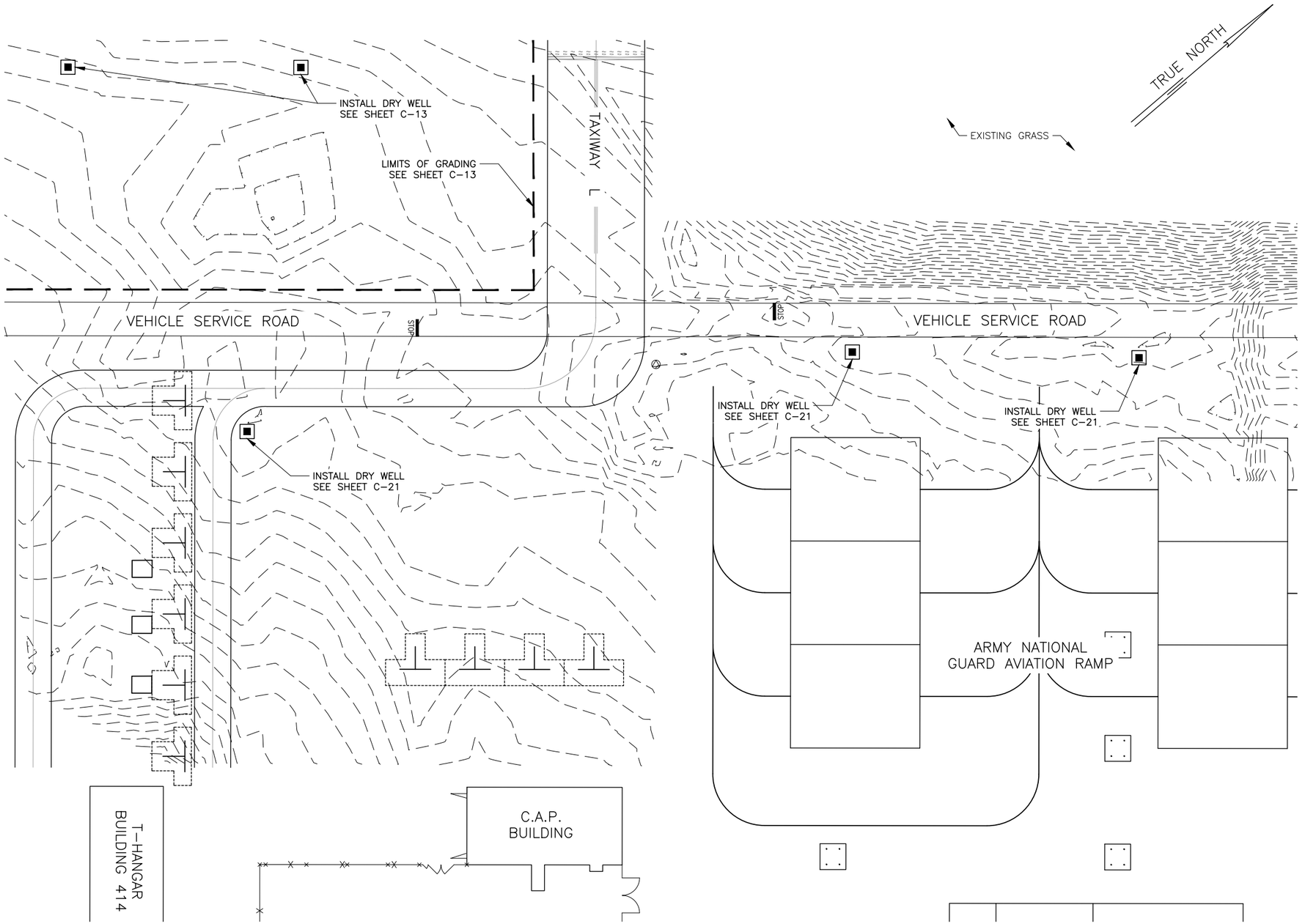


DRAINAGE IMPROVEMENTS PLAN
SCALE: 1"=40'

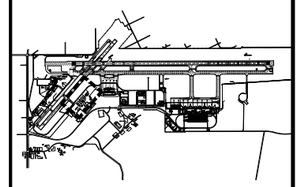
NOTES:
1. INSTALLATION OF DRY WELLS IN NON-GRADED AREAS MUST BE INSTALLED AT EXISTING LOW POINTS.
2. THE CONTRACTOR MUST VERIFY THE EXISTING CONDITIONS OF THE RAMP TO LOCATE THE LOW POINTS.
3. AIRFIELD STRIPING AFFECTED BY THE DRY WELL INSTALLATION SHALL MUST BE RESTRIPED IN ACCORDANCE WITH SPECIFICATION SECTION XXXXXXXX

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

80% DESIGN SUBMITTAL
MARCH 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

DRAINAGE IMPROVEMENTS PLAN

DATE :	DWG. NO.
MARCH 2021	C-15
SHEET :	
24 OF 49 SHEETS	

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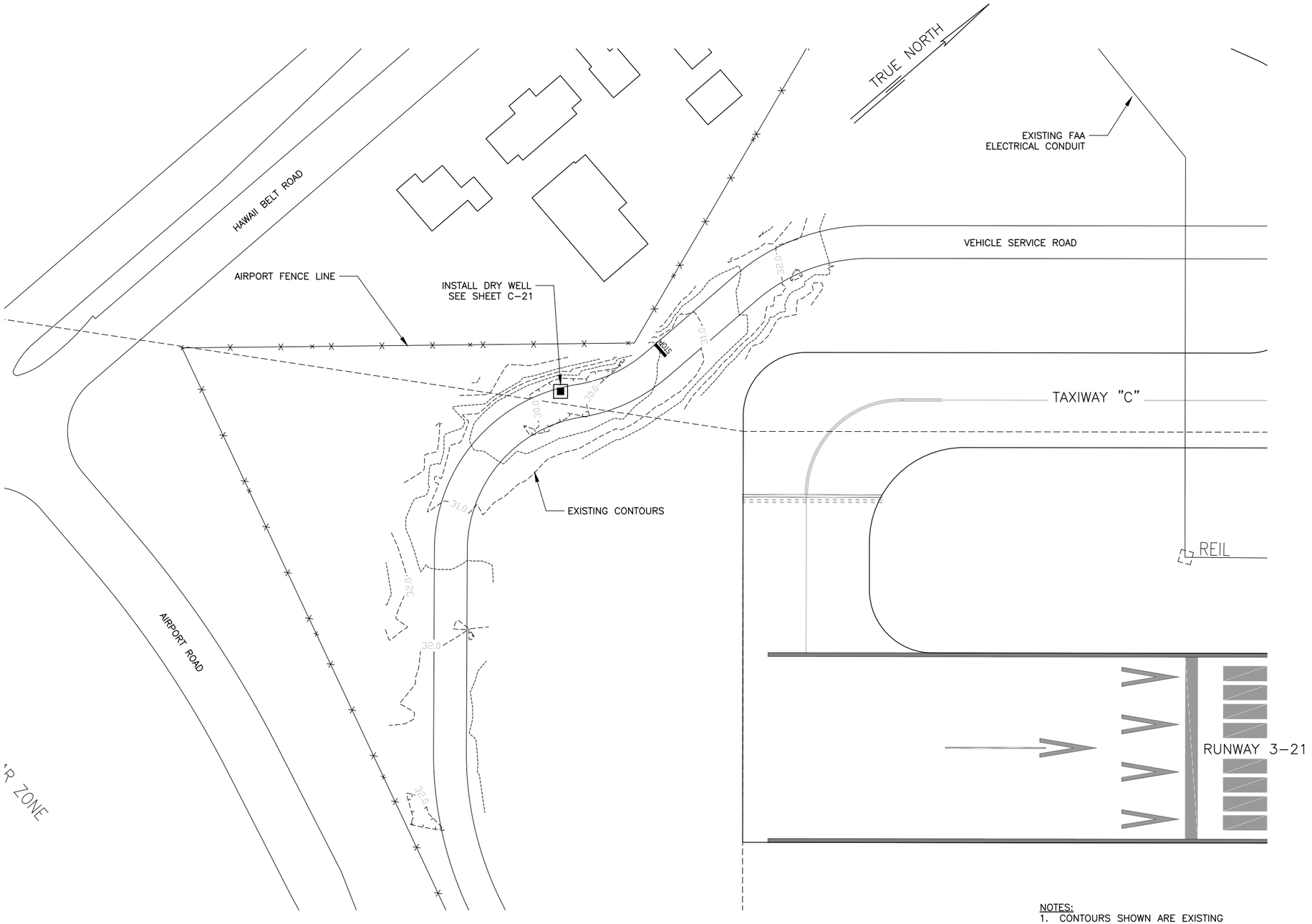


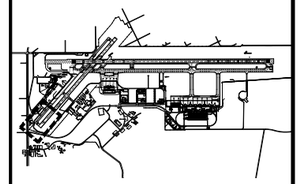
VEHICLE SERVICE ROAD DRAINAGE PLAN
SCALE: 1"=40'

NOTES:
1. CONTOURS SHOWN ARE EXISTING CONDITIONS. THE CONTRACTOR MUST VERIFY THE DRAINAGE LOW POINT PRIOR TO THE INSTALLATION OF THE DRY WELL.

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

80% DESIGN SUBMITTAL
MARCH 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

DRAINAGE IMPROVEMENTS PLAN

DATE :	DWG. NO.
MARCH 2021	C-16
SHEET :	
25 OF 49 SHEETS	

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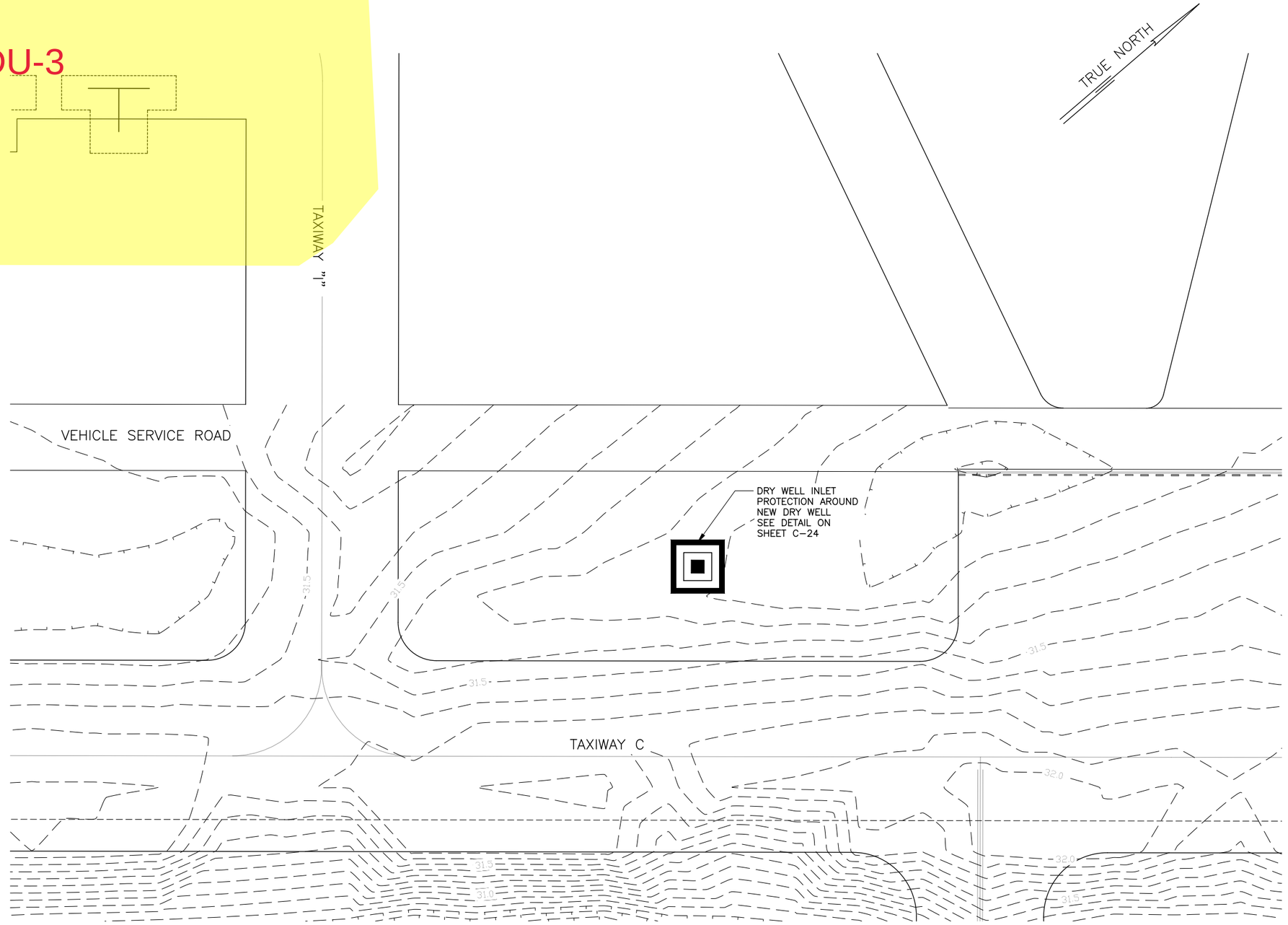
DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDAIS
01562-200

DU-3



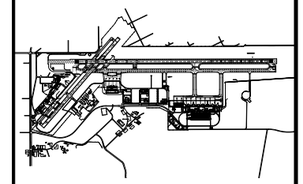
EROSION CONTROL – TAXIWAY "I" & TAXIWAY "C"
SCALE: 1"=20'

STATE OF HAWAII 1959

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

DSGN.	DRWN.	CHKD.	APPD.
RF	RF	CD	NF

KEY PLAN / NOTES:



NO.	DATE	REVISIONS

80% DESIGN SUBMITTAL
MARCH 1, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

EROSION CONTROL

DATE :	DWG. NO.
MARCH 2021	C-4
SHEET :	
13 OF 49 SHEETS	

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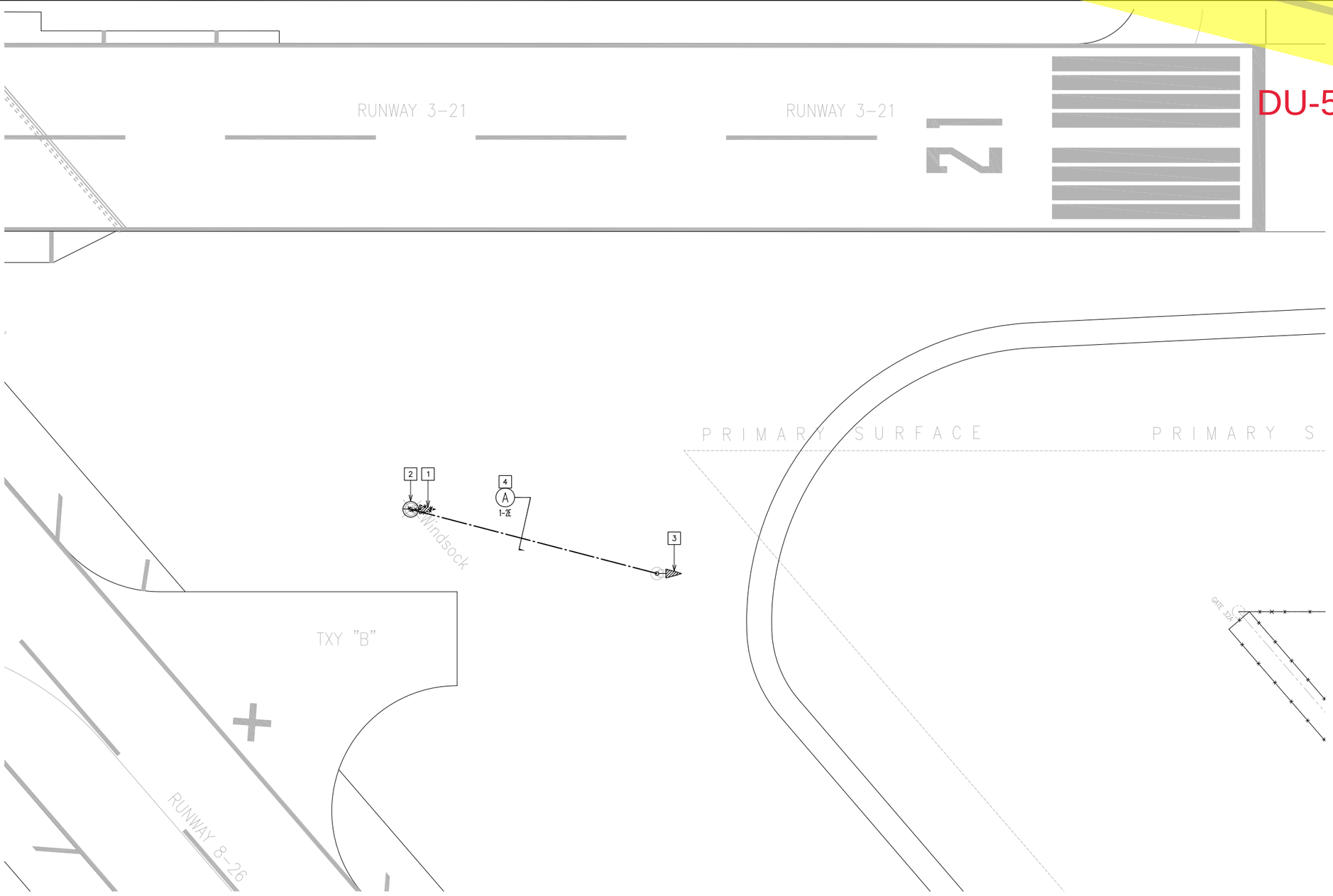
DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDAIS
01562-201

DU-5



NOTES:

1. REMOVE EXISTING WIND CONE LIGHT FIXTURE, CONDUIT AND WIRING.
2. PROVIDE L-867 LIGHT BASE TO INTERCEPT EXISTING WIND CONE LIGHTING CIRCUIT.
3. L-806 SUPPLEMENTAL WIND CONE AND LIGHT FIXTURE. SEE E-6 FOR DETAILS.
4. 2"C, 2-1/C #8, 5KV. EXTEND EXISTING WIND CONE LIGHTING CIRCUIT FROM NEW L-867 LIGHT BASE TO NEW WIND CONE.

NORTH

RUNWAY 21 ELECTRICAL PLAN

SCALE: 1"=40'

40' 20' 0 40' 80' 120'

SCALE: 1"=40'

GRAPHIC SCALE

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

BRYCE H. KANEMURA
LICENSED PROFESSIONAL ENGINEER
No. 16360-E
HAWAII, U.S.A.

