

State of Hawaii
DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
Honolulu, Hawaii

BOARD OF AGRICULTURE

Phyllis Shimabukuro-Geiser
Chairperson

CONTRACT SPECIFICATIONS AND PLANS

Job No. DOASW08-C
Statewide Water Meter Replacement and
Miscellaneous Improvements
Molokai, Hawaii

May 2020

State of Hawaii
DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
Honolulu, Hawaii

CONTRACT SPECIFICATIONS AND PLANS

Job No. DOASW08-C
Statewide Water Meter Replacement and
Miscellaneous Improvements
Molokai, Hawaii

Approved:



Brian K. Kau, P.E.
Administrator and Chief Engineer
Agricultural Resource Management Division
Department of Agriculture

May 2020

CONTENTS

THE CONTRACT DOCUMENTS FORMING THE CONTRACT CONSISTS OF THE FOLLOWING:

NOTICE TO BIDDERS	iii
INFORMATION AND INSTRUCTIONS TO BIDDERS.....	I-1
PROPOSAL	P-1
SPECIAL PROVISIONS.....	SP-1
DETAILED SPECIFICATIONS	S-1

PLANS (Bound Separately)

DEPARTMENT OF LAND AND NATURAL RESOURCES INTERIM GENERAL CONDITIONS, DATED OCTOBER 1994, as amended. (Included on project CD, or bound separately)

STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986. (Bound Separately)

NOTICE TO BIDDERS

(Chapter 103D, HRS)

COMPETITIVE BIDS for Job No. DOASW08-C Statewide Water Meter Replacement and Miscellaneous Improvements shall be submitted to the Department of Land and Natural Resources, Engineering Division on the specified date and time through the Hawaii State e-Procurement (HIePRO). HIePRO is accessible through the State Procurement Office website at www.spo.hawaii.gov.

The Department of Land and Natural Resources Interim General Condition, dated October 1994, as amended, and the General Conditions –AG008, latest revision shall be made part of the specifications.

The project is located throughout the Department of Agriculture irrigation water distribution systems at Molokai, Hawaii.

The work shall generally consist of the removal, replacement and disposal of existing meters and valves as designated. The work shall also include the installation of new valve boxes where indicated on the plans. The project includes all materials, tools, equipment, labor and other incidental work necessary, as required or called for in this Proposal, Specifications and Plans.

Due to the nature of work contemplated, bidders must possess a valid State Contractor's license, classification A.

The estimated cost of construction is \$1,200,000.

The award of the contract, if it be awarded, will be subject to the availability of funds.

This project is subject to preference to Hawaii Products established by Section 103D, Hawaii Revised Statutes. The Hawaii Product List may be examined at the State Procurement Office website.

Since the estimated cost of construction is equal to \$250,000 or more, the apprenticeship agreement preference pursuant to Hawaii Revised Statutes §103-55.6 (ACT 17, SLH 2009) shall apply.

Should there be any questions, please refer to the HIePRO solicitation.

INFORMATION AND INSTRUCTIONS TO BIDDERS

CONTENTS

	<u>Page</u>
A	Project Location and Scope of Work I-2
B	Proposals I-2
C	General Conditions I-2
D	Proposal Form I-2
E	Omissions or Erasures I-2
F	Notice of Intent to Bid and Questionnaire I-2
G	Bid Security I-2
H	Contractor's License Required I-2
I	Irregular Bids I-3
J	Withdrawal of Bids I-3
K	Successful Bidder to File Performance and Payment Bonds I-3
L	Number of Executed Original Counterparts of Contract Documents I-3
M	Change Orders I-3
N	Wages and Hours I-3
O	Permits I-3
P	Property Damage I-4
Q	Time I-4
R	Bidder's Responsibility to Provide Proper Superintendence I-4
S	Liquidated Damages I-4
T	Hiring of Hawaii Residents I-4
U	Water and Electricity I-5
V	Public Convenience and Safety I-5
W	Work to be Done Without Direct Payment..... I-5
X	As-Built Drawings I-5
Y	Asbestos Containing Materials I-5
Z	Worker Safety I-5
AA	Toilet Facilities I-6
BB	Signs I-6
CC	Field Office for Department I-6
DD	Quantities I-6
EE	Other Health Measures I-6
FF	Hawaii Business Requirement I-6
GG	Compliance With §3-122-112 HAR I-7

INFORMATION AND INSTRUCTIONS TO BIDDERS

- A. PROJECT LOCATION AND SCOPE OF WORK: The project location and scope of work shall be as generally described in the Notice to Bidders.
- B. PROPOSALS: Bidders shall submit their bid, including the completed proposal form, bid bond, and any other documents required by the solicitation, as part of their bid through the State of Hawaii e-Procurement System (HIePRO). See Item D, PROPOSAL FORM.
- C. GENERAL CONDITIONS: The Department of Land and Natural Resources Interim General Conditions dated October 1994, as amended, shall be made a part of these contract specifications and are referred to hereafter as the General Conditions.
- D. PROPOSAL FORM: **The Bidders shall fill out and upload the electronic copy of the proposal form to the HIePRO website when submitting the bid. Bid Proposals shall not be mailed, faxed or delivered to the State, unless requested to do so after the designated closing date. The successful Bidder shall fill out and print a hard copy of the proposal form, sign and submit the form with the contract award package.**
- E. OMISSIONS OR ERASURES: Any proposal which contains any omission or erasure or alteration not properly initialed, or conditional bid, or other irregularity may be rejected by the Department of Agriculture (Department).
- F. NOTICE OF INTENT TO BID AND QUESTIONNAIRE:
A Notice of Intent to Bid is not required for this project. In compliance with HRS Section 103D-310, the lowest responsive and responsible bidder may be required to complete a questionnaire. When requested by the State, the completed questionnaire shall be submitted to the Chief Engineer for evaluation. Failure to furnish the requested information within the time allowed may be grounds for a determination of non-responsibility, in accordance with HRS Section 103D-310 and HAR Section 3-122-108.
- G. BID SECURITY: A bid security will be furnished by each bidder as provided in sub-section 2.7 of the General Conditions. The successful bidder's bid security will be retained until Contract execution and furnished a performance and payment bond in an amount equal to one hundred percent (100%) of the total Contract price, including an amount estimated to be required for extra work, is furnished.
- The Department reserves the right to hold the bid securities of the four lowest bidders until the successful bidder has entered into a contract and has furnished the required performance bond. All bid securities will be returned in accordance with sub-section 3.5 of the General Conditions.
- Should the successful bidder fail to enter into a contract and furnish a satisfactory performance bond within the time stated in the proposal, the bid security shall be forfeited as required by law.
- H. CONTRACTOR'S LICENSE REQUIRED: The Department will reject all bids received from contractors who have not been licensed by the State Contractors License Board in

accordance with Chapter 444, HRS; Title 16, Chapter 77, Hawaii Administrative Rules; and statutes amendatory thereto.

- I. IRREGULAR BIDS: No irregular bids or propositions for doing the work will be considered by the Department.
- J. WITHDRAWAL OF BIDS: No bidder may withdraw his bid between the time of the opening thereof and the award of contract.
- K. SUCCESSFUL BIDDER TO FILE PERFORMANCE AND PAYMENT BONDS: The successful bidder will be required to file performance and payment bonds each; in the amount equal to the total contract price, including amounts estimated to be required for extra work, as provided in sub-section 3.6 of the General Conditions.
- L. NUMBER OF EXECUTED ORIGINAL COUNTERPARTS OF CONTRACT DOCUMENTS: If requested by the Department, six copies of the Contract, performance and payment bonds shall be executed.
- M. CHANGE ORDERS: No work of any kind in connection with the work covered by the plans and specifications shall be considered as change order work, or entitle the Contractor to extra compensation, except when the work has been ordered in writing by the Chief Engineer (Engineer) and in accordance with sub-section 4.2 of the General Conditions.