This work was prepared by me or under my supervision.
Exp. 04-30-22

2021.01.22
Ronald N.S. Ho & Associates, Inc.

DSGN.	DRWN.	CHKD.	APPD.
BHK	CAD	BO	BO

KEY PLAN / NOTES:

NO.	DATE	REVISIONS

80% DESIGN SUBMITTAL
JANUARY 22, 2021
DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS
AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

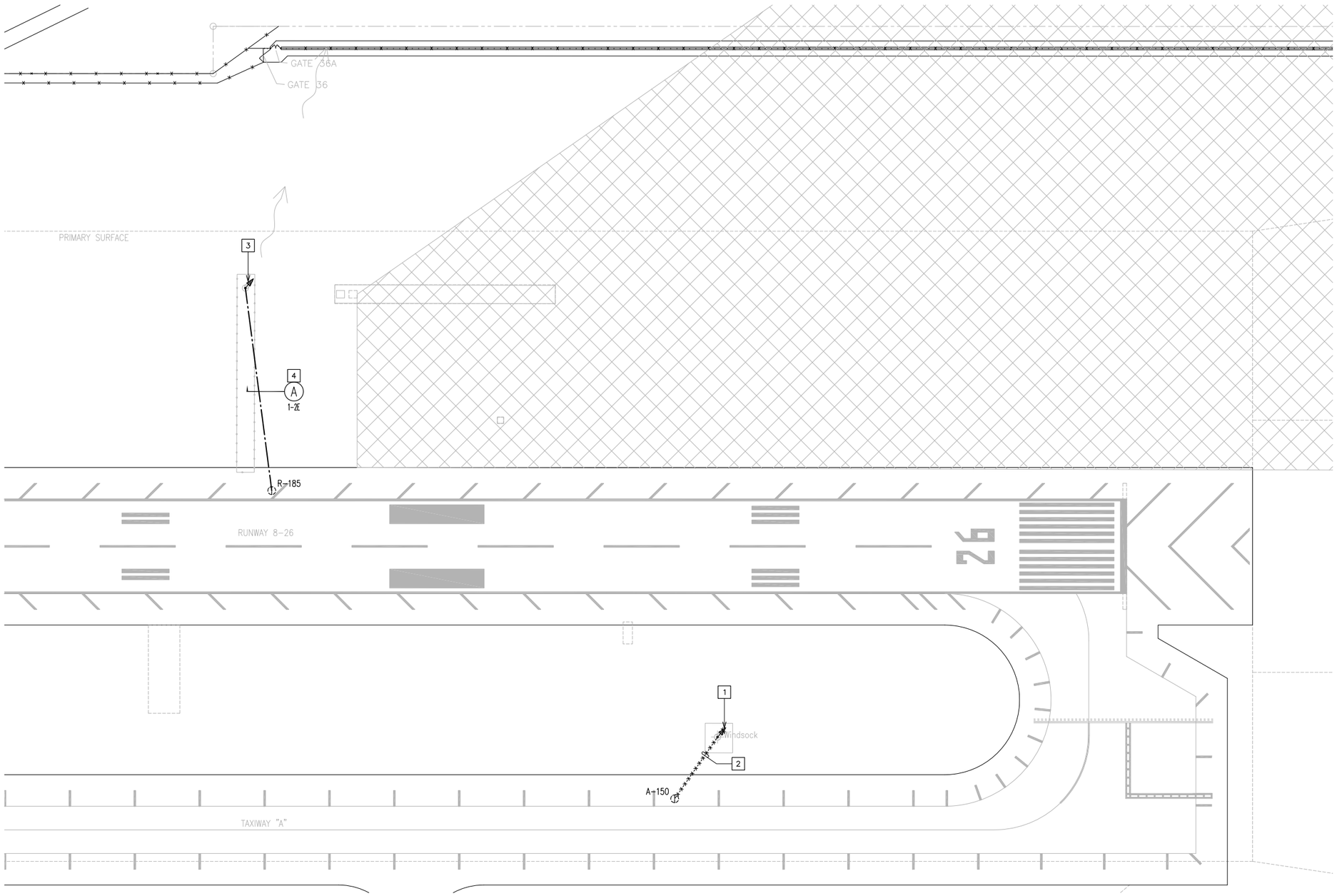
SHEET TITLE:

RUNWAY 21 ELECTRICAL PLAN

DATE :	DWG. NO.
MARCH 2021	E-4
SHEET :	
45 OF47SHEETS	

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDAIS
01562-202



NOTES:

1. REMOVE EXISTING WIND CONE LIGHT FIXTURE, CONDUIT AND WIRING.
2. REMOVE EXISTING WIRING. ABANDON EXISTING CONDUIT IN PLACE.
3. L-806 SUPPLEMENTAL WIND CONE AND LIGHT FIXTURE. SEE E-6 FOR DETAILS.
4. 2"C, 2-1/C #8, 5KV. EXTEND EXISTING LIGHTING CIRCUIT FROM EXISTING RUWNAY LIGHT FIXTURE TO NEW WIND CONE.

NORTH

RUNWAY 26 ELECTRICAL PLAN

SCALE: 1"=80'

80' 40' 0 80' 160' 240'

SCALE: 1"=80'

GRAPHIC SCALE

STATE OF HAWAII 1959

Airports Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

BRYCE H. KANEMURA
LICENSED PROFESSIONAL ENGINEER
No. 16360-E
HAWAII, U.S.A.

This work was prepared by me or under my supervision.
Exp. 04-30-22

2021.06.08

Ronald N.S. Ho & Associates, Inc.

DSGN.	DRWN.	CHKD.	APPD.
BHK	CAD	BO	BO

KEY PLAN / NOTES:

NO.	DATE	REVISIONS

80% DESIGN SUBMITTAL

FEBRUARY 17, 2021

DATE

PROJECT TITLE :

DRAINAGE & WIND CONE IMPROVEMENTS

AT
HILO INTERNATIONAL AIRPORT
SOUTH HILO, HAWAII

PROJECT NO.:

AH1021-20

SHEET TITLE:

RUNWAY 26 ELECTRICAL PLAN

DATE :
FEBRUARY 2021
SHEET :
46 OF47SHEETS

DWG. NO.
E-5

DRAINAGE AND WIND CONE IMPROVEMENTS
HILO INTERNATIONAL AIRPORT
STATE PROJECT NO. AH1021-20
AIP PROJECT NO. 3-15-0004-###

MANAGEMENT OF CONTAMINATED MEDAIS
01562-203

SECTION 01565 - SECURITY MEASURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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.

1.02 DESCRIPTION

A. The Contractor must incorporate the State's airport security measures as part of his work. The Contractor must adhere to established and enhanced security procedures, as mandated by the State and FAA, throughout the course of this Contract.

1.03 SUBMITTALS

A. Submit a security plan that addresses the conditions set forth in this Contract. Said plan must contain, at a minimum, a plan of the project scope with locations of construction barricades with secured entry/exits, identification of locations requiring guards, Contractor measures to ensure security of worksite and personnel and procedures to ensure the containment of the worksite from unauthorized personnel. This package must be submitted within fourteen (14) calendar days after award of the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SECURITY

A. Obtain airport security identification badges for all employees working on this project and Air Operations Area (AOA) decals for all vehicles entering the AOA area in accordance to the requirements stated in the Special Provisions, Paragraph 8.21. All requests for badges and AOA decals must be submitted in writing to the Airport District Manager through the Engineer within fourteen (14) calendar days after award of the Contract. Only authorized personnel working on this project must be allowed to obtain badges. The Contractor must be responsible to pay for all costs associated with complying with airport security requirements, including obtaining airport security identification badges.

Currently the fee to obtain a new airport identification badge is $60.00, but due to the changing fee structure of these services, the Contractor must inquire with the Daniel K. Inouye International Airport AOA badge and ramp license office at 827-3874. For other Airport Districts cost inquiries should be made the District Manager's office.

B. The Contractor must comply with all existing and proposed airport security initiative requirements. Contractor may be subject to civil penalties up to $35,000.00 for each security violation.

C. The Contractor must protect work areas from theft, vandalism and unauthorized entry. Ensure that proper methods are undertaken to secure tools, materials and equipment from the public.

D. All vehicles entering the AOA through any of the Airport Access Check Points may be subject to search. The Contractor must allow extra time for these inspections and be able to provide personnel, as required, to assist Airport security personnel during the inspections.

E. If required by the State, the Contractor will be responsible for the posting of guards at access points where the construction traffic may compromise the integrity of the airport security. Payment for posting of security guards required by the State must be paid for as an allowance item in the Proposal Schedule. The Contractor must submit the name and qualifications of the security company to the Engineer for review prior to hiring the security company. The security company must have extensive experience in working on airports and knowledgeable in airport security procedures within the State of Hawaii.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this Section, including the provision of security measures required by the State, must be considered incidental to and included in the bid prices for the various items of work in this project. AOA badges, decals, and fines are not eligible for reimbursement.

B. Posting of security guards must be paid for under an allowance item in the Proposal Schedule. The allowance is an estimate and the amount must not exceed the maximum amount shown in the proposal schedule. Additional charges by the Contractor for overhead, coordination, profit, insurances and other incidental expenses must not be allowed. These must be included in the Contractor's lump sum bid price.

C. Payment will be made under:

Item No.	**Item**	**Unit**
01565.1	Security Measures	Allowance (ALLOW)

END OF SECTION 01565

SECTION 01580 - TEMPORARY FACILITIES AND UTILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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.

1.02 DESCRIPTION

A. This item must consist of arranging and maintaining all utilities including, but not limited to, water, electricity, sewage disposal and telephone communications in the work area which the Contractor and Engineer deems necessary to meet the requirements of the work under the contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 TEMPORARY UTILITIES DURING CONSTRUCTION

A. Water and Sanitation: The Contractor must provide temporary drinking water and sanitary facilities for the field personnel. The facilities must be in accordance with the applicable health regulations and must be maintained clean and operable until the conclusion of the construction work.

B. Internet: The Contractor shall provide internet access and shall pay for all connections and monthly charges incurred during construction.

C. Electricity: Contractor must obtain or provide temporary electric power and must pay for all connections and energy charges incurred during construction. At the end of the contract, the Contractor must pay for the removal of temporary meters and utility services deemed necessary by HDOTA.

D. Metering: Water and electrical services must be metered and payment for meters and services must be borne by the Contractor. Temporary connections for water must include installation of a meter and backflow preventer at the point of connection according to State standards at the Contractor's cost. The Contractor must submit requests for temporary connections in writing to the Engineer fourteen (14) calendar days prior to the connection and must include a description of work and a sketch of the proposed installation.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OFMEASUREMENT AND PAYMENT

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

END OF SECTION 01580

SECTION 01800 – SPECIAL REQUIREMENTS FOR CONTRACTORS ON THE AOA

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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.

1.02 DESCRIPTION OF WORK

A. The Contractor must incorporate the State's airport security measures as part of his work. The Contractor must adhere to established and enhanced security procedures, as mandated by the State and FAA, throughout the course of this Contract.

B. The requirements of this Section are essential for ensuring public and worker safety on this project; hence, the Contractor must comply with all requirements of this section when performing work on the AOA (Airport Operations Area). Should the Contractor fail to comply with any requirement of this section; work may be delayed or temporarily suspended without contract time extensions, or liquidated damages or fines may result. All liquidated damages or fines resulting from violations due to improper activity, inattention, or failure to comply with required airport procedures; must be borne by the Contractor.

1.03 SUBMITTALS

A. Submit a Safety Plan Compliance Document (SPCD) within fourteen (14) calendar days after award of the Contract. The SPCD's purpose is to demonstrate the Contractor's understanding of the project's impacts to airport operations and the safety measures implemented to mitigate hazards and risks. The SPCD must contain, at a minimum, a plan of each project phase with locations of barricades, applicable runway or taxiway closures, haul routes, NAVAID shut downs, work areas, special airport considerations, work hours, and other information related to airport safety. The SPCD must conform to the requirements found in FAA Advisory Circular 150/5370-2G, Operational Safety on Airports During Construction and the project specifications.

B. Submit tall equipment and vehicle information, required to fill out FAA Form 7460-1, to the Engineer within fourteen (14) calendar days after the award of Contract. Tall vehicles and equipment use in the AOA requires prior approval by the FAA. Use of tall equipment in the AOA will not be allowed unless a determination letter is issued and approved by the FAA.

C. Submit a lighting plan within fourteen (14) calendar days after the award of Contract. The lighting plan must encompass all work phases and

precautions to be taken to address light pollution issues affecting native wildlife.

1.04 AOA SECURITY REQUIREMENTS

A. AOA Badges – Must only be issued to people that apply through the Airport Security Office, and complete all of the fingerprinting requirements.

All people accessing the AOA must possess an AOA Badge with unescorted access. AOA temporary escort badges will only be issued during State-deemed emergencies.

All requests for badges and AOA decals must be submitted in writing to the Airport District Manager through the Engineer within fourteen (14) calendar days after award of the Contract. Only authorized personnel working on this project must be allowed to obtain badges. The Contractor must be responsible to pay for all costs associated with complying with airport security requirements, including obtaining airport security identification badges.

Currently, the fee to obtain a new airport identification badge is $60.00, but due to the changing fee structure of these services, the Contractor must inquire with the Hilo International Airport AOA badge and ramp license office at 327-9517.

B. AOA Access Points – The Contractor will be assigned only one access point for each work phase, and must ensure that all of their personnel, vehicles, and equipment enter and exit the AOA only through the assigned access point.

All vehicles entering the AOA through any of the Airport Access Check Points may be subject to search. The Contractor must allow extra time for these inspections and be able to provide personnel, as required, to assist Airport security personnel during the inspections.

If the State deems an emergency situation has rendered the assigned access point unusable, the Contractor will be assigned a temporary access point for the remaining workday. Should the original assigned access point remain unusable for a prolonged period, the Contractor will be assigned a new access point the following day, and must be responsible for all requirements at the new assigned access point.

C. AOA Access Gates – Should the Contractor's assigned AOA access point be through an unguarded gate, the Contractor must be responsible for the following:

1. Obtain the AOA access gate key(s) from the Airport Security Office (a $500.00 deposit is required per key).
2. Proper control of the AOA access gate in accordance with all required airport security procedures.

3. Close and lock the AOA access gate immediately after entering or exiting the AOA.

D. The Contractor must comply with all existing and proposed airport security initiative requirements. Contractor may be subject to civil penalties up to $35,000.00 for each security violation.

E. The Contractor must protect work areas from theft, vandalism and unauthorized entry. Ensure that proper methods are undertaken to secure tools, materials and equipment from the public.

1.05 AOA OPERATIONAL SAFETY REQUIREMENTS

It is the explicit intent of this contract that the safety of aircraft, and all of the personnel and equipment under the Contractor's jurisdiction, be the highest priority; hence, the Contractor must carefully plan the operations of all personnel and equipment under their jurisdiction to provide for the free and unobstructed movement of all aircraft on the AOA, and to provide for the uninterrupted operation of visual and electronic signals used to guide aircraft while all personnel and equipment under their jurisdiction traverses the AOA.

With the exception of actual construction methods, the FAA ATCT will have full authority to control the Contractor's movements within the existing movement area. If the FAA ATCT notifies the Contractor to temporarily halt operations, the Contractor must effectively notify all personnel and equipment under its jurisdiction, without using lighted flares, to cease all work and move all equipment and themselves away from hazardous areas.

The Contractor is responsible for all of their movements on the AOA. Should the State deem that an escort, flagman, or driver fails to perform their duties; that escort, flagman, or driver may be terminated, or suspended and required to undergo additional training.

A. AOA Communication Devices – The Contractor must have at least two (2) people on the AOA possessing and continuously monitoring the following fully charged communication devices:

1. A two-way radio capable of communicating on frequencies 118.1 (Hilo Tower), 121.9 (Hilo Ground), and 122.45 (Honolulu Radio); with a spare charged battery and
2. A cellular telephone, with a listing of all required emergency contact numbers.

The Contractor must have a dedicated Radio Monitoring Person (RMP) as indicated in the project specific CSPP, unless otherwise directed by ITO.

B. AOA Travel Routes - The Contractor will be assigned only one travel route per work phase, and must ensure that all of their personnel, vehicles and equipment traverse the AOA only along the assigned travel route.

Should the State deem that an emergency situation has caused the assigned travel route to become unusable, the Contractor will be assigned a temporary travel route for the duration needed and must be responsible for all requirements associated with the new assigned travel route.

C. AOA Authorized Vehicles – Only vehicles considered safe, and required to complete the contracted work will be allowed to operate on the AOA. Each vehicle operating on the AOA must be authorized, possessing:

1. An AOA vehicle decal obtained from the Airport Security Office and displayed on the driver's side front bumper (use of an AOA temporary vehicle permit is not allowed); and,
2. Insurance coverage as required by Article 8.4 of the General Provisions, and further amended by the Special Provisions 8.21 and Supplemental Special Provisions.

D. Vehicle and Equipment Requirements on the AOA – Each vehicle and driven piece of equipment must possess the following when operating or staging on the AOA.

1. Operations occurring at night, or during periods of poor visibility, must require a Flashing Amber Beacon mounted atop each vehicle/equipment's highest point.
2. Daylight operations with clear visibility, must require a Checkered Orange and White Flag attached to a staff that is mounted to each vehicle/equipment in lieu of a Flashing Amber Beacon (The flag must be at least a three-foot square with a checker pattern of international orange and white squares that are at least one-foot on each side).
3. Two placards must be on both sides of each vehicle or equipment at all times to identify the vehicle or equipment owner (Placards must contain the company name in letters at least four-inches tall, or six-inch minimum-sized company logo).
4. All additional equipment marking, lighting and positioning that may be required by the FAA.
5. Use of tall equipment (cranes, concrete pumps, ect.) will not be allowed unless the FAA Form 7460-1 determination letter is issued and approved for such equipment. The Contractor must provide the Engineer with all information required to fill out the Form 7460-1. The Engineer will fill out and submit the Form 7460-1 on the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE/AAA) website. The Contractor should anticipate the Form 7460-1 review and approval length to be forty-five (45) days.

E. Airport Vehicle Operator's Permit – Must only be issued to people that apply through the Airport Security Office, and pass a written exam covering portions of the Airport Rules and Regulations related to vehicle operations on the AOA.

The State may suspend or revoke an issued permit at any time for cause.

F. AOA FOD Control - The Contractor must keep all work areas, AOA Travel Routes, and all adjacent areas clean at all times. Unless otherwise stated in this contract, or otherwise directed by the Airport Manager, the Contractor must properly haul and dispose all removed pavement materials and collected debris to a site off the Airport. The State will require remedial cleaning from the Contractor whenever their FOD Control Operations are unsatisfactory. Upon receipt of notification, the Contractor must be ready to start remedial cleaning at the jobsite within one-hour.

The use of a sweeper to collect loose FOD is required unless determined otherwise by Airport Operations. ITO has only 1 vacuum sweeper that is not guaranteed to be available at all times. The Contractor shall be responsible for providing a vacuum sweeper through the duration of the project unless otherwise notified by ITO.

Notification by telephone will be deemed as official.

G. AOA Drivers – All people operating a vehicle or any driven piece of equipment on the AOA must possess:

1. Current and valid Hawaii State Driver's License.
2. Current and valid Airport Vehicle Operator's Permit.
3. Complete Airport Familiarization.
4. An understanding and ability to identify the following:

    a. All RSA's and TSA's;

    b. All AOA Markings, Lighting, and Signing;

    c. The Need for Control of FOD;

    d. All AOA Equipment for Aircraft Navigation & Service;

    e. All AOA Critical Areas; and

    f. All AOA Travel Routes for the Various Work Phases.

5. An understanding and ability to follow all ground vehicle operation and communication requirements while operating on the AOA.
6. Successful completion of all AOA driver training required by the Airport Operations Manager.

H. AOA Flag People – Should the plans require flag people along the AOA Travel Route, each flag-person must possess:

1. AOA Driver Requirements 3, 4, and 6 listed above;
2. Both AOA Communication Devices previously specified;
3. A traffic directing LED Light Baton;
4. A broom and dustpan to assist in AOA FOD Control.

I. AOA Escorts – While operating on the AOA, the Contractor must provide at least one escort for every five vehicles and/or equipment under their jurisdiction. The Airport Operations Manager must approve all escorts prior to any work commencing; hence, each escort must possess:

1. All AOA Driver Requirements;
2. Both AOA Communication Devices previously specified;
3. Knowledge about the assigned access points and travel routes for the project.
4. The ability to effectively communicate intended AOA movements and the ability to lead five vehicles between the work area(s) and the assigned AOA Access Point in a safe and efficient manner.

J. AOA Traffic Control – The Contractor must furnish and provide the following traffic control devices as needed, as well as, an individual that must be available on a 24-hours a day, seven days a week, every week during the contract time to address any emergency traffic control needs such as non-illuminated lights, dislodged components of traffic control devices, fallen devices or poorly delineated devices, etc.:

1. Runway Lighted X's – Must be placed on top of the runway designation marking, on both sides of the runway.

   a. Used to indicate to aircraft that the runway is closed.

2. Low-Profile, Lighted Barricades – Must be spaced 15' on center unless otherwise specified, and used as follows:

   a. Restrict aircraft from taxiing into the work area (Barricades must extend across the full Taxiway/Roadway width, with one barricade placed on the Taxiway/Roadway centerline);

   b. Channel aircraft around work areas (Barricades must be placed ten feet away from active RSA's/TSA's)

3. Reflective Cones – Used to demarcate AOA travel routes, and locations where vehicles must yield to aircraft.

K. Airport Staging Areas – The Contractor must only stage its vehicles and equipment at State approved areas. No vehicle or equipment must park within four feet of a security fence. Demarcation of the staging area must be as follows:

1. Low-profile, lighted barricades spaced 20' on center continuously along the perimeter of the staging area. Low-profile barricades must be secured and weighed down by either sandbags or being water filled.