The Contractor shall clearly identify and inform the Engineer in writing of any deviations from the contract documents at the time of submission and shall obtain the Engineer's written approval to the specified deviation prior to proceeding with any work.

- N. WAGES AND HOURS: In accordance with sub-sections 7.3 to 7.9 of the General Conditions relative to hours of labor, minimum wages and overtime pay, the current minimum wage rates promulgated by the Department of Labor and Industrial Relations (DLIR) shall be paid to the various classes of laborers and mechanics engaged in the performance of this contract on the job site. The minimum wages shall be increased during the performance of the contract in an amount equal to the increase in the prevailing wages for those kinds of work as periodically determined by the DLIR.

The Department will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the said minimum wage rates. The possibility of wage increase is one of the elements to be considered by the Contractor in determining his bid, and will not, under any circumstances, be considered as the basis of a claim against the Department under this Contract.

No work shall be done on Saturdays, Sundays, legal State holidays, and/or in excess of eight (8) hours each day without the written consent of the Engineer. Should permission be granted to work at such times, the Contractor shall pay for all inspection administrative costs thereof. No work shall be done at night unless authorized by the Engineer.

- O. PERMITS: The State will process permit applications whenever possible, and the Contractor shall procure the pre-processed permits and pay the required fees. If permit applications are not processed by the State, the Contractor shall process the permit applications, permits and

licenses, and pay all charges and fees. In all cases, the Contractor shall give all notices necessary and incident to the due and lawful prosecution of the work.

- P. PROPERTY DAMAGE: It shall be the responsibility of the contractor to respect State property and to prevent damage to existing improvements. The Contractor will be responsible for damages resulting from construction operations. Immediately upon discovery, the Contractor shall repair such damage to the satisfaction of the Engineer.

All trees and shrubbery outside the excavation, embankment or construction limits shall be fully protected from injury.

- Q. TIME: The time of completion is specified in the Proposal. It is the Department's intention to insist the Contractor diligently prosecute the work to completion within the specified time.

Prospective bidders are reminded that the State has the option to proceed with or abandon a project depending on whether the project can be completed for occupancy in the specified time.

It is the bidder's responsibility to check the availability of all materials before bidding. The bidder shall select sub-contractors and suppliers who can warrant availability and delivery of all specified or qualified materials to assure project completion within the specified time.

The successful bidder must assume all risks for completing the project by the specified date. There shall be no extension of time for any reason except for delays caused by acts of God, labor disputes involving unions, or actions of the State. If for any reason the project falls behind schedule, the Contractor shall at its own cost, take necessary remedial measures to get the project back on schedule, i.e., working overtime, air freighting all materials, etc. In addition, if the Contractor fails to fully complete the project by the completion date, Contractor will be required to make the facility usable at its own cost.

- R. BIDDER'S RESPONSIBILITY TO PROVIDE PROPER SUPERINTENDENCE: The successful low bidder shall designate in writing to the Engineer the name of its authorized superintendent (Superintendent), who will be present at the job site whenever any work is in progress. The Superintendent shall be responsible for all work, receiving and implementing instructions from the Engineer in a timely manner. The cost for superintendence shall be considered incidental to the project.

If the Superintendent is not present at the site of work, the Engineer shall have the right to suspend the work as described under sub-section 5.5 c. and 7.20 - Suspension of Work of the General Conditions.

- S. LIQUIDATED DAMAGES: Liquidated damages in the amount specified in the Proposal will be assessed for each and every calendar day from and after the expiration of the time period stated in the Contract for the completion of the project.

- T. HIRING OF HAWAII RESIDENTS: The Contractor shall comply with Act 68, SLH 2010, in the performance and for the duration of this contract. The Contractor shall ensure that Hawaii residents compose not less than eighty percent of the workforce employed to perform the contract work on the project. The eighty percent requirement shall be determined by

dividing the total number of hours worked on the contract by Hawaii residents, by the total number of hours worked on the contract by all employees of the Contractor in the performance of the contract. The hours worked by any Subcontractor of the Contractor shall count towards the calculation for this section. The hours worked by employees with shortage trades, as determined by the Department of Labor and Industrial Relations (DLIR), shall not be included in the calculation for this section.

The requirements shall apply to any subcontract of \$50,000 or more in connection with the Contractor, that is, such Subcontractors must also ensure that Hawaii residents compose not less than eighty percent of the Subcontractor's workforce used to perform the subcontract.

- U. WATER AND ELECTRICITY: The Contractor shall make all necessary arrangements and pay all expenses for water and electricity used in the construction of this project.
- V. PUBLIC CONVENIENCE AND SAFETY: The Contractor shall conduct construction operations with due regard to the convenience and safety of the public at all times. No materials or equipment shall be stored where it will interfere with the safe passage of public traffic. The Contractor shall provide, install, and maintain in satisfactory condition, all necessary signs, flares and other protective facilities and shall take all necessary precautions for the protection of the work and the convenience and safety of the public. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the General Conditions.
- W. WORK TO BE DONE WITHOUT DIRECT PAYMENT: Whenever the contract that the Contractor is to perform work or furnish materials of any kind for which no price is fixed in the contract, it shall be understood that the Contractor shall perform such work or furnish said materials without extra charge or allowance or direct payment of any sort. The cost of performing such work or furnishing said material is to be included by the Contractor in a unit price for the appropriate item unless it is expressly specified that such work or material is to be paid for as extra work.
- X. AS-BUILT DRAWINGS: As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required. All authorizations given by the Engineer to deviate from the plans shall be drawn on the job site plans. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded on the as-built drawings. Final as-built drawings shall be submitted to the Engineer for review and approval. After the Engineer approves the as-built drawings, the contractor shall submit an electronic copy in Adobe PDF format on CD ROM.
- Y. ASBESTOS CONTAINING MATERIALS: The use of asbestos containing materials or equipment is prohibited. The Contractor shall insure that all materials and equipment incorporated in the project are asbestos-free.
- Z. WORKER SAFETY: The Contractor shall provide, install and maintain in satisfactory condition all necessary protective facilities and shall take all necessary precautions for the protection and safety of its workers in accordance with the Occupational Safety and Health Standards for the State of Hawaii. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the

General Conditions.

- AA. TOILET FACILITIES: All toilet facilities constructed at the project site shall be in accordance with the Public Health Regulations of the State Department of Health (DOH). All necessary precautions shall be observed at the project site. The use of sanitary facilities shall be strictly enforced and workers violating these provisions shall be promptly discharged.
- BB. SIGNS: Whenever the project involves closing or obstructing any public thoroughfare, the Contractor shall provide traffic signs conforming to the applicable provisions of the current edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways", published by the Federal Highway Administration as directed by the Engineer for the purpose of diverting or warning traffic prior to the construction area. All traffic signs shall bear proper wording stating thereon the necessary information as to diverting or warning traffic.

When indicated in the Proposal, the Contractor shall provide a project sign, size 4'-0" x 7'-0" to be placed as directed by the Engineer. The sign shall be constructed in accordance with Section 01581 - Project Sign of these specifications and approved by the Engineer. All wording, type and size of lettering and color selection shall be as specified in these specifications or as approved by the Engineer.

All signs shall be kept neat and clean, and properly erected at all times.

- CC. FIELD OFFICE AREA FOR DEPARTMENT: When indicated in the Proposal, the Contractor shall provide a housed working area of at least 100 square feet adjacent to the Contractor's office for the Department's use. This area will be used by the Engineer to perform tests and to store equipment. As a minimum, the field office shall include the following: standard sized office desk and chair, lighting, ventilation, window-type air conditioning rated at 5,000 BTU, door and window with locking hardware, electrical outlets, and working communications facilities (a cellular telephone is acceptable). The Department will pay for all long distance toll charges made by the Engineer.
- DD. QUANTITIES: All bids will be compared on the basis of quantities of work to be done as shown in the Proposal; the quantities shown in the Unit Price items are estimated, being given as a basis for comparison of bids. The Department reserves the right to increase or decrease the quantities given under the items or delete items entirely as may be required during the progress of the work.
- EE. OTHER HEALTH MEASURES: Forms of work site exposure or conditions which may be detrimental to the health or welfare of workers or of the general public shall be eliminated or reduced to safe levels as required by the DOH codes, standards, and regulations. Suitable first aid kits and a person qualified to render first aid, as specified in the DOH regulations, shall be provided at all times when work is scheduled.
- FF. HAWAII BUSINESS OR COMPLIANT NON-HAWAII BUSINESS REQUIREMENT: Bidders (Contractors) shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract, as stipulated in §3-122-112 HAR.

GG. COMPLIANCE WITH §3-122-112 HAR:

As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the apparent low bidder shall furnish the required documents to the Department. If the valid required certificates are not submitted on a timely basis for award of a contract, a bidder otherwise responsive and responsible may not receive the award. Bidder is responsible to apply for and submit the following documents to the Department.

- A. **TAX CLEARANCE REQUIREMENTS (HRS Chapter 237):** Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by the Department.
- B. Department of Labor (DLIR) “**Certificate of Compliance**”. (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers’ Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care): Bidder shall obtain a certificate of compliance from the Hawaii State Department of Labor and Industrial relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by the Department.
- C. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) “**Certificate of Good Standing**”. Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

Alternately, instead of separately applying for these certificates at the various state agencies, bidder may choose to use the Hawaii Compliance Express (HCE), which allows businesses to register online through a simple wizard interface at <http://vendors.ehawaii.gov> to acquire a “Certificate of Vendor Compliance” indicating the bidder’s status is compliant with the requirements of §103D-310(c), HRS, and shall be accepted for contracting and final payment purposes. Bidders that elect to use the new HCE services will be required to pay an annual fee of \$12.00 to the Hawaii Information Consortium, LLC (HIC). Bidders choosing not to participate in the HCE program will be required to provide the paper certificates as instructed in the previous paragraphs.

PROPOSAL

FOR

DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
State of Hawaii

JOB NO. DOASW08-C
STATEWIDE WATER METER REPLACEMENT AND
MISCELLANEOUS IMPROVEMENTS
Molokai, Hawaii

_____, 2020

Chief Engineer
Agricultural Resource Management Division
Department of Agriculture
State of Hawaii
Honolulu, Hawaii

Dear Sir:

The undersigned, having carefully examined the local conditions and all available records and information covering conditions which may affect the cost of the work to be performed, and having carefully examined the Plans and Specifications, and other contract documents, hereby proposes to furnish and pay for all materials, tools, equipment, labor and other incidental work necessary to remove and replace water meters, valves, laterals, valve boxes and covers, as required or called for in this Proposal, all according to the true intent and meaning of the Notice to Bidders, Information and Instructions to Bidders, Proposal, Detailed Specifications, Interim General Conditions, Plans, and any and all addenda for:

JOB NO. DOASW08-C
STATEWIDE WATER METER REPLACEMENT AND
MISCELLANEOUS IMPROVEMENTS

on file in the office of the Division of Agricultural Resource Management for the TOTAL SUM
BID (Items 1 to 6) of:

_____ Dollars (\$ _____) and
will fully complete all work under this contract within 180 consecutive calendar days from the date
of written notice to proceed, including date of said order, said total sum being itemized on the
following page.

PROPOSAL

Item#	Quantity	Unit	Description	Unit price	Total
<u>BASIC BID</u>					
1	Job	LS	Molokai – Mobilization & Demobilization (Total project mobilization & demobilization not to exceed 6% of the Total Sum Bid)	\$ _____	\$ _____
2	81	EA	Molokai – Remove existing meter and valve; Realign 2 inch piping and install new 2 inch meter and meter valve, and ball stop valve downstream of meter.	\$ _____	\$ _____
3	21	EA	Molokai – Remove existing meter and valve; Realign 4 inch piping and install new 4 inch meter and meter valve, and ball stop valve downstream of meter.	\$ _____	\$ _____
4	3	EA	Molokai – Remove existing meter and valve; Realign 6 inch piping and install new 6 inch meter and meter valve, and ball stop valve downstream of meter.	\$ _____	\$ _____
5	47	EA	Molokai – Remove existing meter box & replace with new concrete meter/valve boxes and cover; restore affected construction areas to original condition.	\$ _____	\$ _____
<u>MISCELLANEOUS</u>					
The prices for items 2 thru 5 shall include excavation and backfill for the replacement, modification, relocation of meter, valves, laterals, valve boxes and cover as required, labor, tools, equipment, materials and all incidentals necessary to construct the system in place complete.					
6	-	-	Molokai – Allowance, Project Sign.	\$ _____	\$ <u>5,000</u>
TOTAL SUM FOR BASE BID					\$ _____

ADDITIVE BID ITEM NO. 1

7	2	EA	Molokai – Remove existing meter and valve; Realign 1.5 inch piping and install new 1.5 inch meter and meter valve, and ball stop valve	\$ _____	\$ _____
---	---	----	---	----------	----------

Item#	Quantity	Unit	Description	Unit price	Total
			downstream of meter.		
8	87	EA	Molokai – Remove existing meter and valve; Realign 2 inch piping and install new 2 inch meter and meter valve, and ball stop valve downstream of meter.	\$ _____	\$ _____
9	18	EA	Molokai – Remove existing meter and valve; Realign 4 inch piping and install new 4 inch meter and meter valve, and ball stop valve downstream of meter.	\$ _____	\$ _____
10	3	EA	Molokai – Remove existing meter and valve; Realign 6 inch piping and install new 6 inch meter and meter valve, and ball stop valve downstream of meter.	\$ _____	\$ _____
11	1	EA	Molokai – Remove existing meter and valve; Realign 8 inch piping and install new 8 inch meter and meter valve, and ball stop valve downstream of meter.	\$ _____	\$ _____
12	68	EA	Molokai – Remove existing meter box & replace with new concrete meter/valve boxes and cover; restore affected construction areas to original condition.	\$ _____	\$ _____

MISCELLANEOUS

The prices for items 7 thru 12 shall include excavation and backfill for the replacement, modification, relocation of meter, valves, laterals, valve boxes and cover as required, labor, tools, equipment, materials and all incidentals necessary to construct the system in place complete.