2. The Contractor may coordinate with the Airport for acceptable alternative staging area demarcation devices.

1.06 COORDINATION OF CONSTRUCTION ON THE AOA

Work on the AOA requires Roadway and Taxiway closures that demand proper notification to numerous agencies responsible for public safety; thus, the State must receive the following sufficiently accurate information from the Contractor.

A. Maximum Equipment Height – Must be submitted to the State at least 35-days prior to construction. Construction must not commence until the State receives confirmation from the FAA. All reported heights must be the maximum heights among all vehicles or equipment used to complete the contracted work, and includes proper notification to the State whenever the reported maximum heights are to be exceeded.

B. Detailed Work Schedule – The Contractor's detailed work schedule is vital information needed to generate the airfield closures needed to perform work. Airport Roadways and Taxiways are vital to Airport Operations, and all closures generate operational and safety hardships to varying degrees. Hence the Contractor must plan their work accordingly to minimize airfield closures prior to generating their detailed work schedule. Construction must not commence until the State approves the Contractor's detailed work schedule, and will only commence ten days after the State approves the said work schedule. The detailed work schedule must show pictorially the work area(s), all light placements, and placement of traffic controls devices for each working day of the project.

C. Updated Work Schedule – The Contractor must update their detailed work schedule on a weekly basis. No new closures for the Contractor's work will be made until the State approves the updated work schedule, and will only be made seven days after the State approves the said work schedule. The updated work schedule must show pictorially the work area(s), all light placements, and placement of traffic control devices for each workday remaining on the project.

D. Cancellations – The Contractor must only cancel work through the Project Manager, Airport Operations Manager, or Airport Duty Manager. Whenever a cancellation is not made, and the Contractor is not at the assigned AOA Access Point within 30-minutes of the start time; all Contractor closures for the remaining workweek will be cancelled. The Contractor must reimburse the State $600.00 for every work cancellation the State deems unjustified. This reimbursement is to compensate the State for all unnecessary costs related to canceling existing and coordinating new closures.

1.07 CONSTRUCTION LIGHTING REQUIREMENTS

The Contractor must perform the following in accordance with all applicable federal, state, local, and airport rules and regulations related

A. Should any part of the work area lack sufficient sunlight, the Contractor must provide sufficient artificial lighting to permit the work and inspection to be carried out efficiently, thoroughly, safely, and satisfactorily.

B. Work and inspections must not be performed with only flashlights and/or vehicle/equipment headlights.

C. All lights must be positioned so they do not blind aircraft pilots and FAA-ATCT controllers.

D. The use of light towers must be minimized to reduce the harm to endangered seabirds and native wildlife. The Contractor must ensure lighting used at night is shielded and pointed down to the ground.

E. All wiring for electrical lights and power must be properly installed, maintained, securely fastened and kept as far as possible from telephone and signal wires.

F. The Contractor must submit a lighting plan to the Engineer for all work phases that must be subject to approval.

1.08 ENVIRONMENTAL AND HEALTH REQUIREMENTS

The Contractor must perform the following in accordance with all applicable federal, state, local, and airport rules and regulations related to environmental pollution control, abatement, and fire code.

A. Airport Water – Airport water must not be drawn from a tap lacking a reduced pressure principle backflow prevention device. Water valves must be opened and closed so that water hammers are not produced.

B. Waste Disposal – Must be performed properly. Materials must not be burned, and construction wastes must not be disposed into Airport storm water or sewer systems.

C. Restoration – Completely restore, to an acceptable condition; staging areas, work areas, AOA travel routes, and areas adjacent to the aforementioned.

If the Contractor damages an existing Airport perimeter fence, the Contractor must perform immediate repairs on the fence to prevent inadvertent entry, and maintain Airport Security.

D. Vehicle/Equipment Leaks and Material Spills – Must be handled by the following five-step process, and pertains to all fluids other than potable water.

1. All leaked or spilled fluids must immediately be kept from entering the Airport storm water and sewer systems.
2. All fluid leaks or spills must be respectively fixed or stopped, immediately after ensuring that the fluids are kept out of the Airport storm water and sewer systems.
3. All areas containing the leaks or spills must be properly cleaned and restored.
4. Dispose all wastes per Section 1.06.B above.

5. Submit proper documentation to the State showing that all leaks or spills were properly cleaned and disposed.

E. Erosion Control – The Contractor must provide any essential temporary drainage, dikes, and similar facilities to prevent erosion damage to the site. Run-off must be controlled to prevent damage to surrounding areas.

F. Dust Control – The Contractor must take positive measures to ensure that dust is properly controlled without chemicals and/or oil treatments.

G. Noise Control – Must be within the levels that comply with all applicable regulations.

1.09 CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

A. The Contractor must comply with the project specific Construction Safety and Phasing Plan included in the bid documents and any revised versions issued prior to bid.

B. It is the Contractor's responsibility to adhere to all requirements, restrictions, and coordination efforts specified in the CSPP.

C. Work Hours – The work hours in the CSPP have been reviewed and approved by the FAA, HDOTA, Airport District, Airlines, and other stakeholders. If the Contractor wishes to alter the work times listed in the CSPP, prior coordination and approval by all entities mentioned prior is required. HDOTA and the Airport District reserve the right to hold the Contractor to the listed work times in the CSPP.

Work hours listed in the CSPP are limited to the work areas identified on the runway or taxiway.

D. Phasing Plan – The Contractor must adhere to the phasing plans attached to the CSPP. This includes, but is not limited to: barricade placement, work times, haul routes, prior coordination, and other airfield considerations.

E. Coordination – The Contractor must adhere to the coordination requirements in the CSPP and specifications. Failure to properly coordinate with the proper entities can lead to safety risks which the Contractor will be held liable for.

F. Changes to the CSPP must be approved by the Engineer, HDOTA, and FAA.

1.10 RUNWAY CLOSURE PROCEDURES

A. The Contractor must follow procedures in the approved CSPP for work requiring runway closure. Work will not be allowed to begin until all procedures for runway closure is completed, including the following:

1. Confirm proper Notice to Airmen (NOTAMs) issued per approved 3-week construction schedule.

2. Install lighted runway closure X's at locations shown on both ends of the runway in accordance with the CSPP.

3. Turn-off power for the runway edge lights, approach lighting, and applicable visual NAVAIDs. Coordination with FAA TechOps will be required to shut down FAA owned NAVAIDs.

4. Turn-off or cover lights for the closed portions of taxiways.

5. Install barricades in accordance with the CSPP.

6. Notify the Construction Manager and/or Airport Manager when all the above runway closure procedures have been completed.

B. At the end of each night's work for runway reopening, the Contractor must follow the procedures in the approved CSPP, to include the following:

1. Remove the lighted runway closure X's at both ends of the runway.

2. Turn-on power for the runway edge lights, approach lighting, and NAVAIDs. Coordination with FAA TechOps will be required to restart FAA owned NAVAIDs.

3. Turn-on power or remove covers from lights for the closed taxiways.

4. Remove all installed barricades.

5. Perform the Foreign Object Debris (FOD) clean-up and inspection. Once completed, request a clearance check from Airport Operations for reopening.

1.11 TAXIWAY CLOSURE PROCEDURES

A. The Contractor must follow procedures in the approved CSPP for work requiring taxiway closures. Work will not be allowed to begin until all procedures for runway closure is completed, including the following:

1. Confirm proper Notice to Airmen (NOTAMs) issued per approved 3-week construction schedule.

2. Install barricades in accordance with the CSPP.

3. Install required temporary taxiway edge reflectors.

4. Turn-off power for the taxiway edge lights on the closed taxiways.

5. Notify the Construction Manager and/or Airport Manager when all the above taxiway closure procedures have been completed.

B. At the end of each night's work for runway reopening, the Contractor must follow the procedures in the approved CSPP, to include the following:

1. Remove all installed barricades and required temporary taxiway edge reflectors.

2. Turn-on power for the taxiway edge lights.

3. Perform the Foreign Object Debris (FOD) clean-up and inspection. Once completed, request a clearance check from Airport Operations for reopening.

1.12 OTHER REQUIREMENTS

The Contractor must also comply with the following requirements should they arise.

A. Any new TSA security requirement.

B. Any additional operational safety requirements generated by the FAA.

C. Provide additional lights along AOA travel routes should the Engineer deem additional safety enhancements are needed.

D. Any new environmental and health requirements generated by the EPA or DOH.

E. The latest edition of FAA Advisory Circular 150/5370-2, Operational Safety on Airport During Construction.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

END OF SECTION 01800

SECTION 01900 – PROJECT SURVEY AND STAKEOUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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.

1.02 SUMMARY

A. This item shall consist of all activities necessary to control the Contractor's Work. It shall also include all additional site survey efforts as may be dictated by the RPR during the course of the work in order to facilitate the development of field directives, change orders, or other items necessary for the successful completion of the project.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. The Contractor shall submit the final survey results and electronic file to the RPR.

1.04 SURFACE CONTROL SURVEY

A. Record File: All survey information shall be recorded in an electronic CAD file. The record file shall identify all pre-construction above ground features such as pavement edges, pavement, markings, airfield lights, NAVAIDs, manholes and handholes, utility boxes, drainage facilities, spot elevations, etc.. Spot elevations shall be taken at every twenty-five feet, in a grid, along with top existing airfield paved areas and grading limits. Requirements for the post-construction record file shall be the same as the pre-construction survey results.

B. Accuracy: All survey work shall be equal to third order accuracy as classified by the Federal Geodetic Control Committee.

C. Schedule: The pre-construction condition survey work shall commence upon receipt of Notice to Proceed (NTP). The pre-construction survey drawings shall be completed within fourteen days of NTP. The post-construction condition survey work shall be completed within seven days after grading and dry well installation areas are to be opened for aircraft traffic.

D. Electronic CAD files shall be supplied in AutoCAD 2010 formats.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 COOPERATION BETWEEN CONTRACTORS

A. The State reserve the right to contract for and perform other or additional work on or near the work covered by this contract.

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

C. Each Contractor involved shall assume all liability, financial or otherwise, in connection with his/her contract and shall protect and save harmless the State from any and all damages or claims that may arise because of inconvenience, delays, or loss experience by him/her because of the presence and operations of other Contractors working within the limits of the same project.

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

3.02 CONSTRUCTION LAYOUT AND STAKES

A. The horizontal and vertical control shall be established in accordance with Specification Section 01050 – Control of Work, FAA Specification Section 50, paragraph 50-07.

B. The Contractor will be required to furnish all lines, grades, and measurements from the control points necessary for the proper execution of the control of work contracted under these Specifications.

C. Construction Staking and Layout includes but is not limited to:

1. Clearing and Grubbing perimeter staking

2. Rough Grade slope stakes at 50-foot stations

3. Drainage swales slope stakes and flow line blue tops at 50-foot stations.

4. Pavement areas:

    a. Edge of Pavement hubs and tacks (for stringline by Contractor) at 100-foot stations.

b. Between Lifts at 25-foot stations for the following section locations;

i. Runways – each paving lane width

ii. Taxiways – each paving lane width

iii. Holding areas – each paving lane width

c. After finishing paving operations at 50-foot stations:

i. All paved areas – Edge of each paving lane prior to next paving lot

d. Shoulder and safety area blue tops at 50-foot stations and at all break points with maximum of 50-foot stations minimum.

e. Fence lines at 100-foot stations minimum.

f. Electrical and Communications System locations, lines and grades including but not limited to duct runs, connections, fixtures, signs, lights, Visual Approach Slope Indicators (VASIs), Precision Approach Path Indicators (PAPIs), Runway End Identifier Lighting (REIL), Wind Cones, Distance Markers (signs), Airfield Signage, Runway and Taxiway edge lights, pull boxes, and manholes.

g. Drain lines, cut stakes, and alignment on 25-foot stations, inlet and manholes.

h. Painting and Striping layout (pinned with 1.5 inch PK nails) marked for paint Contractor. (All nails shall be removed after painting).

i. Laser, or other automatic control devices, shall be checked with temporary control point or grade hub at a minimum of once per 400 feet per pass (that is, paving lane).

D. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor.

E. Controls and stakes disturbed or suspect of having been disturbed shall be checked and/or reset as directed by the RPR without additional cost to the Owner.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. All work specified in this Section shall be paid for at the contract lump sum price as shown below. The contract price must be full compensation for all

labor, materials, tools, equipment, and all other incidentals necessary to complete the work.

Payment will be made under:

Item No.	**Item**	**Unit**
01900.1	Project Survey and Stakeout	Lump Sum (L.S.)

END OF SECTION 01900

DIVISION 2 – SITE WORK

SECTION 02101 – PREPARATION/REMOVAL OF EXISTING PAVEMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. 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.

1.02 DESCRIPTION OF WORK

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

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Prior to commencing work in this Section, the Contractor must submit a Pavement Removal Plan.

1. Description of the proposed method of accomplishing pavement removals.

2. Descriptions of the proposed equipment.

PART 2 – PRODUCTS

2.01 All materials and equipment required for this item shall be in accordance with FAA Specification Item P-101 Preparation/Removal of Existing Pavements.

PART 3 – EXECUTION

3.01. Removal of existing pavement shall be in accordance with FAA Specification Item P-101.

3.02. Cold milling shall be in accordance with FAA Specification Item P-101.

3.03. Preparation of asphalt pavement surfaces prior to surface treatment shall be in accordance with FAA Specification Item P-101.

3.04. Maintenance shall be in accordance with FAA Specification Item P-101.

PART 4 – MEASUREMENT AND PAYMENT

4.01. METHOD OF MEASUREMENT

A. The quantity of pavement demolition and disposal to be paid for shall be the number of square yards of pavement removed, separated, and hauled off site. This quantity shall also include the demolition, separation, and disposal of abandoned runway/taxiway lighting fixtures, base cans, conduit, conductors, and concrete hand holes out to the demolition limits shown as part of the measured quantity. Any removed pavement or lighting infrastructure not included in the contract because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal.

4.02. BASIS OF PAYMENT

A. Payment for AC Pavement Demolition and Disposal shall be made at the contract unit price per square yard. This price shall be full compensation for the pavement demolition, removal, separation, hauling, and disposal. Price includes furnishing all materials and for all preparation, hauling, and stockpiling of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

B. Payment for Cold Milling (Constant Depth) shall be made at the contract unit price per square yard. This price shall be full compensation for milling, stockpiling, hauling, and disposal at an authorized waste facility. Price includes furnishing all materials and for all preparation, hauling, and stockpiling of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item No.	**Item**	**Unit**
02101.1	AC Pavement Demolition and Disposal	Square Yard (S.Y.)
02101.2	Cold Milling (Constant Depth)	Square Yard (S.Y.)

PART 5 - ATTACHMENT

5.01 FAA Specification Item P-101 Preparation/Removal of Existing Pavement

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

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. Not Used

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. Pavement inside the saw cut shall be removed by methods which will not cause distress in the pavement which is to remain in place. Removed pavement shall be hauled off site and disposed of.

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. Not Used

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

High-pressure water and cold milling may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be

deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

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

a. Repair of concrete spalls in areas to be overlaid with asphalt. Not Used

b. Asphalt pavement repair. Not Used

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 Airport property.

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

101-3.8.1 Removal of Existing Joint Sealant. Not Used

101-3.8.2 Cleaning prior to sealing. Not Used

101-3.8.3 Joint sealant. Not Used

101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing. Not Used

101-3.9.1 Preparation of Crack. Not Used

101-3.9.2 Removal of Existing Crack Sealant. Not Used

101-3.9.3 Crack Sealant. Not Used

101-3.9.4 Removal of Pipe and other Buried Structures.

a. **Removal of Existing Pipe Material.** Not Used
b. **Removal of Inlets/Manholes.** Not Used

END OF ITEM P-101

END OF SECTION 02101

SECTION 02209 – CRUSHED AGGREGATE BASE COURSE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section shall be in accordance with FAA Specification Item P-209: Crushed Aggregate Base Course, as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

A. This item shall consist 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.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Gradation of aggregate base course shall be submitted in accordance with FAA Specification Item P-209, Table 2.

C. Aggregate base samples and gradation test results from the in-place, uncompacted material shall be submitted in accordance with FAA Specification Item P-209, paragraph 2.3.

D. Field density results of compacted material meeting the requirements of FAA Specification Item P-209 paragraph 3.5 and 3.9.

PART 2 – PRODUCTS

2.01 All materials and equipment required for this item shall be in accordance with FAA Specification Item P-209, paragraph 2.1.

PART 3 – EXECUTION

3.01 Construction methods shall be in accordance with FAA Specification Item P-209.

PART 4 – MEASUREMENT AND PAYMENT

4.01. BASIS OF MEASUREMENT AND PAYMENT

A. All work specified in this section shall not be measured or paid for separately but shall be considered incidental to Bid Items 02610.1.

PART 5 - ATTACHMENT

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

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

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
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 subbase material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557 The moisture content of the material during placing operations shall be within ±2 percentage points of the optimum moisture content as determined by ASTM 6938. 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 Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM 1557 The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or 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.

END OF ITEM P-209

END OF SECTION 02209

SECTION 02220 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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.

1.02 DESCRIPTION OF WORK

A. This section describes razing, removing, disposing of, walls, fences, structures, old pavements, abandoned pipelines or utilities, and other structures and obstructions designated for removal.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONSTRUCTION

Preserve and protect structures, fences, and utilities to remain or to be removed by others.

A. Removal of Wind Cone Structures. Remove existing structures related to wind cones inside project limits unless otherwise indicated in the contract documents:

1. Wind cones, wind cone foundations, wind cone electrical equipment, concrete encased electrical conduit and wiring, and other related structures.

2. Removal of the existing wind cones must not occur until the new wind cones are operational. There must always be an operational wind cone at each runway end.

3. Backfill trenches, basements, cavities, depressions and pits left by the removal of obstruction to level of surrounding ground in accordance with Section 02300 – Excavation, Subgrade, and Embankment.

4. Coordinate with ITO Maintenance to turn over any reusable wind cone parts. Any unwanted materials shall be disposed of by the Contractor at no additional cost.

B. Removal of Broken AC Pavement: Remove existing broken pavement near the Army National Guard Aviation Ramp and Runway 3-21 as indicated in the contract documents:

1. Leave adjacent areas with neat and finished appearance.

2. Grade and grass the area in accordance with the construction drawings and Specification Section 02901 – Seeding.

C. Removal of Segmented Circle: Remove the existing segmented circle around the Runway 8 end wind cone as indicated in the contract documents:

1. Leave adjacent areas with neat and finished appearance. Dispose of slashings, flammable material, and other debris within or adjacent to project limits. Do not burn material and debris.

2. Backfill trenches, basements, cavities, depressions and pits left by the removal of obstruction to level of surrounding ground in accordance with Section 02300 – Excavation, Subgrade, and Embankment.

D. Remove material and debris and dispose of at an authorized disposal site. Obtain written authorization from property owners and governmental authorities for disposal locations outside of project limits.

1. Leave adjacent areas with neat and finished appearance. Dispose of slashings, flammable material, and other debris within or adjacent to project limits. Do not burn material and debris.

2. Backfill trenches, basements, cavities, depressions and pits left by the removal of obstruction to level of surrounding ground in accordance with Section 02300 – Excavation, Subgrade, and Embankment.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. All work specified in this Section must not be measured or paid for separately but must be considered incidental to various bid items.

END OF SECTION 02220

SECTION 02300 – EXCAVATION, SUBGRADE, AND EMBANKMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Item P-152: Excavation, Subgrade, and Embankment, as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

A. 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.

B. The project work area has been identified to contain contaminated soil, See Specification Section 01562 – Management of Contaminated Medias.

C. Handling and Disposal of contaminated soil shall be offsite and in accordance with Specification Section 01562 – Management of Contaminated Medias.

1.03 SUBMITTALS

A. Submit in accordance with Specification Section 01300 – Submittals.

B. Survey notes of the elevations and measurements of the ground surface shall be submitted in accordance with FAA Specification Item P-152; paragraph 152-2.2.

C. Daily compaction and density test results, on a lot basis, shall be submitted to the RPR for acceptance in accordance with FAA Specification Item P-152; paragraph 152-2.8.

D. Final smoothness and grade check results shall be submitted in accordance with FAA Specification Item P-152, paragraph 152-2.13.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. Execution must be in accordance with FAA Specification Item P-152.

B. Handling and disposal of contaminated soil must be in accordance with Specification Section 01562 – Management of Contaminated Medias and the project specific C-EHMP.