**TOTAL SUM FOR
ADDITIVE NO. 1 (ITEMS 7 THRU 12)** \$ _____

ADDITIVE BID ITEM NO. 2

13	5	EA	Molokai – Remove existing 6-inch gate valve and replace with new 6-inch gate valve at transmission main blow-off valve locations specified on plans. Restore affected construction areas to original condition.	\$ _____	\$ _____
14	1	EA	Molokai – Replace damaged 6-inch pipe spool	\$ _____	\$ _____

Item#	Quantity	Unit	Description	Unit price	Total
			piece between transmission main and blow-off valve at location specified on plans. Restore affected construction areas to original condition.		
15	1	EA	Molokai – Replace damaged top slab of concrete manhole at location specified on plans. Restore affected construction areas to original condition.	\$ _____	\$ _____
TOTAL SUM FOR ADDITIVE NO. 2 (ITEMS 13 THRU 15)					\$ _____

ADDITIVE BID ITEM NO. 3

16	17	EA	Molokai – Delivery only of a spare 2-inch Meter including register and flanged connections as described in the plans and specifications.	\$ _____	\$ _____
17	4	EA	Molokai – Delivery only of a spare 4-inch Meter including register and flanged connections as described in the plans and specifications.	\$ _____	\$ _____
18	1	EA	Molokai – Delivery only of a spare 6-inch Meter including register and flanged connections as described in the plans and specifications.	\$ _____	\$ _____
TOTAL SUM FOR ADDITIVE NO. 3 (ITEMS 16 THRU 18)					\$ _____

TOTAL SUM BID INCLUDING ADDITIVE BID ITEMS NO 1 THRU NO 3: \$ _____

*Note: All quantities are provided for reference only, Contractor to verify. Contractor shall inform Engineer immediately following identification of quantity error greater than 5%. Re-measurement quantities greater than 10% following Notice to Proceed shall not be accepted for payment unless subject to a verified Claim or Compensation Event

HAWAII PRODUCTS PREFERENCE AND/OR USE OF HAWAII PRODUCTS

In accordance with Act 175, SLH 2009, the Hawaii products preference is applicable to this solicitation. Hawaii products may be available for items noted on the Offer Form. The Hawaii Products List is available on the SPO webpage at <http://hawaii.gov/spo>. Click on *Procurement of Goods, Services and Construction-Chapter 103D, HRS*; under *Procurement* click on *Preferences, Hawaii Products* and select *Hawaii Products List* to view.

Bidder offering a Hawaii product (“HP”) shall identify the HP in the table below. Any person desiring a Hawaii product preference shall have the product(s) certified and qualified, if not currently on the Hawaii Products List, prior to the deadline for receipt of offer(s) specified in the procurement notice and solicitation. The responsibility for certification and qualification shall rest upon the person requesting the preference.

Persons desiring to qualify their product(s) not currently on the Hawaii Product List, shall complete Form SPO-38, *Certification for Hawaii Product Preference*, and submit the completed form to the Procurement Officer providing any additional information required by the Procurement Officer. One form shall be completed and submitted for each product. Form SPO-38 is available on the SPO webpage at <http://hawaii.gov/spo>, under the *Quicklinks* menu click on *Forms for Vendors/Contractors/Services Providers*.

For the purpose of selecting the low bid when a solicitation contains both HP and non-HP, the price offered for a HP item shall be decreased by subtracting 10% for the class I or 15% for the class II HP item(s) offered. The lowest total offer, taking the preference into consideration, shall be awarded the contract, unless the offer provides for additional award criteria. The contract amount of any contract awarded, however, shall be the amount of the price offered, exclusive of the preferences.

In the event of any change that materially alters the bidder’s ability to supply the Hawaii product(s), the bidder shall immediately notify the procurement officer in writing and the parties shall enter into discussions for the purpose of revising the contract or terminating the contract for convenience.

Item No.	Pre-Approved Hawaii Product Description & Manufacturer	Class (I or II)	Quantity	Unit Measure	Unit Price	Total Price

RECYCLED PRODUCTS PREFERENCE

This project allows a 10% price preference for recycled products in accordance with HRS 103D-1005. Bidders are required to complete this section. FAILURE TO COMPLETE THIS SECTION MAY BE SUFFICIENT CAUSE FOR REJECTION OF THE BID.

Only the following products are being considered for the recycled product preference. Please indicate your selection of recycled or non-recycled product by indicating its cost FOB jobsite unloaded in the schedule below, including applicable General Excise & Use Taxes.

<u>DESCRIPTION</u>	<u>RECYCLED PRODUCT COST</u>	<u>NONRECYCLED PRODUCT COST</u>
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____

The bidder requesting a recycled product preference by his selection above, shall also complete and submit the form "CERTIFICATION OF RECYCLED CONTENT" as shown in the Interim General Conditions and provide all supporting information with this proposal. Additional information may be requested to qualify a product.

The following definitions are applicable to the CERTIFICATION OF RECYCLED CONTENT form:

"Post-consumer recovered material" means any product used by a consumer, including a business that purchases the material, that has served its intended end use, and that has been separated or diverted from the solid waste stream for the purpose of use, reuse, or recycling.

"Product" includes materials, manufactures, supplies, merchandise, goods, wares, and foodstuffs.

"Recovered material" means waste material and by-products that have been separated, diverted, or removed from the solid waste stream after a manufacturing process for the purpose of use, reuse, or recycling. Recovered material does not include those materials and by-products that are generated and normally reused on-site or within original manufacturing processes (such as mill broke, in the case of paper products).

"Recycled content" means the percentage of a product composed of recovered material, or post-consumer recovered material, or both.

"Recycled product" means a product containing recovered material, or post-consumer recovered material, or both.

The bidder agrees that preference for recycled products shall be taken into consideration to determine the low bidder in accordance with said Section and the rules promulgated, however, the award of contract will be in the amount of the bid offered exclusive any preference.

APPRENTICESHIP AGREEMENT PREFERENCE

1. If applicable to this project, any bidder seeking the preference must be a party to an apprenticeship agreement registered with the State Department of Labor and Industrial Relations (DLIR) at the time the bid is submitted for each apprenticeable trade the bidder will

employ to construct the project. "Employ" means the employment of a person in an employer-employee relationship.

- a. The apprenticeship agreement shall be registered with the DLIR and conform to the requirements of Hawaii Revised Statutes Chapter 372.
 - b. Subcontractors do not have to be a party to an apprenticeship agreement for the bidder to obtain preference.
 - c. The bidder is not required to have apprentices in its employ at the time the bid is submitted to qualify for the preference.
2. A bidder seeking the preference must state the apprenticeable trade the bidder will employ for each trade to be employed to perform the work by submitting a completed signed original Certification Form 1 verifying participation in an apprenticeship program registered with DLIR. "Apprenticeable trade" shall have the same meaning as "apprenticeable occupation" pursuant to Hawaii Administrative Rules (HAR) §12-30-5.
- a. The Certification Form 1 shall be authorized by an apprenticeship sponsor listed on the DLIR list of registered apprenticeship programs. "Sponsor" means an operator of an apprenticeship program and in whose name the program is approved and registered with the DLIR pursuant to HAR §12-30-1.
 - b. The authorization shall be an original signature by an authorized official of the apprenticeship sponsor.
 - c. The completed signed original Certification Form 1 for each trade must be submitted with the bid. Previous certifications shall not apply.
 - d. When filling out the Certification Form 1, the name of Apprenticeable Trade and Apprenticeship Sponsor must be the same as recorded in the List of Construction Trades in Registered Apprenticeship Programs that is posted on the DLIR website. "Registered apprenticeship program" means a construction trade program approved by the DLIR pursuant to HAR §12-301 and §12-30-4.
 - e. The Certificate Form 1 and the List of Construction Trades in Registered Apprenticeship Programs is available on the DLIR website at:
<http://hawaii.gov/labor/wdd>.
3. Upon receiving the Certification Form 1, the Procurement Officer will verify that the apprenticeship program is on the List of Construction Trades in Registered Apprenticeship Programs and that the form is signed by an authorized official of the Apprenticeship Program Sponsor. If the programs and signature are not confirmed by the DLIR, the bidder will not qualify for the preference.
4. If the bidder is certified to participate in an apprenticeship program for each trade which will be employed by the bidder for the project, a preference will be applied to decrease the bidder's bid amount by five percent (5%) for evaluation purposes.
5. Should the bidder qualify for other preferences (e.g. Hawaii Products), all applicable preferences shall be applied to the bid price.