PART 4 – MEASUREMENT AND PAYMENT

4.01. METHOD OF MEASUREMENT

A. Measurement for payment specified by the cubic yard shall be computed by the comparison of digital terrain model (DTM) surfaces for computation of neat line design quantities. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the RPR.

B. The quantity of "Unclassified Excavation and Embankment, Off Airport Property" to be paid for shall be the number of cubic yards measured in its final position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

4.02. BASIS OF PAYMENT

A. "Unclassified Excavation and Embankment, Off Airport Property" payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

B. Payment for proper handling and disposal of contaminated materials and for all materials, labor, equipment, tools, and incidentals necessary in accordance with the project specific C-EHMP shall not be paid for separately but shall be considered incidental to Bid Item 02300.1 – Unclassified Excavation and Embankment, Off Airport Property.

Payment will be made under:

Item No.	**Item**	**Unit**
02300.1	Unclassified Excavation and Embankment, Off Airport Property	Cubic Yard (C.Y.)

PART 5 – ATTACHMENTS

5.01. FAA Specification Item P-152 Excavation, Subgrade, and Embankment

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

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 and Embankment, Off Airport Property. Shall consist of the excavation and embankment of all material, regardless of its nature. Disposal of all material shall be off airport property.

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 within stockpile/wasting areas as shown on the plans, or as directed by the RPR. All areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of stockpile/waste areas shall be as 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 will be issued to the successful bidder.

Existing grades shown on the design plans 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, the 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. The Contractor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the DTM's. Contractor's verification of original ground surface, however shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Contractor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 foot of the stated elevations for ground surfaces, or within 0.04 foot for hard surfaces (pavements, buildings, foundations, structures. Etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Contractor's verification identifies discrepancies in the topographic map, the 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 are 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 off the airport. The cost is incidental to this item. 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 are not required.

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. Not used

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

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

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

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

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

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

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

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

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

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

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

The RPR will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with D 698. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the RPR 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 D 698. Under all areas to be paved, the embankments shall be compacted to a depth of 24 inches and to a density of not less than 95% percent of the maximum density as determined by ASTM D698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches which shall be prepared for a seedbed in accordance with Specification Section 02901 – Seeding.

The in-place field density shall be determined in accordance with ASTM D1556. 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. Before start of embankment, and **a**fter compaction is completed, the subgrade area shall be proof rolled with a 20 ton Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 80/100/150 psi in the presence of the RPR. Apply a minimum of 2 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 of 12 inches and to a density of not less than 100 percent of the maximum dry density as determined by ASTM D1557. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557.

The material to be compacted shall be within ±2% of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the ¾ inch (19.0 mm) sieve, follow the methods in ASTM D1557. Tests for moisture content and compaction will be taken at a minimum of 3,000 S.Y. of subgrade. All quality assurance testing shall be done by the Contractor's laboratory in the presence of the RPR, and density test results shall be furnished upon completion to the RPR for acceptance determination.

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

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

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

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

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

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

152-2.12 Haul. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay 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.

In areas specified to contain contaminated soil, topsoil shall not be salvaged and stockpiled, but must be handled and disposed of in accordance with Specification Section 01562 – Management of Contaminated Medias.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Specification Section 02905 – Topsoil (Item T-905). Topsoil shall be paid for as provided in Specification Section 02905. No direct payment will be made for topsoil under Specification Section 02300 – Excavation, Subgrade, and Embankment.

END OF ITEM P-152

END OF SECTION 02300

SECTION 02401 – ASPHALT MIX PAVEMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Item P-401: Asphalt Mix Pavement, as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

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

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Job mix formula (JMF) laboratory's current accreditation and accredited test methods shall be submitted in accordance with the requirements of FAA Specification Item P-401, paragraph 401-3.2.

C. JMF mixture shall be submitted in accordance with the requirements of FAA Specification Item P-401, paragraph 401-3.3.

D. Coatings for truck beds to prevent asphalt from sticking to the truck beds shall be submitted in accordance with the requirements of FAA Specification Item P-401-4.4.

E. A laydown plan shall be submitted in accordance with the requirements of FAA Specification Item P-401, paragraph 401-4.12.

F. A lighting plan shall be submitted in accordance with the requirements of FAA Specification Item P-401, paragraph 401-4.17.

PART 2 – PRODUCTS

2.01. Aggregates: in accordance with FAA Specification Item P-401, paragraph 2.1.

2.02. Mineral Filler: in accordance with FAA Specification Item P-401, paragraph 2.2.

2.03. Asphalt Binder: in accordance with FAA Specification Item P-401, paragraph 2.3.

2.04. Anti-Stripping Agent: in accordance with FAA Specification Item P-401, paragraph 2.4.

2.05. Composition of mixtures, job mix formula (JMF) laboratory, JMF, and control strip shall be in accordance with FAA Specification Item P-401.

PART 3 – EXECUTION

3.01. Construction Methods shall be in accordance with FAA Specification Item P-401.

3.02. The Contractor Quality Control shall be in accordance with FAA Specification Item P-401.

3.03. Material Acceptance shall be in accordance with FAA Specification Item P-401.

PART 4 – MEASUREMENT AND PAYMENT

4.01. METHOD OF MEASUREMENT

A. Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 4.02.A for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitations that:

1. The total project payment for plant mix asphalt pavement shall not exceed 100 percent of the product of the contract unit price and the total number of tons of asphalt used in the accepted work.

2. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

4.02. BASIS OF PAYMENT

A. The pay factor for each individual lot shall be calculated in accordance with Table 1. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 4.01.A. Payment in excess of 100% for accepted lots of asphalt shall be used to

offset payment for accepted lots of asphalt pavement that achieve a lot pay factor less than 100%.
Payment for sublots which do not meet grade in accordance with paragraph 401-6.2d after correction for over 25% of the sublot shall be reduced by 5%.

Table 1 – Price Adjustment Schedule

Percentage of Material Within Specification Limits (PWL)	Lot Pay Factor (percent of contract unit price)
96-100	106
90-95	PWL + 10
75-89	0.5 PWL + 55
55-74	1.4 PWL – 12
Below 55	Reject[2]

[1] Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401.A.

[2] The lot shall be removed and replaced. However, the RPR may decide to allow the rejected lot to remain. In that case, if the RPR and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

Payment will be made under:

Item No.	**Item**	**Unit**
02401.1	Asphalt Mix Pavement Surface Course	Ton

PART 5 – ATTACHMENTS

5.01. FAA Specification Item P-401 Asphalt Mix Pavement

REFERENCES

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

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Asphalt Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Asphalt Paving Mixtures
ASTM D1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor.
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E950	Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference

ASTM E2133	Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
AASHTO T324	Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures
AASHTO T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

Asphalt Institute (AI)

Asphalt Institute Handbook MS-26, Asphalt Binder

Asphalt Institute MS-2Mix Design Manual, 7th Edition

AI State Binder Specification Database

Federal Highway Administration (FHWA)

Long Term Pavement Performance Binder Program

Advisory Circulars (AC)

AC 150/5320-6	Airport Pavement Design and Evaluation

FAA Orders

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

Software

FAARFIELD

Item P-401 Asphalt Mix Pavement

DESCRIPTION

401-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

MATERIALS

401-2.1 Aggregate. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (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.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds (27200 kg) or more: Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face[1]	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 [2]	ASTM D4791

[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 fine aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	15% maximum by weight of total aggregate	ASTM D1073

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate.

401-2.2 Mineral filler. Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

Mineral Filler Requirements

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

401-2.3 Asphalt binder. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 76-22.

Asphalt Binder PG Plus Test Requirements

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084[1]

[1] Follow procedure B on RTFO aged binder.

401-2.4 Anti-stripping agent. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

COMPOSITION

401-3.1 Composition of mixture(s). The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 Job mix formula (JMF) laboratory. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Resident Project Representative (RPR) prior to start of construction.

401-3.3 Job mix formula (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the RPR for review and accepted in writing. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

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

The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition**.** Samples shall be prepared and compacted using the gyratory compactor in accordance with ASTM D6925.

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

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

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

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

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 401-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 401-2.4.
- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 401-2.1.
- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the JMF.
- Specific Gravity and absorption of each coarse and fine aggregate.
- Percent natural sand.
- Percent fractured faces.
- Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- Percent of asphalt.
- Number of blows or gyrations
- Laboratory mixing and compaction temperatures.
- Supplier-recommended field mixing and compaction temperatures.

- Plot of the combined gradation on a 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.

Table 1. Asphalt Design Criteria

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

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

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

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

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

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing 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
Minimum Voids in Mineral Aggregate (VMA)[1]	15.0
Asphalt Percent:	
Stone or gravel	5.0-7.5
Recommended Minimum Construction Lift Thickness	2 inches

[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.

401-3.4 Reclaimed asphalt pavement (RAP). RAP shall not be used.

401-3.5 Control Strip. Not Required

CONSTRUCTION METHODS

401-4.1 Weather limitations. The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the RPR, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum)	
	°F	°C
3 inches (7.5 cm) or greater	40 [1]	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

401-4.2 Asphalt plant. Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items.

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

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

401-4.3 Aggregate stockpile management. Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

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

401-4.4 Hauling equipment. Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the RPR. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

401-4.4.1 Material transfer vehicle (MTV). Material transfer vehicles are not required.

401-4.5 Asphalt pavers. Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

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

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.12.

401-4.6 Rollers. The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating

at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

401-4.7 Density device. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the RPR upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

401-4.8 Preparation of asphalt binder. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

401-4.9 Preparation of mineral aggregate. The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

401-4.10 Preparation of Asphalt mixture. The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

401-4.11 Application of Prime and Tack Coat. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

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

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

401-4.12 Laydown plan, transporting, placing, and finishing. Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the RPR.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature.

The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

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

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

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

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot (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 long.

401-4.13 Compaction of asphalt mixture. After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

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

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

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to

the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

401-4.14 Joints. The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

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

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C**)**; or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

401-4.15 Saw-cut grooving. Saw-cut grooving is not required.

401-4.16 Diamond grinding. Diamond grinding is not required.

401-4.17 Nighttime paving requirements. The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the RPR prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

CONTRACTOR QUALITY CONTROL (CQC)

401-5.1 General. The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

401-5.2 Contractor quality control (QC) facilities. The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

401-5.3 Contractor QC testing. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

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

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

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

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

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

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

g. Smoothness for Contractor Quality Control.

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

The Contractor may use a 12-foot "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 either the FAA profile program, ProFAA, or FHWA ProVal, using the 12-foot straightedge simulation function.

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

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

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-

608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

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

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet (30 mm) laterally. The documentation will be provided by the Contractor to the RPR 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 401-4.16.

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

401-5.4 Sampling. When directed by the RPR, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

401-5.5 Control charts. The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

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

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

Control Chart Limits for Individual Measurements

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

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

Control Chart Limits Based on Range

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

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

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

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

401-5.6 QC reports. The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with Item C-100.

MATERIAL ACCEPTANCE

401-6.1 Acceptance sampling and testing. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be

performed by the RPR at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

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

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

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

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

(1) Sampling. Material from each sublot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes to maintain the material at or above the compaction temperature as specified in the JMF.

(2) Testing. Air voids will be determined for each sublot in accordance with ASTM D3203 for a set of compacted specimens prepared in accordance with ASTM D6925.

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

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

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

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

(4) Mat density. One core shall be taken from each sublot. Core locations will be determined by the RPR in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each sublot sample by the TMD for that sublot.

(5) Joint density. One core centered over the longitudinal joint shall be taken for each sublot that has a longitudinal joint. Core locations will be determined by the RPR in accordance with ASTM D3665.

The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

401-6.2 Acceptance criteria.

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

b. Air Voids and Mat density. Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 4.02.A.

c. Joint density. Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 4.02.A.

d. Grade. The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch vertically.

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 pavement.

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

e. Profilograph roughness for QA Acceptance. Not used.

401-6.3 Percentage of material within specification limits (PWL). The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

Table 5. Acceptance Limits for Air Voids and Density

Test Property	Pavements Specification Tolerance Limits	
	L	**U**
Air Voids Total Mix (%)	2.0	5.0
Surface Course Mat Density (%)	92.8	-
Base Course Mat Density (%)	92.0	-
Joint density (%)	90.5	--

a. Outliers. All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on

production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.30; Base Course Mat Density (%), 1.55; Joint Density (%), 1.55.

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface course with an average mat density of at least 94.5% with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 94.0% with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 92.5% with 1.55% or less variability.

401-6.4 Resampling pavement for mat density.

a. General. Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the RPR. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-6.2b. Only one resampling per lot will be permitted.

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

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

b. Payment for resampled lots. The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%.

END OF ITEM P-401

END OF SECTION 02401

SECTION 02602 – EMULSIFIED ASPHALT PRIME COAT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section shall be in accordance with FAA Specification Item P-602: Emulsified Asphalt Prime Coat, as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

A. This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Manufacturer's Certificate of Analysis for the emulsified asphalt material shall be submitted in accordance with FAA Specification Item P-602, paragraph 2.1.

C. Asphalt Distributor Calibration Certificate shall be submitted in accordance with FAA Specification Item P-602, paragraph 3.3.

D. Asphalt material and application rate shall be submitted in accordance with FAA Specification Item P-602, paragraph 3.3.

E. Waybills and delivery tickets shall be submitted in accordance with FAA Specification Item P-602, paragraph 3.3.

PART 2 – PRODUCTS

2.01 Emulsified asphalt material: in accordance with FAA Specification Item P-602, paragraph 2.1.

PART 3 – EXECUTION

3.01 Construction methods shall be in accordance with FAA Specification Item P-602.

PART 4 – MEASUREMENT AND PAYMENT

4.01. METHOD OF MEASUREMENT

A. Emulsified asphalt material for prime coat shall be measured by the gallon. Volume shall be corrected to the volume at 60°F in accordance

with ASTM D4311. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

4.02. BASIS OF PAYMENT

A. Emulsified Asphalt Prime Coat shall be paid at the contract unit price per gallon. The price shall be full compensation for furnishing all materials and for all preparation, delivering, and applying the material, and for all labor, equipment, tools and incidentals necessary to complete the item.

Payment will be made under:

Item No.	**Item**	**Unit**
02602.1	Emulsified Asphalt Prime Coat	Gallon

PART 5 - ATTACHMENT

5.01 FAA Specification Item P-602 Emulsified Asphalt Prime Coat.

REFERENCES

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

ASTM International (ASTM)

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

Item P-602 Emulsified Asphalt Prime Coat

DESCRIPTION

602-1.1 This item shall consist of an application of emulsified asphalt material on the prepared base course in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

602-2.1 Emulsified Asphalt material. The emulsified asphalt material shall be as specified in ASTM D3628 for use as a prime coat appropriate to local conditions. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt material. The COA shall be provided to and approved by the Resident Project Representative (RPR) before the emulsified asphalt material is applied. The furnishing of the COA for the emulsified asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

CONSTRUCTION METHODS

602-3.1 Weather limitations. The emulsified asphalt prime coat shall be applied only when the existing surface is dry; the atmospheric temperature is 50°F (10°C) or above, and the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

602-3.2 Equipment. The equipment shall include a self-powered pressure asphalt material distributor and equipment for heating asphalt material.

Provide a distributor with pneumatic tires of such size and number that the load produced on the base surface does not exceed 65.0 psi (4.5 kg/sq cm) of tire width to prevent rutting, shoving or otherwise damaging the base, surface or other layers in the pavement structure. Design and equip the distributor to spray the asphalt material in a uniform coverage at the specified temperature, at readily determined and controlled rates from 0.05 to 1.0 gallons per square yard (0.23 to 4.5 L/square meter), with a pressure range of 25 to 75 psi (172.4 to 517.1 kPa) and with an allowable variation from the specified rate of not more than ±5%, and at variable widths. Include with the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying asphalt material manually to areas inaccessible to the distributor. Equip the distributor to circulate and agitate the asphalt material during the heating process. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

A power broom and power blower suitable for cleaning the surfaces to which the asphalt coat is to be applied shall be provided.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

602-3.3 Application of emulsified asphalt material. Immediately before applying the prime coat, the full width of the surface to be primed shall be swept with a power broom to remove all loose dirt and other objectionable material.

The asphalt emulsion material shall be uniformly applied with an asphalt distributor at the rate of 0.15 to 0.30 gallons per square yard (0.68 to 1.36 liters per square meter) depending on the base course surface texture. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Following application of the emulsified asphalt material and prior to application of the succeeding layer of pavement, allow the asphalt coat to cure and to obtain evaporation of any volatiles or moisture. Maintain the coated surface until the succeeding layer of pavement is placed, by protecting the surface against damage and by repairing and recoating deficient areas. Allow the prime coat to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course. Furnish and spread sand to effectively blot up and cure excess asphalt material. The Contractor shall remove blotting sand prior to asphalt concrete lay down operations at no additional expense to the Owner. Keep traffic off surfaces freshly treated with asphalt material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

602-3.4 Trial application rates. The Contractor shall apply a minimum of three lengths of at least 100 feet (30 m) for the full width of the distributor bar to evaluate the amount of emulsified asphalt material that can be satisfactorily applied with the equipment. Apply three different application rates of emulsified asphalt materials within the application range specified in paragraph 602-3.3. Other trial applications can be made using various amounts of material as directed by the RPR. The trial application is to demonstrate the equipment can uniformly apply the emulsified asphalt material within the rates specified and determine the application rate for the project.

602-3.5 Freight and waybills. The Contractor shall submit waybills and delivery tickets during the progress of the work. Before the final estimate is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

END OF ITEM P-602

END OF SECTION 02602

SECTION 02603 – EMULSIFIED ASPHALT TACK COAT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section shall be in accordance with FAA Specification Item P-603: Emulsified Asphalt Tack Coat, as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

A. This item shall consist of the preparation of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Manufacturer's Certificate of Analysis for the emulsified asphalt material shall be submitted in accordance with FAA Specification Item P-603, paragraph 2.1

C. Asphalt Distributor Calibration Certificate shall be submitted in accordance with FAA Specification Item P-603, paragraph 3.2.

D. Asphalt material and application rate shall be submitted in accordance with FAA Specification Item P-603, paragraph 3.3.

E. Waybills and delivery tickets shall be submitted in accordance with FAA Specification Item P-603, paragraph 3.4.

PART 2 – PRODUCTS

2.01 All materials and equipment required for this item shall be in accordance with FAA Specification Item P-603, paragraph 2.1.

PART 3 – EXECUTION

3.01 Construction methods shall be in accordance with FAA Specification Item P-603.

PART 4 – MEASUREMENT AND PAYMENT

4.01. METHOD OF MEASUREMENT

A. The emulsified asphalt material for tack coat shall be measured by the

gallon. The emulsified asphalt material paid for will be measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

4.02. BASIS OF PAYMENT

A. Emulsified Asphalt Tack Coat shall be paid at the contract unit price per gallon. This shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the items.

Payment will be made under:

Item No.	**Item**	**Unit**
02603.1	Emulsified Asphalt Tack Coat	Gallon

PART 5 - ATTACHMENT

5.01 FAA Specification Item P-603 Emulsified Asphalt Tack Coat

REFERENCES

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

ASTM International (ASTM)

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

Item P-603 Emulsified Asphalt Tack Coat

DESCRIPTION

603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

603-2.1 Asphalt materials. The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Resident Project Representative (RPR) before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

CONSTRUCTION METHODS

603-3.1 Weather limitations. The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

603-3.2 Equipment. The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot (3.7-m) spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

603-3.3 Application of emulsified asphalt material. The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Emulsified Asphalt

Surface Type	Residual Rate, gal/SY (L/square meter)	Emulsion Application Bar Rate, gal/SY (L/square meter)
New asphalt	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
Existing asphalt	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
Milled Surface	0.04-0.08 (0.18-0.36)	.0.06-0.12 (0.27-0.54)
Concrete	0.03-0.05 (0.13-0.23)	0.05-0.08 (0.23-0.36)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the RPR. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

603-3.4 Freight and waybills The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

END ITEM P-603

END OF SECTION 02603

SECTION 02608 – EMULSIFIED ASPHALT SEAL COAT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. Section must be in accordance with FAA Specification Item P-608: Emulsified Asphalt Seal Coat, as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

A. This item shall consist of application of an emulsified asphalt surface treatment for taxilanes and apron surface areas as designated on the plans.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Certification showing particle size analysis and properties shall be submitted in accordance with the requirements of FAA Specification Section Item P-608, paragraph 608-2.1.

C. Manufacturer's Certificate of Analysis for the emulsified asphalt delivered to the project shall be submitted in accordance with the requirements of FAA Specification Section Item P-608, paragraph 608-2.2.

D. Manufacturer's Supplemental Certificate of Analysis from an independent laboratory verifying the asphalt emulsion properties shall be submitted in accordance with the requirements of FAA Specification Section Item P-608, paragraph 608-2.2.

E. List of airport pavement projects, exposed to similar climate conditions, where the product has been successfully applied within at least 5 years shall be submitted in accordance with the requirements of FAA Specification Section Item P-608, paragraph 608-2.2.

F. Manufacturer's Certificate of Analysis for polymer used in the seal coat shall be submitted in accordance with the requirements of FAA Specification Section Item P-608, paragraph 608-2.4.

G. Verification of truck setup shall be submitted in accordance with the requirements of FAA Specification Section Item P-608, paragraph 608-4.3.

H. Documentation that the seal coat contractor is qualified to apply the seal coat shall be submitted in accordance with the requirements of FAA Specification Section Item P-608, paragraph 608-5.2.

PART 2 – PRODUCTS

2.01. Asphalt Emulsion: in accordance with FAA Specification Item P-608, paragraph 608-2.2.

2.02. Water: in accordance with FAA Specification Item P-608, paragraph 608-2.3.

2.03. Polymer: in accordance with FAA Specification Item P-608, paragraph 608-2.4.

PART 3 – EXECUTION

3.01. Application Rate shall be in accordance with FAA Specification Item P-608, paragraph 608-3.1.

3.02. Construction Methods shall be in accordance with FAA Specification Item P-608.

3.03. Quality Control shall be in accordance with FAA Specification Item P-608.

3.04. Acceptance shall be in accordance with FAA Specification Item P-608.

PART 4 – MEASUREMENT AND PAYMENT

4.01. METHOD OF MEASUREMENT AND PAYMENT

A. All work specified in this section shall not be measured or paid for separately but shall be considered incidental to Bid Item 02620.1.

PART 5 – ATTACHMENTS

5.01. FAA Specification Item P-608 Emulsified Asphalt Seal Coat

REFERENCES

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

ASTM International (ASTM)

ASTM C117	Standard Test Method for Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D5	Standard Test Method for Penetration of Asphalt Materials

ASTM D244	Standard Test Methods and Practices for Emulsified Asphalts
ASTM D2007	Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
ASTM D2042	Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
ASTM D2995	Standard Practice for Estimating Application Rate of Bituminous Distributors
ASTM D4402	Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces
AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements

Item P-608 Emulsified Asphalt Seal Coat

DESCRIPTION

608-1.1 This item shall consist of the application of an emulsified asphalt surface treatment composed of an emulsion of natural and refined asphalt materials, water and a polymer additive, for taxiways and runways with the application of a suitable aggregate to maintain adequate surface friction; and airfield secondary and tertiary pavements including low-speed taxiways, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied as designated on the plans. The terms seal coat, asphalt sealer, and asphalt material are interchangeable throughout this specification. The term emulsified asphalt means an emulsion of natural and refined asphalt materials.

MATERIALS

608-2.1 Aggregate. Not Used

608-2.2 Asphalt Emulsion. The asphalt emulsion shall meet the properties in the following table:

Concentrated Asphalt Emulsion Properties

Properties	Specification	Limits
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	20 – 100 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	57% minimum
Sieve Test	ASTM D6933	0.1% maximum
24-hour Stability	ASTM D6930	1% maximum
5-day Settlement Test	ASTM D6930	5.0% maximum
Particle Charge [1]	ASTM D7402	Positive 6.5 maximum pH

[1] pH may be used in lieu of the particle charge test which is sometimes inconclusive in slow setting, asphalt emulsions.

The asphalt material base residue shall contain not less than 20% gilsonite, or uintaite and shall not contain any tall oil pitch or coal tar material and shall contain no less than one percent (1%) polymer.

Tests on Residue from Distillation or Evaporation

Properties	Specification	Limits
Viscosity at 275°F (135°C)	ASTM D4402	1750 cts maximum
Solubility in 1, 1, 1 trichloroethylene	ASTM D2042	97.5% minimum
Penetration	ASTM D5	50 dmm maximum
Asphaltenes	ASTM D2007	15% minimum
Saturates	ASTM D2007	15% maximum
Polar Compounds	ASTM D2007	25% minimum
Aromatics	ASTM D2007	15% minimum

The asphalt emulsion, when diluted in the volumetric proportion of one part concentrated asphalt material to one part hot water shall have the following properties:

One-to-One Dilution Emulsion Properties

Properties	Specification	Limits
In Ready-to-Apply Form, one part concentrate to one part water, by volume		
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	5 – 50 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	28.5% minimum
Pumping Stability [1]		Pass

[1] Pumping stability is tested by pumping one pint (475 ml) of seal coat diluted one (1) part concentrate to one (1) part water, at 77°F (25°C), through a 1/4-inch (6 mm) gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt delivered to the project. If the asphalt emulsion is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt emulsion properties.

The COA shall be provided to and approved by the RPR before the emulsified asphalt is applied. The furnishing of the vendor's certified test report for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

The asphalt material storage and handling temperature shall be between 50°F - 160°F (10°C - 70°C) and the material shall be protected from freezing, or whenever outside temperature drops below 40°F (4°C) for prolonged time periods.

Contractor shall provide a list of airport pavement projects, exposed to similar climate conditions, where this product has been successfully applied within at least 5 years of the project.

608-2.3 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use. Water used in making and diluting the emulsion shall be potable, with a maximum hardness of 90ppm calcium and 15ppm magnesium; deleterious iron, sulfates, and phosphates maximum 7ppm, and less than 1ppm of organic byproducts. Water shall be a minimum of 140°F (60°C) prior to adding to emulsion.

608-2.4 Polymer. The polymer shall meet the properties in the following table:

Polymer Properties

Properties	Limits
Solids Content	47% to 65%, Percent by Weight
Weight	8.0 to 9.0 pounds/gallon (1.07 to 1.17 kg/L)
pH	3.0 to 8.0
Particle Charge	Nonionic/Cationic
Mechanical Stability	Excellent
Film Forming Temperature, °C	+5°C, minimum
Tg, °C	22°C, maximum

The manufacturer shall provide a copy of the Certificate of Analysis (COA) for the polymer used in the seal coat; and the Contractor shall include the COA with the emulsified asphalt COA when submitting to the RPR.

608-2.5 Seal Coat with Aggregate. Not Used

COMPOSITION AND APPLICATION RATE

608-3.1 Application Rate. The approximate amounts of materials per square yard (square meter) for the asphalt surface treatment shall be as provided in the table for the treatment area(s) at the specified dilution rate(s) as noted on the plans. The actual application rates will vary within the range specified to suit field conditions and will be recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation.

Application Rate

Dilution Rate	Quantity of Emulsion gal/yd^2 (l/m^2)	Quantity of Aggregate lb/yd^2 (kg/m^2)
1:1	0.10-0.17 (0.45-0.77)	0.20-0.50 (0.11-0.27)

608-3.2 Control areas and control strips. Prior to full application, the control strip must be accepted by the RPR. The surface preparation, personnel, equipment, and method of operation used on the test area(s) and control strip(s) shall be the same as used on the remainder of the work.

A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips to determine the appropriate application rate of both emulsion and aggregate to be approved by the RPR.

A test area(s) and control strip(s) shall be applied for each differing asphalt pavement surface identified in the project. The test area(s) and control strip(s) shall be used to determine the material application rate(s) of both emulsion and sand prior to full production.

a. For taxiway, taxilane and apron surfaces. Prior to full application, the Contractor shall place test areas at varying application rates as recommended by the Contractor's manufacturer's representative

to determine appropriate application rate(s). The test areas will be located on representative section(s) of the pavement to receive the asphalt surface treatment designated by the RPR.

b. For runway and high-speed exit taxiway surfaces. Not Used

CONSTRUCTION METHODS

608-4.1 Worker safety. The Contractor shall obtain a Safety Data Sheet (SDS) for both the asphalt emulsion product and sand and require workmen to follow the manufacturer's recommended safety precautions.

608-4.2 Weather limitations. The asphalt emulsion shall be applied only when the existing pavement surface is dry and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. No material shall be applied in strong winds that interfere with the uniform application of the material(s), or when dust or sand is blowing or when rain is anticipated within eight (8) hours of application completion. The atmospheric temperature and the pavement surface temperature shall both be at, or above 60°F (16°C) and rising. Seal coat shall not be applied when pavement temperatures are expected to exceed 130ºF within the subsequent 72 hours if traffic will be opened on pavement within those 72 hours. During application, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the emulsion. Should emulsion get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the RPR, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Owner.

608-4.3 Equipment and tools. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

a. Pressure distributor. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven hundred (700) feet per minute (213 m per minute). The equipment will be tested under pressure for leaks and to ensure proper set-up before use. The Contractor will provide verification of truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application per nozzle manufacturer, spray-bar height and pressure and pump speed appropriate for the viscosity and temperature of sealer material, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a 12-foot (3.7-m), minimum, spray bar with individual nozzle control. The distributor truck shall be capable of specific application rates in the range of 0.05 to 0.25 gallons per square yard (0.15 to 0.80 liters per square meter). These rates shall be computer-controlled rather than mechanical. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy.

The distributor truck shall effectively heat and mix the material to the required temperature prior to application in accordance with the manufacturer's recommendations.

The distributor shall be equipped with a hand sprayer to spray the emulsion in areas not accessible to the distributor truck.

b. Aggregate spreader. Not Used

c. Power broom/blower. A power broom and/or blower shall be provided for removing loose material from the surface to be treated.

d. Equipment calibration. Asphalt distributors must be calibrated within the same construction season in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

608-4.4 Preparation of asphalt pavement surfaces. Clean pavement surface immediately prior to placing the seal coat so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease from the asphalt pavement by scrubbing with a detergent, washing thoroughly with clean water, and then treat these areas with a spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

608-4.5 Emulsion mixing. The application emulsion shall be obtained by blending asphalt material concentrate, water and polymer, if specified. Always add heated water to the asphalt material concentrate, never add asphalt material concentrate to heated water. Mix one part heated water to one part asphalt material concentrate, by volume.

Add 1% polymer, by volume, to the emulsion mix. If the polymer is added to the emulsion mix at the plant, submit weight scale tickets to the RPR. As an option, the polymer may be added to the emulsion mix at the job site provided the polymer is added slowly while the asphalt distributor truck circulating pump is running. The mix must be agitated for a minimum of 15 minutes or until the polymer is mixed to the satisfaction of the RPR.

608-4.6 Application of asphalt emulsion. The asphalt emulsion shall be applied using a pressure distributor upon the properly prepared, clean and dry surface at the application rate recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation for each designated treatment area. The asphalt emulsion should be applied at a temperature between 130°F (54°C) and 160°F (70°C) or in accordance with the manufacturer's recommendation.

If low spots and depressions greater than 1/2 inch (12 mm) in depth in the pavement surface cause ponding or puddling of the applied materials, the pavement surface shall be lightly broomed with a broom or brush type squeegee until the pavement surface is free of any pools of excess material.

During all applications, the surfaces of adjacent structures shall be protected to prevent their being spattered or marred.

608-4.7 Application of aggregate material. Not Used

QUALITY CONTROL (QC)

608-5.1 Manufacturer's representation. The manufacturer's representative knowledgable of the material, procedures, and equipment described in the specification is responsible to assist the Contractor and RPR in determining the appropriate application rates of the emulsion and aggregate, as well as recommendations for proper preparation and start-up of seal coat application. Documentation of the manufacturer representative's experience and knowledge for applying the seal coat product shall be furnished to the RPR a minimum of 10 work days prior to placement of the control strips. The cost of the manufacturer's representative shall be included in the Contractor's bid price.

608-5.2 Contractor qualifications. The Contractor shall provide documentation to the RPR that the seal coat Contractor is qualified to apply the seal coat, including personnel, and equipment, and has made at least three (3) applications similar to this project in the past two (2) years.

MATERIAL ACCEPTANCE

608-6.1 Application rate. The rate of application of the asphalt emulsion shall be verified at least twice per day.

608-6.2 Friction tests. Not Used

END OF ITEM P-608

SECTION 02610 – DRY WELLS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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.

1.02 DESCRIPTION OF WORK

A. This item covers installation of dry wells in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

B. Injection wells shall consist of precast concrete rings connected together by special precast concrete locking blocks, backfilled with filler material all around. Injection well covers shall consist of cast-in-place concrete cover with steel frame and grating.

C. Injection wells will be deeper than diameter of rings. A UIC permit is required. Comply with the requirements of the associated UIC permit.

1.03 REFERENCES

A. ASTM A 123 Zinc Coating (Hot-Dip) on Iron and Steel Hardware

B. ASTM C 478 – Standard Specification for Precast Reinforced Concrete Manhole Sections

C. ASTM C 150 Portland Cement

D. HAR Chapter 11-23 – Underground Injection Control

1.04 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Product Data: Furnish manufacturer’s product data for precast concrete rings and locking blocks.

C. Manufacturer’s Installation Instructions: Indicate special procedures and installation instructions for concrete ring units.

D. Shop Drawings: Submit shop drawings of storm drainage items showing dimensioned plans and elevations, large scale details, attachment devices, and other components.

PART 2 – PRODUCTS

2.01 CONCRETE COVER

A. Provide cast-in-place, reinforced concrete cover, as shown on the drawings.

B. Concrete work shall conform to Specification Section 03300 – Concrete for Miscellaneous Structures. Concrete shall have a compressive strength of a minimum 4,000 psi at 28 days.

2.02 CONCRETE RINGS

A. Fabricate precast concrete rings in accordance with ASTM C478.

B. Precast concrete ring units shall have a minimum inside diameter of 60 inches (5 ft.). Height of units shall be 48 inches (4 ft.) or per manufacturer's standard. Wall thickness shall be minimum 4.5 inches, or 1/12 diameter of ring unit, whichever is greater.

C. Units shall have 12 – 7.5 inch wide by 2.5 inch high drainage opens at 45 degrees per row.

D. Provide precast concrete locking blocks per manufacturer's standard.

2.03 GRATES

A. Provide dry well grate and rebar grating per the project drawings.

PART 3 – EXECUTION

3.01 SITE VERIFICATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of work means the Contractor accepts existing conditions.

3.02 INSTALLATION

A. Provide excavation and backfill in accordance with Specification Section 02300 – Excavation, Subgrade, and Embankment.

B. Existing AC pavement where dry wells are to be installed shall be prepared in accordance with Specification Section 02101 – Preparation/Removal of Existing Pavements.

C. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the Engineer. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other

than rock, special care shall be taken not to disturb the bottom of the excavation, and excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

D. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. Unless otherwise provided, bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry.

E. Install concrete rings and locking blocks in accordance with manufacturer's specifications.

F. Install concrete rings with drainage openings pitching downwards towards the exterior.

G. All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the Engineer, and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set. After the frames or fittings have been set in final position and the concrete or mortar has been allowed to harden for 7 days, then the grates or covers shall be placed and fastened down.

H. Dry wells installed around existing AC pavement shall have the surrounding AC pavement restored in accordance with Specification Section 02401 – Asphalt Mix Pavement.

I. Do not permanently cover dry well without approval of the Owner's Project Manager.

3.03 BACKFILLING

A. After a structure has been completed, the area around it shall be filled with approved material, in horizontal layers not to exceed 8 inches in loose depth, and compacted to the density required in Section 02300 – Excavation, Subgrade, and Embankment. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the Engineer.

B. Backfilling shall not be placed against any structure until permission is given by the Engineer. In the case of concrete, such permission shall not be given until the concrete has been in place 7 days, or until tests made by the laboratory under supervision of the Engineer establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

3.04 CLEANING AND RESTORATION OF SITE

A. At completion, pressure wash interior surfaces and remove dirt and debris.

B. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus soil may be deposited in embankments, shoulders, or as ordered by the Engineer. The Contractor shall restore all disturbed areas to their original condition.

C. After all work is completed, the Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

3.05 FIELD QUALITY CONTROL

A. Retain a Geotechnical Engineer and pay for the services to provide monitoring and testing services.

B. The Geotechnical Engineer shall observe the excavation of the injection wells and shall determine the actual depth, based on his observations and injection test results. Contractor shall be responsible to perform injection testing on each injection well under the observance of the Geotechnical Engineer.

C. The Geotechnical Engineer shall include observations, taking readings during testing, and preparation and submittal of documentation for injection well registration. All other work shall be included by the Contractor.

D. Presence of Geotechnical Engineer or acceptance of injection wells shall not relieve the Contractor of his responsibility to perform work in accordance with contract documents.

3.06 DRY WELL INFILTRATION CAPACITY TESTING

A. Testing and installation of storm drainage dry wells shall be in accordance with applicable State Department of Health Rules and Regulations for underground injection control.

B. The Contractor shall hire a Licensed and Experienced Geotechnical Engineer to provide the services as outlined in Paragraph 3.05. The Services of the Licensed Geotechnical Engineer shall be incidental to contract unit price of dry wells.

C. The services of the Licensed Geotechnical Engineer during the dry well construction and percolation tests include only: (1) Observation; (2) Taking readings during the testing; and (3) Preparation/Submittal of documentation for dry well registration. All costs associated with the installation and setup of the test shall be incidental to the contract unit price of dry wells.

The words “monitoring” or “observing” shall mean periodic observation of the work by the Licensed Geotechnical Engineer for compliance with plans, specifications, and design concepts.

The presence of the Licensed Geotechnical Engineer will be for the purpose of providing observation ensuring that the work conforms to the contract documents. The service does not include supervision or direction of the actual work of the Contractor, his employees or agents.

The Contractor shall also be informed that neither the presence of the Licensed Geotechnical Engineer nor the observation and testing shall excuse them in any way for defects discovered. The Licensed Geotechnical Engineer will not be responsible for job or site safety on this project. Job and site safety must be the sole responsibility of the Contractor.

D. Prior to the completion of each dry well, the Contractor must perform infiltration tests for each dry well as specified by the UIC permit, under the observation of the Licensed Geotechnical Engineer.

E. If the Geotechnical Engineer determines that the capacity is not sufficient, the Owner may direct additional drilling be performed. The cost for additional drilling shall be paid on a force account basis. The Contractor shall be responsible for informing and coordinating this work with the Licensed Geotechnical Engineer.

3.07 FINAL INSPECTION

A. At the time of final inspection of the work performed under the contract, the utilities covered by this section shall be complete in every respect and operating as designed. All surplus materials of every character resulting from the work of this section shall be removed. Dry wells shall be free from sand, silt, or other obstructions. Any defects discovered in the utilities subsequent to the inspection shall be corrected prior to the final acceptance.

PART 4 – MEASUREMENT AND PAYMENT

4.01. METHOD OF MEASUREMENT

A. All work specified under this section shall be measured for payment at the contract unit price, completed and accepted.

4.02. BASIS OF PAYMENT

A. Payment will be made at the contract unit price per each Dry Well, 20 feet deep. This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item No.	**Item**	**Unit**
02610.1	Dry Well, 20 Feet Deep	Each (E.A.)

END OF SECTION 02610

SECTION 02620 – RUNWAY AND TAXIWAY MARKINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section shall be in accordance with FAA Specification Item P-620: Runway and Taxiway Markings, as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

A. This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Manufacturer’s certified test reports for all materials shipped to the project shall be submitted in accordance with FAA Specification Item P-620, paragraph 2.1

C. Contractor certification of surface preparation shall be submitted in accordance with FAA Specification Item P-620, paragraph 3.3.

D. Copy of paint manufacturer’s application and surface preparation requirements shall be submitted in accordance with FAA Specification Item P-620, paragraph 3.3.

PART 2 – PRODUCTS

2.01 Paint shall be in accordance with FAA Specification Item P-620, paragraph 2.2.a.

2.02 Reflective media shall be in accordance with FAA Specification Item P-620, paragraph 2.2.b.

PART 3 – EXECUTION

3.01 Construction methods shall be in accordance with FAA Specification Item P-620.

PART 4 – MEASUREMENT AND PAYMENT

4.01. METHOD OF MEASUREMENT

A. Taxilane Markings – Remarking, shall be measured by the number of square feet of paint applied and accepted by the RPR. Surface preparation shall not be measured and shall be considered incidental to the application of pavement markings.