CONDITION OF AWARD

It is understood that the award of the contract will be made on the basis of the lowest responsible Total Bid (Items 1 to 6) selected by the Department of Agriculture (DOA). Write the total of bid items 1 to 6 on page P-1.

In the event the low bid is below the available funds certified by the appropriate fiscal officer, the head of the purchasing agency responsible for the procurement in question is authorized to award Additives to the lowest bidder. The award of Additives may be in any order or combination such that the Base Bid plus Additives do not exceed the available funds.

It is understood and agreed that the Department of Agriculture reserves the right to reject any and/or all bids and waive any defects when, in the DOA's opinion, such rejection or waiver will be for the best interest of the State of Hawaii.

In the event all bids exceed available funds certified by the appropriate fiscal officer, the head of the purchasing agency responsible for the procurement in question is authorized in situations where time or economic considerations preclude resolicitation of work of a reduced scope to negotiate an adjustment of the bid price, including changes in the bid requirements, with the low responsible and responsive bidder, in order to bring the bid within the amount of available funds. It is understood and agreed upon that the head of the purchasing agency may delete a portion or all of any item(s) in the proposal at the stated unit or lump sum price as necessary to stay within the available funding. The bidder is responsible to make an earnest effort to represent the actual cost of each item, including all materials, labor, equipment, overhead and profit in their bid proposal to preclude claims of anticipated profit or loss of profit because of an unbalanced bid proposal.

It is also understood that if a mutually agreeable cost for the reduced scope of work necessitated by a lack of available funds cannot be agreed upon between the bidder and the head of the purchasing agency within 14 calendar days after the bid opening, then the bid may be rejected in the best interest of the purchasing agency, and the head of the purchasing agency may negotiate in progressive order (lowest to highest) with the next lowest responsible and responsive bidder.

It is also understood and agreed that the award of the contract shall be conditioned upon funds being made available for this project and further upon the right of the Department of Agriculture to hold all bids received for a period of sixty (60) days from the date of the opening thereof, unless otherwise required by law, during which time no bid may be withdrawn.

It is also understood that Notice to Proceed may be delayed up to one (1) year after the bid opening date, and that no additional compensation will be provided for any claim for escalation or delay for issuance of Notice to Proceed on or before that date.

It is also understood and agreed that the quantities given herewith are approximate only and are subject to increase or decrease, and that the undersigned will perform all quantities of work as either increased or decreased, in accordance with the provisions of the Contract Specifications.

It is also understood and agreed that the estimated quantities shown for the items for which a UNIT PRICE is asked in this Proposal are only for the purpose of comparing on a uniform basis, bids offered for the work under this contract, and the undersigned agrees that he is satisfied with and will at no time, dispute said estimated quantities as a means of claims for anticipated profit or loss of profit, because of a difference between the quantities of the various classes of work done or the materials and equipment installed, and the said estimated quantities. On UNIT PRICE bids, payment will be made only for the actual number of units incorporated into the finished project at the contract UNIT PRICE.

After the proposals are opened and read, the figures will be extended and/or totaled in accordance with the bid prices of the acceptable proposals and the totals will be compared. In the comparison of bids, words written in the proposal shall govern over figures and unit prices will govern over totals. Until the award of the contract, however, the right will be reserved to reject any and all proposals and to waive any defects or technicalities as may be deemed best for the interest of the State.

It is also understood and agreed that liquidated damages in the amount of Three-hundred and no/100 Dollars (\$300.00) for each and every calendar day in excess thereof prior to completion of the contract shall be withheld from payments due to the Contractor.

It is also understood and agreed that if this bid is accepted, the successful bidder must enter into and execute a contract with the Department of Agriculture and furnish a Performance and Payment Bond, as required by law. These bonds shall conform to provisions of Section 103D-324 and 325, Hawaii Revised Statutes and any law applicable hereto.

It is also understood and agreed that the successful bidder will provide all necessary labor, materials, tools, equipment, and other incidentals necessary to do all the work and furnish all the materials specified in the contract in the manner and time herein prescribed, and according to the requirements of the Engineer as therein set forth.

It is understood that by submitting this proposal, the undersigned is declaring that his firm has not been assisted or represented on this matter by an individual who has, in a State capacity, been involved in the subject matter of this contract in the past two years.

It is understood that by submitting this proposal in accordance with HAR 3-122-192, the undersigned is declaring that the price submitted is independently arrived without collusion.

It is also understood that by submitting this proposal, a Certification for Safety and Health Programs for bids in excess of \$100,000 (in accordance with HRS 396-18), the undersigned certifies that his organization will have a written safety and health plan for this project that will be available and implemented by the Notice to Proceed date of this project. Details of the requirements of this plan may be obtained from the Department of Labor and Industrial Relations, Occupational, Safety and Health Division (HIOSH).

It is further understood and agreed that the successful bidder shall comply with paragraph 3.1.a "SUBCONTRACTING" of the General Provisions which requires that the contractor shall perform with his own organization and with the assistance of workmen under his immediate superintendence, work of a value not less than twenty percent (20%) of the value of all work embraced in the Contract, except that certain contract items of work, if specifically referred to in the special provisions, will be exempted from said twenty percent requirement.

Compliance with §103-310 HRS. As a condition of award all bidders shall comply with all laws governing entities doing business in the State, including Chapter 237 HRS (general excise tax); Chapter 383 HRS (employment security – unemployment insurance); Chapter 386 HRS (workers compensation); Chapter 392 HRS (temporary disability insurance); and Chapter 393 HRS (pre-paid health care), and shall produce all documents to the State (DLNR, Engineering Division) required to demonstrate compliance with these subsections. Any bidder making a false affirmation or certification under this subsection shall be suspended and may be debarred from further offerings or awards pursuant to §103D-702 HRS.

RECEIPT OF ADDENDA

The bidder also acknowledges receipt of any and all addenda issued by the Division of Agricultural Resource Management, by recording the date of receipt of the respective addenda in the space provided below:

<u>Addendum</u>	<u>Date Received</u>	<u>Addendum</u>	<u>Date Received</u>
No. 1	_____	No. 5	_____
No. 2	_____	No. 6	_____
No. 3	_____	No. 7	_____
No. 4	_____	No. 8	_____

It is understood that failure to receive any such addendum shall not relieve the Contractor from any obligation under this Proposal as submitted.

It is also understood and agreed that if this Proposal is accepted and the undersigned should fail or neglect to contract as aforesaid, the DOA may determine that the bidder has abandoned the Contract, and thereupon, forfeiture of the security accompanying his proposal shall operate and the same shall become the property of the DOA.

CAMPAIGN CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS PROHIBITED

If awarded a contract in response to this solicitation, offeror agrees to comply with HRS §11-355, which states that campaign contributions are prohibited from a State and country government contractor during the term of the contract if the contractor is paid with funds appropriated by the legislative body between the execution of the contract through the completion of the contract.

JOINT CONTRACTORS OR SUBCONTRACTORS
TO BE ENGAGED ON THIS PROJECT

The Bidder agrees that the following is a complete listing of all joint contractors or subcontractors covered under Chapter 444, Hawaii Revised Statutes (HRS), who will be engaged by the Bidder on this project to perform the required work indicated pursuant to Section 103D-302, HRS. 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. The Bidder certifies that the completed listing of joint contractors or subcontractors fulfills the requirements for the project and the Bidder, together with the listed subcontractors or joint contractors have all the specialty contractor's licenses to complete the work, except as provided for in HRS §103D-302(b). Failure of the Bidder to comply with this requirement may be just cause for rejection of the bid.

“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 in which 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.

General Engineering “A” Contractors automatically have these “C” specialty contractor's licenses: C-3, C-9, C-10, C-17, C-24, C-31a, C-32, C-35, C-37a, C-37b, C-38, C-43, C-49, C-56, C-57a, C-57b and C-61.

General Building “B” Contractors automatically have these “C” specialty contractor's licenses: C-5, C-6, C-10, C-12, C-24, C-25, C-31a, C-32a, C-42a and C-42b.

In completing the Joint Contractors or Subcontractors List, describe the specialty contractor's nature and scope of work to be performed for this project and provide the complete firm name of the joint contractor or subcontractor in the respective columns. If the Bidder is a general contractor providing the work of a required specialty contractor, whose license is not automatically held pursuant to HAR 16-77-32, fill in the Bidder's (general contractor's) name and nature and scope of work to be performed on this project.

List only one joint contractor or subcontractor per required specialty contractor's classification, unless within the same specialty, the work of each joint contractor or subcontractor can be described so that there is no overlap in work descriptions.

If a contractor's license is required by law for the performance of the work which is called for in this bid, the bidder and all subcontractors must have the required license before the submission of the bidder's proposal in the case of a non-federal aid project, and for federal-aid projects, the bidder must have the required license prior to the award of the project and all subcontractors prior to the start of the subcontracted work.

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

Enclosed herewith is a:

- 1. Surety Bond (*1))
- 2. Legal Tender (*2))
- 3. Cashier's Check (*3))
- 4. Certificate of Deposit (*3)) in the
- 5. Certified Check (*3)) amount
- 6. Official Check (*3)) of
- 7. Share Certificate (*3))
- 8. Teller's Check (*3))
- 9. Treasurer's Check (*3))

(Cross Out Those Not Applicable)

Dollars (\$ _____)

as required by law.

Respectfully submitted,

Name of Company, Joint Venture
or Partnership

Contractor's License No.

By _____
Signature (*4)

Title _____

Print _____ Name _____

Date _____

Address _____

Telephone No. _____

E-Mail Address _____

NOTES:

1. Surety bond underwritten by a company licensed to issue bonds in this State;
2. Legal tender; or
3. A certificate of deposit; share certificate; or cashier's, treasurer's, teller's, or official check drawn by, or a certified check accepted by, and payable on demand to the State by a bank, a savings institution, or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration.
 - A. These instruments may be utilized only to a maximum of \$100,000.
 - B. If the required security or bond amount totals over \$100,000, more than one instrument not exceeding \$100,000 each and issued by different financial institutions shall be accepted.
4. Please attach to this page evidence of the authority of this officer to submit bids on behalf of the Company and also the names and residence addresses of all officers of the Company.
5. Fill in all blank spaces with information asked for or bid may be invalidated.
PROPOSAL MUST BE INTACT, MISSING PAGES MAY INVALIDATE YOUR BID.

End of Proposal

SPECIAL PROVISIONS

Amend INTERIM GENERAL CONDITIONS, dated October 1994, as follows:

Section 2 – Proposal Requirements and Conditions

1. **AMEND** Section 2.1 Qualification of Bidder with the following:

Written Notice of Intent to Bid or Offer: A written Notice of Intent to Bid is not required for the Solicitation.

Standard Qualification Questionnaire: Bidders may be required to complete a standard qualifications questionnaire. When requested, the information shall be furnished within two working days or longer at the discretion of the Engineer. Failure to furnish the requested information within the time allowed may be grounds for a determination of non-responsibility, in accordance with HRS Section 103D-310 and HAR Section 3-122-108.

Hawaii Business or Compliant Non-Hawaii Business Requirement: Bidders shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract, as stipulated in §3-122-112 HAR. A certified letter is not required prior to bid opening.

Compliance with §3-122-112 HAR: As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the apparent low bidder shall furnish the required documents to the Department. If the valid required certificates are not submitted on a timely basis for award of a contract, a bidder otherwise responsive and responsible may not receive the award. Bidder is responsible to apply for and submit the following documents to the Department.

- A. Tax Clearance (HRS Chapter 237): Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by the Department.
- B. Department of Labor (DLIR) “Certificate of Compliance”. (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers’ Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care): Bidder shall obtain a certificate of compliance from the Hawaii State Department of Labor and Industrial relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by the Department.
- C. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) “Certificate of Good Standing”. Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

Hawaii Compliance Express. Alternately, instead of separately applying for these certificates at the various state agencies, bidder may choose to use the Hawaii Compliance Express (HCE), which allows businesses to register online through a simple wizard interface at <http://vendors.ehawaii.gov> to acquire a “Certificate of Vendor compliance” indicating that bidder’s status is compliant with requirements of §103D-310(c), HRS, shall be accepted for contracting and final payment purposes.

Bidders that elect to use the new HCE services will be required to pay an annual fee of \$15.00 to the

Hawaii Information Consortium, LLC (HIC). Bidders choosing not to participate in the HCE program will be required to provide the paper certificates as instructed in the previous paragraphs.

2. **ADD** Section 2.4a, Pre-Bid Conferences

Required Pre-bid Conferences: For construction and design-build projects with an estimated value of \$500,000 or more and solicited under the competitive sealed bid method (103D-302 HRS); and for construction and design-build projects with an estimated value of \$100,000 or more and solicited under the competitive sealed proposal method (103D-303 HRS); a pre-bid conference is required.

Other Pre-Bid Conferences: The Department may require a pre-bid conference for construction or design-build projects that are below the dollar threshold listed in above or when projects have special or unusual requirements.

Other Conditions: The Department may require the prospective Bidders to make a physical inspection of the project site and make attendance at the pre-bid conference a condition for submitting an offer.

Nothing stated at the pre-bid conference shall change the solicitation unless a change is made by written addendum.

3. **DELETE** Section 2.5, Addenda and Interpretations, in its entirety and replace with the following:

“Discrepancies, omissions, or doubts as to the meaning of drawings and specifications should be communicated using the question and answer section on the HIEPRO solicitation for interpretation and must be received in the time frame set in the HIEPRO solicitation. Any interpretation, if made and any supplemental instructions will be in the form of written addenda to the plans and specifications and made available prior to the offer due date. It shall be the prospective bidder’s sole responsibility to verify and obtain any said addenda. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.”

Section 3 – Award and Execution of Contract

1. **AMEND** Section 3.3, Award of Contract, by deleting “sixty (60)” and replacing with “ninety (90)” in the first paragraph.

2. **AMEND** Section 3.3, Award of Contract, by adding the following after the first paragraph:

“If the contract is not awarded within the ninety (90) days, the Department may request the successful Bidder to extend the time for the acceptance of its bid. The Bidder may reject such a request without penalty; and in such case, the Department may at its sole discretion make a similar offer to the next lowest responsive and responsible bidder and so on until a bid is duly accepted or until the Department elects to stop making such requests.”

3. **AMEND** Section 3.9, Notice to Proceed, by deleting “180 days” and replacing with “one (1) year” in the last paragraph.

4. **ADD** Section 3.10, Protests:

“3.10 PROTESTS—Pursuant to Section 103D-701, Hawaii Revised Statutes, an actual or prospective offeror who is aggrieved in connection with the solicitation or award may submit a protest. Any protest

shall be submitting in writing to the Chairperson, Department of Land and Natural Resources, 1151 Punchbowl Street, Honolulu, Hawaii 96813, or designee as specified in the solicitation.