B. Vehicle Service Road Markings – New, shall be measured by the number of square feet of paint applied and accepted by the RPR. Surface preparation shall not be measured and shall be considered incidental to the application of pavement markings.

C. The quantity of reflective media (glass beads) shall not be measured for payment separately but shall be considered incidental to Bid Item 02620.1.

4.02. BASIS OF PAYMENT

A. Payment for Taxilane Markings - Remarking, shall be paid at the contract unit price for the number of square feet of paint applied and accepted by the RPR. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item in place and accepted by the RPR in accordance with these specifications.

B. Payment for Vehicle Service Road Markings – New, shall be paid at the contract unit price for the number of square feets of paint applied and accepted by the RPR. This price shall be full compensation for surface preparation, furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the items and accepted by the RPR in accordance with these specifications.

C. Payment for permanent markings associated with the Compass Calibration Pad shall not be paid for separately but shall be considered incidental to Bid Item 02820.1 – Compass Calibration Pad, In Place.

D. Payment for reflective media shall not be paid for separately but shall be considered incidental to Bid Item 02620.1 – Taxilane Markings – Remarking and Bid Item 02620.2 – Vehicle Service Road Markings – New.

Payment will be made under:

Item No.	**Item**	**Unit**
02620.1	Taxilane Markings - Remarking	Square Feet (S.F.)
02620.2	Vehicle Service Road Markings - New	Square Feet (S.F.)

PART 5 - ATTACHMENT

5.01 FAA Specification Item P-620 Runway and Taxiway Markings

REFERENCES

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

ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24	Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
29 CFR Part 1910.1200	Hazard Communication

Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D	Beads (Glass Spheres) Retro-Reflective
FED SPEC TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
FED STD 595	Colors used in Government Procurement

Commercial Item Description

A-A-2886B	Paint, Traffic, Solvent Based

Advisory Circulars (AC)

AC 150/5340-1	Standards for Airport Markings
AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

Item P-620 Runway and Taxiway Marking

DESCRIPTION

620-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms "paint" and "marking material" as well as "painting" and "application of markings" are interchangeable throughout this specification.

MATERIALS

620-2.1 Materials acceptance. The Contractor shall furnish manufacturer's certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer's surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

620-2.2 Marking materials.

Table 1. Marking Materials

Paint[1]				Glass Beads[2]	
Type	**Color**	**Fed Std. 595 Number**	**Application Rate Maximum**	**Type**	**Application Rate Minimum**
Waterborne Type III	Yellow	33538 or 33655	55 ft^2/gal	Type III	6 lb/gal
Waterborne Type III	White	37925	55 ft^2/gal	Type III	6 lb/gal
Waterborne Type III	Orange	32473	55 ft^2/gal	Type III	6 lb/gal

[1] See paragraph 620-2.2a

[2] See paragraph 620-2.2b

a. Paint. Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595. TT-P-85 or TT-P-110 shall not be used on bituminous pavement

Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F Type III. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

b. Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type III.

Glass beads for red and pink paint shall meet the requirements for Type I, Gradation A.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black and green paint.

Type III glass beads shall not be used in red and pink paint.

CONSTRUCTION METHODS

620-3.1 Weather limitations. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

620-3.2 Equipment. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 Preparation of surfaces. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminates that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

a. Preparation of new pavement surfaces. The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

b. Preparation of pavement to remove existing markings. Existing pavement markings shall be removed by rotary grinding, water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings.

c. Preparation of pavement markings prior to remarking. Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures

application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

620-3.4 Layout of markings. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

620-3.5 Application. A period of 30 days shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

Marking Dimensions and Spacing Tolerance

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

620-3.6 Application--preformed thermoplastic airport pavement markings.

Preformed thermoplastic pavement markings not used.

620-3.7 Control strip. Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 Retro-reflectance. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 reading shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

Minimum Retro-Reflectance Values

Material	Retro-reflectance mcd/m^2/lux		
	White	**Yellow**	**Red**
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than[1]	100	75	10

[1] 'Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

620-3.9 Protection and cleanup. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

END OF SECTION 02620

SECTION 02820 – COMPASS CALIBRATION PAD

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with the most up to date version of FAA Advisory Circular 150/5300-13, Airport Design.

1.02 DESCRIPTION OF WORK

A. The Contractor must furnish all labor, materials, tools, equipment, and appliances required to install a Compass Calibration Pad, complete, as indicated on the drawings and/or herein specified. The work shall include but not necessarily be limited to, the following:

1. Conduct a Preliminary Total Magnetic Field Survey

2. Conduct a Magnetic Declination Field Survey

3. Install Compass Calibration Pad

4. Conduct a final Magnetic Survey

1.03 SUBMITTALS

A. Shop Drawings: Submit complete shop drawings and manufacturer's literature for review by the Engineer before any work is ordered or fabricated.

B. Preliminary Magnetic Survey Written Report: Submit all results, equipment calibration information, and a drawing showing the declination survey results prior to construction of the compass calibration pad.

C. Magnetic Survey Written Report: Submit all results, equipment calibration information, and a drawing showing the declination survey results after the completion of the compass calibration pad.

PART 2 – PRODUCTS

A. Non-metallic, Type III orange and white paint. In accordance with Specification Section 02620 – Runway and Taxiway Marking.

B. Type IV reflective media. In accordance with Specification Section 02620 – Runway and Taxiway Marking.

PART 3 – EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

A. General:

1. The Compass Calibration Pad must be constructed in accordance with the details on the plans, specifications, and the latest edition of the FAA Advisory Circular 150/5300-13, Airport Design.

B. Magnetic Field Surveys:

1. Conduct a Preliminary Total Magnetic Field Survey and Magnetic Declination Field Survey in accordance with the latest edition of AC 150/5300-13 Appendix 6, A6-4.e.

C. Compass Calibration Pad:

1. Construct the Compass Calibration Pad in accordance with the plans and the latest edition of AC 150/5300-13 Appendix 6, A6-5.

2. Compass Calibration Pad markings must be in accordance with Specification Section 02620 – Runway and Taxiway Marking.

3. After all work related to the construction of the Compass Calibration Pad is complete, the pad must be magnetically resurveyed to show that magnetic materials were not introduced during construction and to establish the current magnetic headings.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. All work specified in this Section shall be paid for at the contract lump sum price as shown below. The contract price paid must be full compensation for all labor, materials, tools, equipment, and all other incidentals necessary to complete the work.

Payment will be made under:

Item No.	**Item**	**Unit**
02820.1	Compass Calibration Pad, In Place	Lump Sum (L.S.)

END OF SECTION 02820

SECTION 02901 - SEEDING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Item T-901: Seeding, as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

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

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Signed copies of a statement by the vendor certifying that each lot of seeds has been tested by a recognized laboratory for seed testing. Signed copies of the statement shall be submitted in accordance with FAA Specification Item T-901, paragraph 2.1.

PART 2 – PRODUCTS

2.01 Seed: In accordance with FAA Specification Item T-901, paragraph 2.1.

2.02 Fertilizer: In accordance with FAA Specification Item T-901, paragraph 2.3.

PART 3 – EXECUTION

3.01 Construction methods shall be in accordance with FAA Specification Item T-901.

3.02 Seeding shall be laid via hydro-mulching in accordance with FAA Specification Item T-901, paragraph 3.4.

3.03 The Contractor must notify USDA Airport Operations of hydro-mulching operations prior to the start of work. USDA have personnel on the airport that monitor and deter birds. The Contractor must conform to any USDA requests or requirements related to seeding and the deterring of birds.

3.04 Previous use of temporary black and white sprinkler heads on the airfield attracted Hawaiian Nene. If temporary sprinkler heads are used, they shall be colored fluorescent orange.

PART 4 – MEASUREMENT AND PAYMENT

4.01. METHOD OF MEASUREMENT

A. The quantity of seeding to be paid for shall be the number of acres measured on the ground surface, completed and accepted. Topsoil shall not be measured and shall be considered incidental to the applicable work of this section.

4.02 BASIS OF PAYMENT

A. Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material; for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item; and for an establishment period of not less than 90 days.

Partial payment will be made as follows:

60 percent of the contract bid price based upon the completion of seeding.

40 percent of the contract bid price for satisfactory performance during the plant establishment period. Payment shall be split into three (3) installments of 15, 15, and 10 percent throughout the maintenance period.

Payment will be made under:

Item No.	**Item**	**Unit**
02901.1	Hydro-Mulch Seeding	Acre (A.C.)

PART 5 – ATTACHMENTS

5.01. FAA Specification Item T-901 Seeding

REFERENCES

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

ASTM International (ASTM)

ASTM C602 Standard Specification for Agricultural Liming Materials

Federal Specifications (FED SPEC)

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

Advisory Circulars (AC)

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

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

Item T-901 Seeding

DESCRIPTION

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

MATERIALS

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

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

Seeds shall be applied as follows:

Seed Properties and Rate of Application

Seed	Minimum Seed Purity (Percent)	Minimum Germination (Percent)	Rate of Application lb/acre (or lb/1,000 S.F.)
Bermuda (Cynodon Dactylon)	95	85	100 lb/acre

Seeding shall be performed during the hours listed in the Construction Safety and Phasing plan inclusive, unless otherwise approved by the RPR.

901-2.2 Lime. Not required.

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

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

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

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

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

Fertilizers shall be 10% nitrogen, 20% phosphate, and 20% potash commercial fertilizer and shall be spread at the rate of 500 lbs/acre about 2 weeks after grassing and shall be followed by watering.

Second application: Fertilizers shall be 16% nitrogen, 16% phosphate, and 20% potash commercial fertilizer and shall be spread at a rate of 300 lbs/acre one week before the end of the maintenance period and shall be followed by watering.

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

901-2.5 Mulch Materials. Mulch shall be specially processed fiber containing no growth or germination inhibiting factors. Fibers shall form a homogeneous slurry after addition and agitation into hydro-mulch seeder with seed, fertilizer, water, and other additives non-detrimental to plant growth. When hydraulically sprayed onto the soil, the fibers shall form a blotter-like ground cover which readily absorbs water and allows infiltration to the underlying soil.

Options for stabilizing and water retaining agent for hydro-mulching shall be: “Verdyol Super”, “Ecology Control M-Binder”, or approved equal. The selected stabilizing and water retaining agent shall be applied at a rate recommended by the manufacturer.

CONSTRUCTION METHODS

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

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

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

901-3.2 Dry application method (Not Used).

901-3.3 Wet application method (Not Used).

901-3.4 Hydro-Mulching. This work shall consist of furnishing and applying hulled Bermuda seed, fertilizer, mulch, and stabilizing and water retaining agent by hydro-mulching.

Apply seeded mulch within two days after completion of slopes or portion of slope when exposed face attains height of 15 feet. Notify the RPR not less than 24 hours ahead of hydro-mulch seeding operation. Do not hydro-mulch until the Engineer inspects and accepts areas for planting.

The RPR will inspect slopes to ensure that surface and subsurface water are properly collected and disposed of and areas to be planted are protected from erosion. Upon the RPR's acceptance for planting, begin hydro-mulch seeding of slopes. Acceptance for planting does not relieve the Contractor of responsibility for repair of slope damage until grassed areas are acceptable to the RPR.

The seeds shall be applied at a rate of 100 pounds per acre minimum. Mulch shall be applied at a rate of 1,200 pounds per acre minimum (25 lbs. per 900 sq. ft.). In every application, complete and uniform coverage of the soil shall be attained.

The hydro-mulch equipment shall be capable of mixing all the necessary ingredients to a uniform mixture and to apply the slurry to provide uniform coverage. Seed, fertilizer, mulch mix, and stabilizing water retaining agent shall be applied in one operation by hydraulic equipment made specifically for this use. Use the RPR-accepted hydro-mulch seeder with build-in agitation system and operating capacity sufficient for uniform mixing until slurry is pumped out of tank. Equip seeder with distribution and discharge lines large enough to prevent stoppage, and hydraulic discharge spray nozzles that provide uniform distribution of the slurry.

In areas that are inaccessible to hydro-mulch seeder, planting and fertilizing by hand may be acceptable by the RPR.

Water immediately after planting to moisten soil and mulch. Continue watering as necessary to ensure proper germination and growth. Water in a way that will prevent erosion, using equipment that will not damage planted areas. Replace watering equipment that causes erosion or runoff.

If there is slope erosion or movement of silt, remove displaced material immediately. Restore areas that are eroded to depth greater than two inches of original grade or width greater than three inches.

901-3.5 Plant Establishment. Plant establishment period shall not be less than 90 days after completion date of planting period acceptable to the RPR. During the plant establishment period, water, fertilize, weed, and mow grass when grass reaches average height of three inches. Replace grass RPR considers unsuitable or sick. Remove and dispose of trash and debris. Provide insect and disease protection and control.

In addition to fertilizer that is applied during initial hydro-mulch seeding, fertilize plantings at least four times during plant establishment period. Fertilize at a rate of not less than 300 pounds per acre per application. Interval between fertilizations shall not be closer than 2-1/2 months. Notify the RPR 24 hours before applying fertilizer.

The RPR will credit the Contractor with plant establishment days when work is done in accordance with the contract documents and when the RPR determines that no work is required, regardless of whether the Contractor actually performs plant establishment work. The RPR will not credit the Contractor with plant establishment days when the RPR determines that work is necessary but the Contractor fails to adequately perform plant establishment work.

901-3.6 Acceptance. The RPR will base acceptance of planted areas on 98 percent coverage with healthy, well-established grass at end of plant establishment period. No 100 square foot area shall show more than two square feet of bare earth. Mow grass before requesting acceptance.

END OF ITEM T-901

END OF SECTION 02901

SECTION 02905 – TOPSOIL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Item T-905: Topsoil, as included as an attachment to this Section.

1.02 DESCRIPTION OF WORK

A. This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the Engineer.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Source of all materials shall be submitted in accordance with FAA Specification Item T-905, paragraph 905-2.2.

PART 2 – PRODUCTS

2.01 Topsoil: In accordance with FAA Specification Section Item T-905, paragraph 905-2.1.

PART 3 – EXECUTION

3.01 GENERAL

A. Execution must be in accordance with FAA Specification Item T-905.

PART 4 – MEASUREMENT AND PAYMENT

4.01. BASIS OF MEASUREMENT

A. Topsoil obtained on the site shall be measured by the number of cubic yards of topsoil measured in its original position and stripped or excavated. Topsoil stockpiled by others and removed for topsoil by the Contractor shall be measured by the number of cubic yards of topsoil measured in the stockpile. Topsoil shall be measured by volume in cubic yards computed by the method of end areas.

B. Topsoil obtained off the site shall be measured by the number of cubic yards of topsoil measured in its original position and stripped or excavated. Topsoil shall be measured by volume in cubic yards computed by the method of end areas.

4.02. BASIS OF PAYMENT

A. Payment will be made at the contract unit price per cubic yard for topsoil, obtained on the site. This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

B. Payment will be made at the contract unit price per cubic yard of topsoil, obtained off site. This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item No.	**Item**	**Unit**
02905.1	Topsoil, Obtained Off Site	Cubic Yard (C.Y.)

PART 5 – ATTACHMENTS

5.01. FAA Specification Item T-905 Topsoil

Item T-905 Topsoil

DESCRIPTION

905-1.1 This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR.

MATERIALS

905-2.1 Topsoil. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches (50 mm) or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed, but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (75 μm) sieve as determined by the wash test in accordance with ASTM C117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

905-2.2 Inspection and tests. Within 10 days following acceptance of the bid, the RPR shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in paragraph 905-2.1.

CONSTRUCTION METHODS

905-3.1 General. Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the RPR before the various operations are started.

905-3.2 Preparing the ground surface. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the RPR, to a minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade

soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

905-3.3 Obtaining topsoil. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the RPR. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the RPR. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the RPR. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoil purposes, shall be removed and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the RPR. The Contractor shall notify the RPR sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

905-3.4 Placing topsoil. The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2 inches (50 mm) after compaction, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches (50 mm) or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. after spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the RPR. The compacted topsoil surface shall conform to the required lines, grades, and cross-sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

REFERENCES

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

ASTM International (ASTM)

ASTM C117	Materials Finer than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing

Advisory Circulars (AC)

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

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-905

END OF SECTION 02905

DIVISION 3 - CONCRETE

SECTION 03300 – CONCRETE FOR MISCELLANEOUS STRUCTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions 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. This Section must be in accordance with FAA Specification Item P-610: Concrete for Miscellaneous Structures, as included as an attachment to this Section.

1.02 DESCRIPTION

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

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Representative preliminary samples of the materials as required shall be submitted in accordance with FAA Specification Item P-610, paragraph 2.1.

C. Source of all materials shall be submitted in accordance with FAA Specification Item P-610, paragraph 2.1.

D. Reactivity test results shall be submitted in accordance with FAA Specification Item P-610, paragraph 2.1.

E. Previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix shall be submitted in accordance with FAA Specification Item P-610.

F. Admixture Certificates shall be submitted in accordance with FAA Specification Item P-610, paragraph 2.7.

G. Shop Drawings:

1. General: Submit for reinforcement. Comply with referenced standard ACI 315. Include bar schedules, stirrup spacing, diagrams of bent bars, arrangement of reinforcement, concrete cover, conditions at openings through the concrete structure, and other requirements necessary for fabrication and placement of reinforcement.

2. Wind Cone Foundation: Submit shop drawings of the wind cone foundations showing dimensioned plans and elevations, large scale details, attachment devices, and other components.

3. Dry Wells: Submit shop drawings of dry wells showing dimensioned plans and elevations, large scale details, attachment devices, and other components.

PART 2 – PRODUCTS

2.01 Coarse Aggregate: In accordance with FAA Specification Item P-610, paragraph 2.2.

2.02 Fine Aggregate: In accordance with FAA Specification Item P-610, paragraph 2.3.

2.03 Cement: In accordance with FAA Specification Item P-610, paragraph 2.4.

2.04 Cementitious Materials: In accordance with FAA Specification Item P-610, paragraph 2.5.

2.05 Water: In accordance with FAA Specification Item P-610, paragraph 2.6.

2.06 Admixtures: In accordance with FAA Specification Item P-610, paragraph 2.7.

2.07 Premolded Joint Material: In accordance with FAA Specification Item P-610, paragraph 2.8.

2.08 Joint Filler: In accordance with FAA Specification Item P-610, paragraph 2.9.

2.09 Steel Reinforcement: In accordance with FAA Specification Item P-610, paragraph 2.10.

2.10 Materials for Curing Concrete: In accordance with FAA Specification Item P-610, paragraph 2.11.

PART 3 – EXECUTION

3.01 Construction methods must be in accordance with FAA Specification Item P-610.

3.02 Quality assurance must be in accordance with FAA Specification Item P-610.

PART 4 – MEASUREMENT AND PAYMENT

4.01. BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section related to the segmented circle will be paid for at the contract lump sum price as shown below. The contract price paid must be full compensation for all labor, materials, tools, equipment, and all incidentals necessary to complete the work.

B. All other work specified in this Section must not be measured or paid for separately but must be considered incidental to and included in the bid prices for the various items of work in this project.

Payment will be made under:

Item No.	Item	Unit
03300.1	Segmented Circle, In Place	Lump Sum (L.S.)

PART 5 – ATTACHMENT

5.01 FAA Specification Item P-610 Concrete for Miscellaneous Structures.

References

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

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

American Concrete Institute (ACI)

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

Item P-610 Concrete for Miscellaneous Structures

DESCRIPTION

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

MATERIALS

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

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

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

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

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

Coarse Aggregate Grading Requirements

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

610-2.2.1 Coarse Aggregate susceptibility to durability (D) cracking. Not used.

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

610-2.4 Cement. Cement shall conform to the requirements of ASTM Type I or II.

610-2.5 Cementitious materials.

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

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

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

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

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

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

c. Other chemical admixtures. The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-

accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

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

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

610-2.10 Steel reinforcement. Reinforcing shall consist of reinforcing steel and welded steel wire fabric conforming to the requirements of ASTM A615 and ASTM A1064, respectively**.**

610-2.11 Materials for curing concrete. Curing materials shall conform to ASTM C171.

CONSTRUCTION METHODS

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

610-3.2 Concrete Mixture. The concrete shall develop a compressive strength of 4000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 3% +/- 1% as determined by ASTM C231 and shall have a slump of not more than 5 inches (100 mm) as determined by ASTM C143.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

QUALITY ASSURANCE (QA)

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

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

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

END OF ITEM P-610

END OF SECTION 03300

DIVISION 16 - ELECTRICAL

SECTION 16050 – BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

The General Provisions 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.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 16522 – Airfield Lighting System; FAA Specification Items L-107, L-108, L-109, L-119, and L-125.

1.03 SUBMITTALS

A. Shop Drawings: Submit complete shop drawings and manufacturer's literature for review by the Engineer before any work is ordered or fabricated. Comply with all requirements of Section 01300 - SUBMITTALS. Submit six sets of manufacturer's literature for the following:

1. Conduit

2. Wiring

B. Intent of Shop Drawing and Catalog Cut Review:

1. Shop drawings and catalog cut submittals processed by the Engineer are not change orders. The purpose of the submittals by the Contractor is to demonstrate to the Engineer that he understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

2. If deviations, discrepancies or conflicts between shop drawings and specifications are discovered, either prior to or after shop drawings are processed by the Engineer, the design drawings and specifications shall control and shall be followed.

C. Prequalification: Where materials or products specified herein are designated by manufacturer’s name, any request to substitute materials or products other than those specified shall be accepted by the Engineer

during the bidding period, as specified in the Instructions to Bidders. Burden of proof of equality of proposed substitutions will be the responsibility of the Contractor.

D. Shop drawings and catalog cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Certification shall not contain statements to imply that the item does not meet requirements specified, such as “as good as”, and “achieve the same end use and results as materials formulated in accordance with the referenced publications”. Certifications shall simply state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer’s letterhead and shall be signed by the manufacturer’s official authorized to sign certificates of compliance. Review of shop drawings and catalog cuts shall not release Contractor from complying with intent of drawings and specifications.

1.04 GUARANTEE AND CERTIFICATE:

Any item of material, apparatus, equipment furnished and installed, or construction by the Contractor showing defects in design, construction, quality or workmanship within one year from the date of final acceptance by the Engineer shall be replaced by such new material, apparatus or parts as may be found necessary to make such defective portion of the complete system conform to the true intent and meaning of the specification and/or the drawings. Such repairs or replacement shall be made by the Contractor, free of all expense to the State.

1.05 GENERAL REQUIREMENTS:

The Contractor shall furnish all labor, materials (except as hereinafter noted), tools, equipment and appliances required to provide and install all electrical work, complete, as indicated on the drawings and/or as herein specified. The drawings note various sizes of equipment as determined for basis of design; the electrical work, however, shall be installed to comply with the equipment furnished by the successful supplier. The work shall include but not necessarily be limited to, the following:

A. Obtain and pay for the electrical permit, arrange for periodic inspections by local authorities and deliver certificate of final inspection to Engineer.

B. Before bidding on this work, carefully examine each of the drawings and the site. By submitting a proposal of the work included in this contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.

C. Prior to ordering equipment, the Contractor shall examine the plans to verify the amount of space allocated for the electrical equipment and to determine if the material proposed will fit within the allocated space. It

shall be the Contractor's responsibility to provide equipment that will fit within the allocated space.

1.06 COORDINATION WITH OTHER TRADES:

During bidding and construction, Contractor shall coordinate his work with other trades to avoid omissions and overlapping of responsibilities.

1.07 CODES, REGULATIONS AND STANDARD SPECIFICATIONS:

A. Work shall conform to latest edition of National Electrical Code.

B. Applicable rules, standards and specifications of following associations shall apply to materials and workmanship:

American National Standards Institute (ANSI)
ASTM International (ASTM)
Illumination Engineering Society of North America (IESNA)
National Board of Fire Underwriters (NBFU)
National Electrical Manufacturer's Association (NEMA)
National Electrical Safety Code (NESC)
National Fire Protection Association (NFPA)
Underwriters' Laboratories, Inc. (UL)

PART 2 - PRODUCTS

2.01 MATERIALS:

A. General: All materials shall be new, except as specifically noted, and shall bear the label of Underwriters' Laboratories, Inc. whenever standards have been established and label service is normally and regularly furnished by the agency.

B. Outlet and Small Junction Boxes: Pressed, zinc-coated steel, minimum nominal size 4", minimum depth 1-1/2". Exposed boxes and weather exposed boxes shall be ferrous alloy, prime painted and enamel finished, with threaded hubs for conduit connection.

C. Raceways: galvanized rigid steel (GRC), non-metallic PVC schedule 40, ¾" minimum diameter unless otherwise noted. Aluminum conduits shall not be used.

D. Wires and Cables: Conductors shall be copper, No. 12 AWG minimum; No. 10 AWG and smaller, solid and round; No. 8 AWG and larger, 7 or 19 strands concentric. For interior locations conductors shall be type THHN/THWN. For exterior locations, conductor shall be type RHW-USE.

E. Hardware, Supports, Backing, Etc.: All hardware, supports, backing and other accessories necessary to install electrical equipment shall be provided. Wood materials shall be "wolmanized" treated against termites, iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be brass or bronze.

PART 3 - EXECUTION

3.01 GENERAL:

A. Rules and Permit: The entire installation shall be made in strict accordance with the latest rules and regulations of the National Board of Fire Underwriters, the currently adopted edition of the National Electrical Code and the local Electrical Bureau. The Contractor shall obtain and pay for the electrical permit as required by local laws and rules. All work shall be inspected by the proper local authorities as it progresses. The Contractor shall pay all inspection fees and shall deliver certificates of completion and inspection to the State before final payment will be made. Costs of permits and inspection fees shall be included in the Contractor's bid price.

B. Qualification of Installers:

1. For actual fabrication, installation and testing of the work in this section, use only thoroughly trained and experienced workmen completely familiar with items required and with manufacturer’s recommended methods of installation. In acceptance or rejection of installed work, no allowance will be made for lack of skill on part of workmen.

2. Workmanship shall be acceptable to the Engineer who shall be afforded every opportunity to determine skill and competency. Concealed work shall be reopened at random during formal inspection by Engineer at his request.

C. Construction Methods: Construction shall conform to construction practices as recommended by the American Electricians Handbook by Croft (latest edition), Edison Electric Institute, National Electrical Code, National Electrical Safety Code and applicable instructions of manufacturers of equipment and material supplied for this project.

D. Record Drawings: The Contractor shall maintain an accurate and adequate record of each change as it occurs on a set of construction documents kept at the project site (site copy) by recording additions and/or changes on the site copy daily. After final inspection and acceptance by the State, prepare “as-built” drawings from the site copy on reproducible contract drawings and edit specifications with all changes

annotated. Certify “as-built” documents and turn over to State for acceptance without additional cost to the contract amount.

E. Plans and Specification: This specification is intended to cover all labor, materials and standards of workmanship to be employed in the work indicated on the plans and called for in the specification or reasonably implied therein. The plans and specification supplement one another. Any part of the work mentioned in one and not represented in the other, shall be done the same as if it has been mentioned in both. The Contractor shall not make alterations in the drawings and specification.

F. Discrepancies and Interpretations:

1. Should the Contractor find any discrepancies in or omissions from any of the documents or be in doubt as to their meaning, he shall advise the Engineer who will issue any necessary clarification within a time period which does not disrupt the progress of the work.

2. All interpretation and supplemental instructions will be in the form of written addenda to the contract documents.

3. Should any discrepancy arise from the failure of the Contractor to notify the Engineer, the higher quality or larger quantity of item shall prevail. The Engineer shall make the final interpretation and judgement.

4. In the event of a discrepancy between small scale drawings and large scale details, or between drawings and specification, on which is in violation of any regulations, ordinances, laws or codes, the discrepancy, if known by the Contractor, shall be immediately brought to the attention of the State for a decision before proceeding with the particular work involved. Work carried out disregarding these instructions will be subject to removal and replacement at the Contractor's expense.

G. Symbols: The standard electrical symbols together with the special symbols, notes and instructions shown on the drawings indicate the work required and are all to be included as a part of this specification.

H. Coordination: This specification is accompanied by plans indicating locations of panelboards, electrical equipment, conduits and wiring. These locations are approximate and, before installing, the Contractor shall study the plans and details and actually make the installation in the most logical manner. Electrical equipment may be relocated within ten feet before installation at the direction of the Engineer. The circuit routing is typical only and may be varied in any logical manner.

3.02 INSTALLATION:

A. Grounding:

1. All metallic enclosures, raceways, and electrical equipment shall be grounded according to requirements of NEC Article 250. Final connection to equipment, raceways and other metallic parts directly exposed to ungrounded electric conductors shall be No. 14 AWG minimum, copper, NEC type TW, green insulation. Use approved bonding terminal at panelboard.

2. Where practical, grounding wire runs shall be routed together with circuit conductors. Provide ground conductor in all conduits.

B. Raceway System:

1. GRC shall be utilized in exposed locations.

2. Below grade or in slab, use Schedule 40 PVC. Provide separate ground wire and rise out of ground with Schedule 40 PVC. Transition to rigid steel conduit within 6” of finished grade.

3. All wiring shall be installed in conduits except as noted.

4. Conduits cut square and inner edges reamed. Butt conduits together evenly in couplings.

5. Bends and offsets shall be made with hickey or conduit bending machine. Do not use vise or pipe tee. Bends shall be made so that interior cross-sectional areas will not be reduced. Radius of curve of inner edge of field bend shall not be less then ten times internal diameter of conduit.

6. Use of running threads not permitted. Where conduits cannot be joined by standard threaded couplings, approved water-tight conduit unions shall be used.

7. Cap conduits during construction with plastic bushings to prevent entrance of dirt or moisture. Swab out all conduits and dry before installing wires.

8. Conduit shall be mounted clear of other piping, valves or mechanical equipment.

9. Fish wires, cord, strings or the like shall not be placed or inserted into the conduit system during installation. Insulating bushings

and two locknuts shall be installed on the end of every run of conduit at metal enclosures and boxes.

10. Exposed conduit shall be parallel with, or at right angles to, structural or architectural elements, and securely fastened in place with two-hole galvanized pipe straps with screws, as conditions require. Vertical runs shall be supported at intervals not exceeding five feet. Where possible, conduits shall be routed along the edge of walls and ceiling to minimize wall space occupied by conduits.

C. Conductors:

1. Mechanical means for pulling shall be torque-limiting type and not used for #2 AWG and smaller wires.

2. Pulling tension shall not exceed wire manufacturer's recommendations.

3. Where necessary, water based gel may be used as a lubricant for drawing wires through conduit. Other means of lubricating may be allowed with prior approval.

4. Form neatly in enclosures for minimum of crossovers. Tag all feeders.

D. Splicing of Wire and Cable:

1. Wires shall be formed neatly in enclosures and boxes.

2. Splices made according to NEC Article 110.

3. Splices shall be reinsulated. Remove all sharp points that can pierce tape. Use Minnesota Mining and Manufacturing Co. "Scotch" #33 tape or equal, unless otherwise noted.

E. Trench Excavation:

1. Dimensions and locations of trenches for pullboxes and ductlines shall be as indicated on drawings. Trench width and depths shall be sufficient to accommodate proper installation of conduit banks and cables.

2. Where a trench is excavated on slope, sides are to be vertical, and depth measured at lowest side. All measurements are to be based on final grades.

3. Bottom of trenches to be flat and smooth.

4. Trenches shall be widened at pullbox sites to permit proper entry of ducts.

5. All excavations for pullboxes in excess of the required depths shall be filled with concrete.

6. Sheathing and bracing as required shall be provided to support sides of excavations from cave-ins.

7. Excavated material may be placed alongside trench.

F. Backfill:

1. Backfilling shall be to finished grades indicated on accompanying drawings, and matching existing conditions.

2. Backfill material shall be completely free of wood or other debris.

3. Backfill material shall be placed in maximum of 12" layers in loose thickness before compacting. Backfill shall be thoroughly compacted with hand or mechanical tampers, and in no case shall tamping be accomplished by using the wheels or tracks of a vehicle.

G. Conduit and Duct Bank:

1. Bottom of trenches for all systems shall be clean, smooth and well graded prior to installation of conduits.

2. Saw cut, ream and taper ducts and conduits with manufacturers' approved tool.

3. Couplings and bells shall be tight to prevent entry of dirt into ducts and conduits.

4. Provide spacers to maintain proper separation between ducts.

5. Changes in direction of greater than 5° shall be accomplished by using special couplings or bends manufactured for this purpose. Where ducts enter pullboxes, they shall be terminated in end bells. Ducts shall be thoroughly cleaned before laying. When it is necessary to cut tapered end of duct at site, cut shall be made with saw and tapered with lathe designed to match original taper. Coordinate placement of duct runs with other utilities, building structures, existing facilities and landscaping elements to avoid conflicts. When necessary, obtain acceptance from the Engineer for relocation and adjustments at no additional cost to the State.

6. Ducts shall be clean and free from debris and rubbish.

7. After each day's work, provide temporary conduit plugs at the end of conduit banks to prevent entry of dirt, rubbish, or debris.

8. Pass smooth bullet-shaped, blunt tip wooden test mandrel through the entire length of each duct or conduit to test for burrs and obstructions. Unless indicated otherwise, mandrel shall be 14" long and shall have diameter of 2" less than inside diameter of duct or conduit. If burrs or obstructions are encountered, that section shall be replaced at no additional cost to the State.

9. Unless indicated otherwise, install #12 AWG galvanized iron pulling wire or polypropylene cord in each conduit after testing.

10. Apply thin coat of sealing compound on ducts and conduits at couplings and bells.

11. Provide duct seals at each entry point into pullboxes to prevent water from flowing between pullboxes.

12. A 4" wide warning tape, with black imprinted message "WARNING - ELECTRICAL LINE BELOW" shall be placed 12" below finish grade over electrical ductlines. Color shall be as noted on drawings.

H. Finishing: Wipe clean all exposed raceways and enclosures with rag and solvent. Unfinished raceways and enclosures shall be prime - painted and finished to blend into background. (Do not cover nameplates.) Factory finished enclosures shall not be painted.

I. Cleaning and Repairing: During the progress of work, all rubbish, waste lumber, displaced materials, etc. shall be removed as soon as possible and upon completion of the work, the Contractor shall remove from the State's property and from all public and private property, at his own expense, all temporary structures, rubbish and waste material resulting from his operations.

J. Miscellaneous Details:

1. Need for remedial work determined by the State as attributable to poor coordination and workmanship shall be cause for reconstruction to the satisfaction of the State.

2. Attachment of electrical equipment to wood by non-ferrous wood screws. Attachment to concrete by expansion anchors. Powder-charge driven studs and anchors permitted only with prior approval.

3. All grounding wire routed together with circuit conductors.

4. Furnish necessary test equipment and make all tests necessary to check for unspecified grounding, shorts and wrong connections. Correct faulty conditions, if any.

3.03 TESTING AND INSPECTION:

A. If the State discovers any errors, the Contractor, at his own expense, shall go over all similar portions of the entire job, taking the necessary or directed remedial action.

B. Installations 600 volts or less shall be tested for insulation resistance after all wiring is completed and ready for connection to fixtures and equipment. Using a 500V megger, measure and record the insulation resistance from phase to phase and phase to neutral. The above tests shall be witnessed by the Engineer and the records turned over to him for proper disposition. The Contractor shall notify the Engineer when this test is to be performed.

C. The Contractor shall retape splices which have been bared for inspection. The Contractor shall test all portions of the electrical system furnished by him for proper operation and freedom from accidental grounds. All tests shall be subject to acceptance of the State.

D. Wherever test or inspection reveals faulty equipment or installation, the Contractor shall take corrective action, at his own expense, repairing or replacing equipment or installation as directed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT:

A. All work specified under this Section shall not be measured for payment unless specified in a line item below, but will be paid for at the contract lump sum price for Section 16522 – Airfield Lighting System. The contract price paid shall be full compensation for all labor, materials, tools, equipment, and all other incidentals necessary to complete the work.

Payment will be made under:

Item No.	Pay Item	Unit
16050.1	Concrete Encased Electrical Duct Bank, 2”, 24” Minimum Cover	Linear Foot

PART 5 - ATTACHMENTS

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

EQUIPMENT AND MATERIALS

110-2.1 General.

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

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

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

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

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from 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. Not used.

110-2.5 Conduit spacers. Not used.

110-2.6 Concrete. See electrical plans for concrete encasement requirements.

110-2.7 Precast concrete structures. Not used.

110-2.8 Flowable backfill. Not used.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 General. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based

on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

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

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

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

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

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

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

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

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

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

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

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

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

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

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

110-3.2 Duct banks. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit

spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

110-3.3 Conduits without concrete encasement. 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 (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word “DUCT” or “CONDUIT” on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 Backfilling for conduits. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152

except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used.

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

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

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

110-3.6 Backfilling for duct banks. After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 "Excavation and Embankment" except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period's construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

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

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

110-3.7 Restoration. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include sodding 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. Not used.

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 16050

SECTION 16522 – AIRFIELD LIGHTING SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

The General Provisions 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.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 16050 – Basic Materials and Methods; FAA Specification Item L-110.

1.03 SUBMITTALS

A. Shop Drawings: Submit complete shop drawings and manufacturer's literature for review by the Engineer before any work is ordered or fabricated. Comply with all requirements of Section 01300 - SUBMITTALS. Submit six sets of manufacturer's literature for the following:

1. L-806 Supplemental Wind Cone
2. L-830 Isolation Transformers
3. L-867 Light Bases
4. Wiring

B. Intent of Shop Drawing and Catalog Cut Review:

1. Shop drawings and catalog cut submittals processed by the Engineer are not change orders. The purpose of the submittals by the Contractor is to demonstrate to the Engineer that he understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.
2. If deviations, discrepancies or conflicts between shop drawings and specifications are discovered, either prior to or after shop drawings are processed by the Engineer, the design drawings and specifications shall control and shall be followed.

C. Prequalification: Where materials or products specified herein are designated by manufacturer’s name, any request to substitute materials

or products other than those specified shall be accepted by the Engineer during the bidding period, as specified in the Instructions to Bidders. Burden of proof of equality of proposed substitutions will be the responsibility of the Contractor.

D. Shop drawings and catalog cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Certification shall not contain statements to imply that the item does not meet requirements specified, such as “as good as”, and “achieve the same end use and results as materials formulated in accordance with the referenced publications”. Certifications shall simply state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer’s letterhead and shall be signed by the manufacturer’s official authorized to sign certificates of compliance. Review of shop drawings and catalog cuts shall not release Contractor from complying with intent of drawings and specifications.

1.04 GUARANTEE AND CERTIFICATE:

Any item of material, apparatus, equipment furnished and installed, or construction by the Contractor showing defects in design, construction, quality or workmanship within one year from the date of final acceptance by the Engineer shall be replaced by such new material, apparatus or parts as may be found necessary to make such defective portion of the complete system conform to the true intent and meaning of the specification and/or the drawings. Exceptions shall be fluorescent and high intensity discharge lamps which shall be guaranteed for one half the manufacturer's listed life time. Such repairs or replacement shall be made by the Contractor, free of all expense to the State.

1.05 GENERAL REQUIREMENTS:

The Contractor shall furnish all labor, materials (except as hereinafter noted), tools, equipment and appliances required to provide and install all electrical work, complete, as indicated on the drawings and/or as herein specified. The drawings note various sizes of equipment as determined for basis of design; the electrical work, however, shall be installed to comply with the equipment furnished by the successful supplier. The work shall include but not necessarily be limited to, the following:

A. Replace existing Runway 8, 21 and 26 wind cone light fixtures, conduit and wiring.

B. Before bidding on this work, carefully examine each of the drawings and the site. By submitting a proposal of the work included in this Contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.

C. Prior to ordering equipment, the Contractor shall examine the plans to verify the amount of space allocated for the electrical equipment and to determine if the material proposed will fit within the allocated space. It shall be the Contractor's responsibility to provide equipment that will fit within the allocated space.

1.06 COORDINATION WITH OTHER TRADES:

During bidding and construction, Contractor shall coordinate his work with other trades to avoid omissions and overlapping of responsibilities.