A protest shall be submitted in writing within five (5) working days after the aggrieved person knows or should have known the facts giving rise thereto; provided that a protest based upon the content of the solicitation shall be submitted in writing prior to the date set for receipt of offers. Further provided that a protest of an award or proposed award shall be submitted within five (5) working days after the posting of the award of the contract.

Section 5 – Control of Work

AMEND Section 5.8 Value Engineering Incentive by deleting “\$100,000” and replacing with “\$250,000” in the first paragraph.

Section 6 – Substitution of Materials and Equipment

ADD the following to Section 6.3 Sub-paragraph b:

4. If the substitution meets all the requirements of the specifications and plans.

Section 7 – Prosecution and Progress

1. **DELETE** Section 7.2d in its entirety and replace with the following:

“d. Insurance Requirements

1. Obligation of Contractor

The Contractor shall not commence any work until it obtains, at its own expense, all required insurance. Such insurance must have the approval of the Department as to limit, form and amount and must be maintained with a company authorized by law to issue such insurance in the State of Hawaii.

All insurance described herein will be maintained by the Contractor for the full period of the contract and in no event will be terminated or otherwise allowed to lapse prior to written certification of final acceptance of the work by the Department.

Certificate(s) of Insurance acceptable to the Department shall be filed with the Engineer prior to commencement of the work. These certificates shall contain a provision that coverages afforded under the policies will not be canceled or changed until at least thirty days written notice has been given to the Engineer by registered mail. The insurance policies shall name the State of Hawaii, its officers and employees as an additional insured and such coverage shall be noted on the Certificate. Should any policy be canceled before final acceptance of the work by the Department, and the Contractor fails to immediately procure replacement insurance as specified, the Department, in addition to all other remedies it may have for such breach, reserves the right to procure such insurance and deduct the cost thereof from any money due to the Contractor.

Nothing contained in these insurance requirements is to be construed as limiting the extent of Contractor’s responsibility for payment of damages resulting from its operations under this contract, including the Contractor’s obligation to pay liquidated damages, nor shall it affect the

Contractor's separate and independent duty to defend, indemnify and hold the Department harmless pursuant to other provisions of this contract. In no instance will the Department's exercise of an option to occupy and use completed portions of the work relieve the Contractor of its obligation to maintain the required insurance until the date of final acceptance of the work.

All insurance described herein shall cover the insured for all work to be performed under the contract, all work performed incidental thereto or directly or indirectly connected therewith, including traffic detour work or other work performed outside the work area, and all change order work.

The Contractor shall, from time to time, furnish the Engineer, when requested, satisfactory proof of coverage of each type of insurance required or a copy of the actual policies covering the work. Failure to comply with the Engineer's request may result in suspension of the work, and shall be sufficient grounds to withhold future payments due the Contractor and to terminate the contract for Contractor's default.

2. Types of Insurance

The Contractor shall purchase and maintain insurance described below which shall provide coverage against claims arising out of the Contractor's operations under the contract, whether such operations be by the Contractor itself or by the subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable.

- (a) Worker's Compensation. The Contractor and all subcontractors shall obtain full worker's compensation insurance coverage for all persons whom they employ or may employ in carrying out the work under this contract. This insurance shall be in strict conformity with the requirements of the most current and applicable State of Hawaii Worker's Compensation Insurance laws in effect on the date of the execution of this contract and as modified during the duration of the contract.
- (b) Commercial General Liability Insurance and Automobile Insurance. Contractor's commercial general liability insurance and automobile liability insurance shall both be obtained in a combined, single limit of not less than \$1,000,000 per occurrence that shall include coverage for bodily injury, sickness, disease or death of any person, arising directly or indirectly out of, or in connection with, the performance of work under this contract.

The Contractor's property damage liability insurance shall provide for a single combined limit of not less than \$1,000,000 for all damages arising out of injury to or destruction of property of others including the Department's, arising directly or indirectly out of or in connection with the performance of the work under this contract including explosion or collapse.

The Contractor shall either:

- i. Require each of its subcontractors to procure and to maintain during the life of its subcontract, subcontractors' comprehensive general liability, automobile liability and property damage liability insurance of the type and in the same amounts specified herein; or

- ii. Insure the activities of its subcontractors in its own policy.

The Contractor will be permitted, in cooperation with insurers, to maintain a self insured retention for up to 25% of the per occurrence combined single limits of the commercial general liability and the automobile liability policies. The existence of the self insured retention must be noted on the certificate of insurance coverage submitted to the Department or else it will be understood that the insurer is providing first dollar coverage for all claims. For all claims within the self-insured retention amount, the rights, duties and obligations between the Contractor and the Department shall be identical to that between a liability insurer and the Department, as an additional insured, as if there was no self-insured retention.

- (c) **Builder's Risk Insurance.** Unless included in the Specifications of this project, the Contractor shall not be required to provide builder's risk insurance. If required as noted in the Specifications, builder's risk insurance shall be provided during the progress of work and until final acceptance by the Department upon completion of the contract. It shall be "All Risk" (including but not limited to earthquake, windstorm and flood damage) completed value insurance coverage on all completed work and work in progress to the full replacement value thereof. Such insurance shall include the Department as additional name insured. The Contractor shall submit to the Engineer for its approval all items deemed to be uninsurable. The policy may provide for a deductible in an amount of up to 25% of the amount insured by the policy. With respect to all losses up to any deductible amount, the relationship between the Contractor and the Department shall be that of insurer and additional insured as if no deductible existed".

2. **DELETE** Section 7.16 in its entirety and replace with the following:

"RESPONSIBILITY FOR DAMAGE CLAIMS; INDEMNITY – The Contractor shall indemnify the State and the Department against all loss of or damage to the State's or the Department's existing property and facilities arising out of any act or omission committed in the performance of the work by the Contractor, any subcontractor or their employees and agents. Contractor shall defend, hold harmless and indemnify the Department and the State, their employees, officers and agents against all losses, claims, suits, liability and expense, including but not limited to attorneys' fees, arising out of injury to or death of persons (including employees of the State and the Department, the Contractor or any subcontractor) or damage to property resulting from or in connection with performance of the work and not caused solely by the negligence of the State or the Department, their agents, officers and employees. The State or the Department may participate in the defense of any claim or suit without relieving the Contractor of any obligation hereunder. The purchase of liability insurance shall not relieve the Contractor of the obligations described herein.

The Contractor agrees that it will not attempt to hold the State and its Departments and Agencies and their officers, representatives, employees or agents, liable or responsible for any losses or damages to third parties from the action of the elements, the nature of the work to be done under these specifications or from any unforeseen obstructions, acts of God, vandalism, fires or encumbrances which may be encountered in the prosecution of the work.

The Contractor shall pay all just claims for materials, supplies, tools, labor and other just claims against the Contractor or any subcontractor in connection with this contract and the surety bond will not be released by final acceptance and payment by the Department unless all such claims are paid or released. The Department may, but is not obligated to, withhold or retain as much of the monies due or to become due the Contractor under this contract considered necessary by the Engineer to cover such just claims

until satisfactory proof of payment or the establishment of a payment plan is presented.

The Contractor shall defend, indemnify and hold harmless the State and its Departments and Agencies and their officers, representatives, employees or agents from all suits, actions or claims of any character brought on account of any claims or amounts arising or recovered under the Worker's Compensation Laws or any other law, by-law, ordinance, order or decree.

Section 8 – Measurement and Payment

1. **DELETE** Section 8.7a in its entirety and replace with the following:

- a. Tax Clearances from the State of Hawaii Department of Taxation and Internal Revenue Service, subject to section 103D-328, HRS, current within two months of issuance date indicating that all delinquent taxes levied or accrued under State Statutes against the contractor have been paid.