1.07 CODES, REGULATIONS AND STANDARD SPECIFICATIONS

A. Work shall conform to latest edition of National Electrical Code.

B. Applicable rules, standards and specifications of following associations shall apply to materials and workmanship:

American National Standards Institute (ANSI)
ASTM International (ASTM)
Illumination Engineering Society of North America (IESNA)
National Board of Fire Underwriters (NBFU)
National Electrical Manufacturer's Association (NEMA)
National Electrical Safety Code (NESC)
National Fire Protection Association (NFPA)
Underwriters' Laboratories, Inc. (UL)

PART 2 - PRODUCTS

2.01 MATERIALS:

A. General: All materials shall be new, except as specifically noted, and shall bear the label of Underwriters' Laboratories, Inc. whenever standards have been established and label service is normally and regularly furnished by the agency.

B. L-806 Supplemental Wind Cone:

1. The supplemental wind cone shall be a type L-806, style I-B, size 1 assembly, meeting all requirements specified in FAA Advisory Circular 150/5345-27 (current edition), FAA Specification for Wind Cone Assemblies.

2. L-806 wind cone light fixture shall be ETL-certified and conform to the requirements of FAA Advisory Circular 150/5345-27 (current edition) and FAA Engineering Brief No. 67 (current edition). Fixtures shall be provided in the quantity as shown on the drawings, complete with all necessary components, cables,

connectors, hardware and accessories for a complete and operational system.

3. L-806 wind cone shall be internally lit by an LED light fixture and shall have an average illumination of 10 to 30 foot lamberts on the top and lateral surface of a fully extended wind sock.

4. L-806 wind cone assembly shall include a L-810 LED obstruction light.

5. L-806 wind cone light fixtures shall be capable of being installed on existing lighting circuit without having to change any other element (CCR, primary and secondary cabling, series transformer, etc.).

C. L-810 Obstruction Light Fixtures:

1. The L-810 fixture shall be ETL-certified and conform to the requirements of FAA Advisory Circular 150/5345-43 (current edition), Specification for Obstruction Lighting and FAA Engineering Briefs No. 67 and No. 98 (current editions). Fixture shall be provided in the quantity as shown on the drawings, complete with all necessary components, cables, connectors, hardware and accessories.

2. Light source shall be LED. Lamp shall be 24W at 120V.

3. Lamp shall have a rated lamp life of 100,000 hours.

4. Fixture shall have a gasket seal between lens cap and fixture. All parts shall be corrosion-resistant. Fixture shall have stainless steel hardware.

5. Red LED obstruction light fixtures shall be visible to pilots using night vision goggle systems.

D. Isolation Transformers:

1. Isolation transformers shall be ETL-certified and conform to FAA Advisory Circular 150/5345-47 (current edition), style L-830. The primary shall have an insulation level voltage rating of 5,000 volts RMS and the secondary shall have a rating of 600 volts RMS. Isolation transformer shall be completely encapsulated in waterproof rubber and suitable for direct burial, exposed to the sun, immersed in water, and exposed to other weather elements.

E. Light Bases:

1. Light bases shall conform to the requirements of FAA Advisory Circular 150/5345-42 (current edition), Specification for Airport

Light Bases, Transformer Housings, Junction Boxes and Accessories.

2. Light bases shall be L-867, Class IIA, non-metallic, size B, 12" diameter, 24" deep.

F. Cables, Wires, and Connectors:

1. Airfield lighting cable shall conform to FAA Specification L-824, Type C, Advisory Circular 150/5345-7 (current edition), voltage rating of 600V or 5000 volts, #8 AWG stranded.

2. All other conductors shall be copper, 600 volts and type RHW; #10 AWG and smaller shall be solid and round; #8 AWG and larger shall be stranded.

3. Cable connectors for airfield lighting system shall conform to FAA Specification L-823, Advisory Circular 150/5345-26 (current edition), plug and receptacle type.

PART 3 - EXECUTION

3.01 GENERAL: As specified in Section 16050 – Basic Materials and Methods.

3.02 INSTALLATION:

A. Installation shall be in accordance with plans and specifications, manufacturer's recommendations and all applicable FAA Advisory Circulars. The existing airfield lighting system shall remain in operation during construction, and unauthorized interruptions will not be acceptable.

3.03 TESTING AND INSPECTION:

A. After the installation has been completed and the Engineer or the State representative has been given fifteen (15) working days advance notice of the proposed test, the Contractor shall perform all operating tests for approval and provide all labor, equipment and incidentals required for testing.

1. The equipment shall be demonstrated to operate in accordance with the requirements of these specifications for a period of not less than forty-five (45) days prior to final acceptance by the State.

2. Test shall be such that each item of control equipment will function not less than five times.

3. If the Engineer or the State representative discovers any of the following errors, the Contractor, at his own expense, shall go over

all similar portions of the entire job, taking the necessary or directed remedial action.

a. Impaired clearance.

b. Improper finish.

c. Improper adjustment.

d. Improper operation.

B. All obstruction lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include turning the input power circuit on and off not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

C. After PAPIs are tested and inspected by the State, a "Flight Inspection" will be scheduled and conducted by the FAA to ensure the PAPIs are aimed at the correct angle. Until this happens, the PAPIs will not be usable for operations. The Contractor shall be on site during the flight inspection to adjust the PAPIs as deemed necessary by the FAA.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT:

A. Work under this Section will be paid for at the various contract lump sum prices as shown below. The contract price paid shall be full compensation for all labor, materials, tools, equipment, and all incidentals necessary to complete work.

Payment will be made under:

Item No.	Pay Item	Unit
16522.1	Type L-806, Style I-B, Size 1 Wind Cone and Foundation, In Place	Each
16522.2	No. 8 AWG, 5 kV, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit	Linear Foot

16522.3	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed in Trench, Duct or Conduit	Linear Foot
16522.4	No. 6 AWG, Bare, Stranded Equipment Ground, Installed in Duct Bank or Conduit	Linear Foot
16522.5	L-810 Airport Obstruction Light, in Place	Each

PART 5 - ATTACHMENTS

5.01 FAA Specification Item L-107 Airport Wind Cones

5.02 FAA Specification Item L-108 Underground Power Cable for Airports

5.03 FAA Specification Item L-119 Airport Obstruction Lights

5.04 FAA Specification Item L-125 Installation of Airport Lighting Systems

Item L-107 Airport Wind Cones

DESCRIPTION

107-1.1 This item shall consist of removal of existing airport wind cones, furnishing, and installing an airport wind cone per these specifications and per the dimensions, design, and details shown in the plans.

The work shall include the furnishing and installation of a support for mounting the wind cone, the specified interconnecting wire, and a concrete foundation. The item shall also include all cable connections, conduit and conduit fittings, the furnishing and installation of all lamps, ground rod and ground connection, the testing of the installation, and all incidentals necessary to place the wind cone in operation (as a completed unit) to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

107-2.1 General.

a. Airport lighting 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.

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). 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 in electronic pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures, that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least forty-eight (48) 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.

107-2.2 Wind cones.

a. The primary wind cone assembly shall be Type L-807, Style I-B, Size 2.

b. The supplemental wind cone assembly shall be Type L-806, Style I-B, Size 1.

c. L-807 and L-806 wind cone light fixtures shall be capable of being installed on the existing lighting circuit without having to change any other element (CCR, primary and secondary cabling, series transformer, etc.)

107-2.3 Electrical wire and cable. Cable rated up to 5,000 volts in conduit shall conform to AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits. For ratings up to 600 volts, moisture and heat resistant thermoplastic wire conforming to Commercial Item Description A-A-59544A Type THWN-2 shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

107-2.4 Conduit. Rigid steel conduit and fittings shall conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242.

107-2.5 Plastic conduit (for use below grade only). Plastic conduit and fittings shall be per the following:

- 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 (polyvinyl chloride (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 Standard UL-651 shall be one of the following, as shown in the plans:

a. Type I–Schedule 40 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.

Plastic conduit adhesive shall be a solvent cement manufactured specifically for the purpose of gluing the type of plastic conduit and fitting.

107-2.6 Concrete. The concrete for foundations shall be proportioned, placed, and cured per Specification Section 03300 - Concrete for Miscellaneous Structures.

107-2.7 Paint.

a. Priming paint for non-galvanized metal surfaces shall be a high solids alkyd primer compatible with the manufacturer's recommendations for the intermediate or topcoat.

b. Priming paint for galvanized metal surfaces shall be zinc dust-zinc oxide primer paint conforming to MIL-DTL-24441C/19B. Use MIL-24441 thinner per paint manufacturer's recommendations.

c. Orange paint for the body and the finish coats on metal and wood surfaces shall consist of a ready-mixed non-fading paint per Master Painter's Institute (MPI) Reference #9 (gloss). The color shall be per Federal Standards 595, International Orange, Number 12197.

d. White paint for body and finish coats on metal and wood surfaces shall be ready-mixed paint conforming to the MPI, Reference #9, Exterior Alkyd, Gloss.

e. Priming paint for wood surfaces shall be mixed on the job by thinning the above specified aviation-orange or white paint by adding 1/2 pint (0.24 liter) of raw linseed oil to each gallon (liter).

CONSTRUCTION METHODS

107-3.1 Installation. The L-807 primary wind cone hinged base and L-806 supplemental wind cone frangible base shall be installed on a concrete foundation per the plans.

107-3.2 Support pole erection. The Contractor shall erect the pole on the foundation following the manufacturer's requirements and erection details. The pole shall be level and secure.

107-3.3 Electrical connection. The Contractor shall furnish all labor and materials and shall make complete electrical connections per the wiring diagram furnished with the project plans. The electrical installation shall conform to the requirements of the latest edition of National Fire Protection Association, NFPA-70, National Electric Code (NEC).

Underground cable and duct for cable installation shall be installed in accordance with Item L-108, Underground Power Cables for Airports, and Item L-110, Airport Underground Electrical Duct Banks and Conduits in locations as shown on the plans.

107-3.4 Booster transformer. Not used.

107-3.5 Ground connection and ground rod. The Contractor shall furnish and install a ground rod, grounding cable, and ground clamps for grounding the "A" frame of the 12-foot (3.7-m) assembly or pipe support of the 8-foot (2.4-m) support near the base. The ground rod shall be of the type, diameter and length specified in Item L-108, Underground Power Cable for Airports. The ground rod shall be driven into the ground adjacent to the concrete foundation (minimum distance from foundation of 2 feet (60 cm)) so that the top is at least 6 inches (150 mm) below grade. The grounding cable shall consist of No. 6 American wire gauge (AWG) minimum stranded copper wire or larger and shall be firmly attached to the ground rod by exothermic welding. 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. The other end of the grounding cable shall be securely attached to a leg of the frame or to the base of the pipe support with non-corrosive metal and shall be of substantial construction. The resistance to ground shall not exceed 25 ohms. If a single rod grounding electrode has a resistance to earth of over 25 ohms, then install one supplemental rod not less than 10 feet from the first rod. If desired resistance to ground levels are still not achieved, see FAA-STD-019 for guidance on the application of coke breeze.

107-3.6 Painting. Three coats of paint shall be applied (one prime, one body, and one finish) to all exposed material installed under this item except the fabric cone, obstruction light globe, and lamp reflectors. The wind cone assembly, if already painted upon receipt, shall be given one finish coat of paint in lieu of the three coats specified above. The paint shall be per MPI Reference #9 (gloss). The color shall be per Federal Standard 595, International Orange, Number 12197.

107-3.7 Light sources. The Contractor shall furnish and install lamps per the manufacturer's instruction book.

107-3.8 Chain and padlock. The Contractor shall furnish and install a suitable operating chain for lowering and raising the hinged top section. The chain shall be attached to the pole support in a manner to prevent the light fixture assembly from striking the ground in the lowered position.

A padlock shall also be furnished by the Contractor on the 8-foot (2.4-m) wind cone for securing the hinged top section to the fixed lower section. Keys for the padlock shall be delivered to the RPR.

107-3.9 Segmented circle. The segmented circle shall be constructed as shown on the Plans.

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 150/5340-5	Segmented Circle Airport Marker System
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 150/5345-27	Specification for Wind Cone Assemblies
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544	Cable and Wire, Electrical (Power, Fixed Installation)

Federal Standard (FED STD)

FED STD 595	Colors Used in Government Procurement

Master Painter's Institute (MPI)

MPI Reference #9	Alkyd, Exterior, Gloss (MPI Gloss Level 6)

Mil Standard

MIL-DTL-24441C/19B	Paint, Epoxy-Polyamide, Zinc Primer, Formula 159, Type III

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit – Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit
UL Standard 1242	Electrical Intermediate Metal Conduit - Steel

National Fire Protection Association (NFPA)

NFPA-70	National Electric Code (NEC)

END OF ITEM L-107

Item L-108 Underground Power Cable for Airports

DESCRIPTION

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

EQUIPMENT AND MATERIALS

108-2.1 General.

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

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

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

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

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

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

resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, *Maintenance Airport Visual Aid Facilities*, paragraph 5.1.3.1, Insulation Resistance Test.

108-2.2 Cable. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

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

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

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

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

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

Ground rods shall be copper or 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 (2.4 m long and 3/4 inch (19 mm)in diameter.

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

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

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

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

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

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

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

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

108-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Specification Section 03300 – Concrete for Miscellaneous Structures.

108-2.7 Flowable backfill. Not used.

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

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

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

108-2.11 Existing circuits. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall

record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

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

CONSTRUCTION METHODS

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

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

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

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

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

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

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

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

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

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

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

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

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

108-3.3 Installation of direct-buried cable in trenches. 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 made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

b. Field-attached plug-in splices. These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2

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

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

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

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

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

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

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

108-3.6 Bare counterpoise wire installation for lightning protection and grounding. If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

a. Equipotential. The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to

provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc – all components - are bonded together and bonded to the vault power system ground loop/electrode.

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

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

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

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

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

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

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

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

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

b. Isolation. Not used.

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

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

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

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

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

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

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

108-3.7 Counterpoise installation above multiple conduits and duct banks. Not used.

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.

REFERENCES

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

Advisory Circulars (AC)

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

Commercial Item Description

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

ASTM International (ASTM)

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

Mil Spec

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

National Fire Protection Association (NFPA)

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

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

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

Federal Aviation Administration Standard

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

END OF ITEM L-108

Item L-119 Airport Obstruction Lights

DESCRIPTION

119-1.1 This item shall consist of furnishing and installing obstruction lights per these specifications. Included in this item shall be the furnishing and installing of wood poles, steel or iron pipes, or other supports as required in the plans or specifications and in accordance with the requirements in advisory circular (AC) 70/7460-1, Obstruction Marking and Lighting

This item shall also include all wire and cable connections, the furnishing and installing of all necessary conduits and fittings, insulators, pole steps, pole cross arms, and the painting of poles and pipes. In addition, it includes the furnishing and installing of all lamps and, if required, the furnishing and installing of insulating transformers, the servicing and testing of the installation and all incidentals necessary to place the lights in operation as completed units to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

119-2.1 General.

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

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

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

d. All materials and equipment used to construct this item shall be submitted to the RPR for 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). Contractor is solely responsible for delays in the project that accrue directly or indirectly from late submissions or resubmissions of submittals.

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

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for 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.

119-2.2 Obstruction lights. The obstruction lighting assembly shall be Type L-810 meeting the requirements of AC 150/5345-43, Specification for Obstruction Lighting Equipment.

119-2.3 Isolation transformers. Where required for series circuits, the isolation transformers shall conform to the requirements of AC 150/5345-47, Specification for Series to Series Isolation Transformers for Airport Lighting Systems.

119-2.4 Transformer housing. Transformer housings, if specified, shall be per AC 150/5345-42, Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories.

119-2.5 Conduit. Steel conduit and fittings shall be per Underwriters Laboratories Standards 6, 514B, and 1242.

119-2.6 Plastic conduit (for use below grade only). Plastic conduit and fittings shall be per:

- UL 514B covers W-C-1094 - Conduit fittings all types, classes 1 through 3 and 6 through 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

and must be one of the following, as shown on the plans:

a. Type I–Schedule 40 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.

119-2.7 Electrical wire and cable. For ratings up to 600 volts, moisture and heat resistant thermoplastic wire conforming to Commercial Item Description A-A-59544A, Type THWN-2, shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal. Overhead line wire from pole to pole, where specified, shall be per American National Standards Institute/Insulated Cable Engineers Association (ANSI/ICEA) S-70-547-2007.

119-2.8 Miscellaneous. Paint, poles, pole steps, insulators, and all other miscellaneous materials necessary for the completion of this item shall be new and first-grade commercial products. These products shall be as specified in the plans or specifications.

CONSTRUCTION METHODS

119-3.1 Placing the obstruction lights. The Contractor shall furnish and install single-or double-obstruction lights as specified and shown in the plans. The obstruction lights shall be mounted on poles, buildings, or towers at approximately the location shown in the plans. The exact location shall be approved by the RPR in accordance with AC 70/7460-1, Obstruction Marking and Lighting.

119-3.2 Installation on poles. Where obstruction lights are to be mounted on poles, each obstruction light shall be installed with its hub at least as high as the top of the pole. All wiring shall be run in not less than one inch (25 mm) galvanized rigid steel conduit. If specified, pole steps shall be furnished and installed, the lowest step being 5 feet (1.5 m) above ground level. Steps shall be installed alternately on diametrically opposite sides of the pole to give a rise of 18 inches (0.5 m) for each step. Conduit shall be fastened to the pole with galvanized steel pipe straps and shall be secured by galvanized lag screws. Poles shall be painted as shown in the plans and specifications.

When obstruction lights are installed on existing telephone or power poles, a large fiber insulating sleeve of adequate diameter and not less than 4 feet (1.2 m) long, shall be installed to extend 6 inches (150 mm) above the conductors on the upper cross arm. In addition, the sleeve shall be at least 18 inches (0.5 m) below the conductors on the lower cross arm. The details of this installation shall be per the plans.

119-3.3 Installation on beacon tower. Not used.

119 3.4 Installation on buildings, towers, smokestacks, etc. Not used.

119-3.5 Series isolation transformers. Not used.

119-3.6 Wiring. The Contractor shall furnish all necessary labor and materials. The Contractor shall make complete electrical connections from the underground cable or other source of power per the wiring diagram furnished with the project plans. If underground cable is required for the power feed and if duct is required under paved areas, the cable and duct shall be installed per and paid for as described in Item L-108, Underground Power Cable for Airports, and Item L-110, Airport Underground Electrical Duct Banks and Conduit.

119-3.7 Lamps. The Contractor shall furnish and install in each unit one or two lamps that are per the manufacturer's requirements. Provide two lamp sets as spares.

119-3.8 Tests. The installation shall be fully tested by continuous operation for not less than 1/2 hour as a completed unit prior to acceptance. These tests shall include the functioning of each control not less than 10 times.

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 70/7460-1	Obstruction Marking and Lighting
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 150/5345-42	Specification for Airport Light Bases, Transformer Housing, Junction Boxes, and Accessories
AC 150/5345-43	Specification for Obstruction Lighting Equipment
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-53	Airport Lighting Equipment Certification Program

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/ICEA S-70-547	Standards for Weather-Resistant Polyolefin Covered Connectors Commercial Item Description (CID)
A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)

Federal Standard (FED STD)

FED STD 595	Colors used in Government Procurement

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 Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit
UL Standard 1242	Electrical Intermediate Metal Conduit - Steel

END OF ITEM L-119

Item L-125 Installation of Airport Lighting Systems

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

125-2.1 General.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not performs as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

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

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR’s opinion, does not meet the system design and the standards and codes, specified herein.

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

EQUIPMENT AND MATERIALS

125-2.2 Conduit/Duct. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 Cable and Counterpoise. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 Tape. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.5 Cable Connections. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 Retroreflective Markers. Not required.

125-2.7 Runway and Taxiway Lights. Not required.

125-2.8 Runway and Taxiway Signs. Not required.

125-2.9 Runway End Identifier Light (REIL). Not required.

125-2.10 Precision Approach Path Indicator (PAPI). Not required.

125-2.11 Circuit Selector Cabinet. Not required.

125-2.12 Light Base and Transformer Housings. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867, Class 2A, Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

125-2.13 Isolation Transformers. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

INSTALLATION

125-3.1 Installation. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

125-3.2 Testing. All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

125-3.3 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.4 Elevated and In-pavement Lights. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

REFERENCES

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

Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

END OF ITEM L-125

END OF SECTION 16522