2. **ADD** Section 8.7d, Certificate of Compliance:

- d. A Certification from the Contractor affirming that the Contractor has, as applicable, remained in compliance with all laws as required by Section 103D-310, HRS, and Section 3-122-112, HAR. A contractor making a false affirmation shall be suspended and may be debarred pursuant to section 103D-702, HRS.
 1. Certification of Compliance for Final Payment, State Procurement Office Form-22. Must be Signed Original.

3. **ADD** Section 8.7e, Hawaii Compliance Express:

- e. In lieu of submitting the tax clearances from Taxation and IRS, and SPO Form -22, the Contractor may choose to use the Hawaii Compliance Express as described on page SP-1 of this Special Provisions.

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS	SECTION NO.
<i>DIVISION 1 – GENERAL REQUIREMENTS</i>	
General Specifications	01019
Archeological Protection	01100
Permits and Licenses	01109
Construction Progress Documentation	01320
Submittal Procedures	01330
Environmental Protection	01430
Mobilization and Demobilization	01505
Barricades	01530
Pollution Control	01567
Project Sign	01581
Closeout Procedures	01770
<i>DIVISION 2 – SITEWORK</i>	
Site Preparation	02100
Structural Excavation and Backfill	02200
Trench Excavation and Backfill	02221
Temporary Soil Erosion Control	02270
Soil Treatment for Vegetation Control	02362
Demolition	02400
Road Pavement	02500
Pavement Markers, Striping, and Marking	02577
Meter and Valve Boxes	02605
Copper Pipe and Fittings	02630
Service Laterals	02646
<i>DIVISION 3 – CONCRETE</i>	
Concrete Formwork	03100
Concrete Reinforcement	03200
Concrete	03300
Pre-cast Concrete	03400
<i>DIVISION 4 – MASONRY</i>	
Concrete Unit Masonry	04220
<i>DIVISION 5 – METALS</i>	
Miscellaneous Metal	05100
Metal Fabrication	05500
<i>DIVISION 6 – WOODS AND PLASTICS</i>	
Not used	
<i>DIVISION 7 – THERMAL AND MOISTURE PROTECTION</i>	
Not used	

DIVISION 8 – DOORS AND WINDOWS

Not used

DIVISION 9 – FINISHES

Not used

DIVISION 10 – SPECIALTIES

Not used

DIVISION 11 – EQUIPMENT

Not used

DIVISION 12 – FURNISHINGS

Not used

DIVISION 13 – SPECIAL CONSTRUCTION

Asbestos Containing Material

13286

DIVISION 14 – CONVEYING SYSTEMS

Not used

DIVISION 15 – MECHANICAL

Not used

DIVISION 16 – ELECTRICAL

Not used

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01019 - GENERAL SPECIFICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work shall consist of furnishing all labor, tools, materials, and equipment necessary and required to construct in place complete all work as indicated on the drawings and as specified herein.

1.02 GENERAL

- A. Examination of Premises: The Contractor shall contact the Engineer and obtain permission before visiting the site.
- B. All lines and grades shall be established by a licensed surveyor, or licensed Civil Engineer, registered in the State of Hawaii. The Contractor shall submit evidence of current and valid registration.
- C. Notices: The Contractor shall notify the Engineer and give at least 3 working days' notice before starting any work.
- D. Disruption of Utility Services: All work related to the temporary disconnection of utility services shall be pre-arranged with the Engineer so that any disruption of such services will be kept to a minimum. In the event temporary irrigation water hook up is required, the Contractor shall provide the necessary services.
- E. Contractor's Operations
 - 1. The Contractor must employ, insofar as possible, such methods and means of carrying out the work so as not to cause any interruption or interference to the irrigation water system operations. Where the Contractor's operations would result in interruptions which would significantly hamper the operations of the irrigation water system, the Contractor shall rearrange the schedule of work accordingly.
 - 2. The Contractor shall maintain safe passageway to and from the project area for the Department of Agriculture personnel, property owners, and the public at all times.
- F. Lead Paint
 - 1. When the project includes paint to be disturbed that was applied prior to 1980, it shall be assumed to contain lead. The Contractor shall inform its employees, subcontractors, and all other persons engaged in the project that lead containing paints may be present throughout the existing irrigation system at the job site and to follow the requirements of the Department of Labor and Industrial Relations, Division of Occupational Safety and Health, Title 12, Subtitle 8, Chapter 148, Lead Exposure in Construction, Hawaii Administrative Rules (Chapter 12-148, HAR).
- G. Parking Policy for Contractor
 - 1. The Contractor and its employees will not be allowed to park vehicles and equipment on private property.

2. Areas to be used by the Contractor shall be as designated by the Engineer. Any lawn damaged by the Contractor shall be restored as instructed by the Engineer at no cost to the State.
- H. Toilet Accommodations: It is the Contractor's responsibility to provide toilet facilities as required for their personnel, unless otherwise directed by the Engineer.
- I. Protection of Property: The Contractor shall continually maintain adequate protection of all its work from damage and shall protect all property, including but not limited to buildings, equipment, furniture, grounds, vegetation, material, utility systems located at and adjoining the job site. The Contractor shall repair, replace, or pay the expense of repair of damages resulting from its operations.
- J. Use of Power-Driven Equipment: The Contractor is cautioned to take all necessary safety precautions to protect adjacent property, personnel, and the public whenever power driven equipment is used.
- K. Safety: The Contractor shall carefully read and strictly comply with the requirements of the Hawaii Occupational Safety and Health Law, Chapter 396, Hawaii Revised Statutes, as amended, is applicable and made a part of the Contract.
- L. Clean Up Premises: The Contractor shall clean up and remove from premises all debris accumulated from operations as necessary or as directed. See also Section 7.25 of the General Conditions.
- M. Responsibility
1. The State will hold the Contractor liable for all the acts of Subcontractors and shall deal only with the prime Contractor in matters pertaining to other trades employed on the job. The Contractor shall be responsible for coordinating the work of all trades on the job.
 2. Should the Contractor discover any discrepancy in the plans or specifications, the Contractor shall immediately notify the Engineer before proceeding any further with the work, otherwise, the Contractor will be held responsible for any cost involved in correction of work placed due to such discrepancy.
- N. Cooperation with Other Contractors: The State reserves the right at any time to contract for or otherwise perform other or additional work within the contract zone limits of this Contract. The Contractor of this project shall, to the extent ordered by the State, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by other contractors.
- O. Division of the Work: The Divisions and Sections into which these Specifications are divided shall not be considered an accurate or complete segregation of work by trades. This also applies to all work specified within each Section.
- P. Drawings and Specifications
1. The Contractor shall not make alterations in the drawings and specifications. In the event the Contractor discovers any errors or discrepancies, the Contractor shall immediately notify the Engineer in accordance with the General Conditions.

2. Where devices, or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items, or parts as are required to properly complete the work.
3. Specifications and drawings are prepared in abbreviated form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", "an", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.

Q. Required Submittals

1. Required submittals as specified in the Technical Sections of these specifications include one or more of the following: Shop drawings; material samples; technical data; schedules of materials; schedules of operations; guarantees; operating and maintenance manuals; and as built drawings.
2. The Contractor shall make a comprehensive list of the required submittals, by Specification Section, and submit this list to the Engineer within 15 days after notice to proceed.
3. As Built Drawings: When as built drawings are required for submittal, the following shall apply:
 - a. As built drawings, the intent of which is to record the actual in place construction so that any future renovations or tie ins can be anticipated accurately, shall be required.
 - b. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded in red on the as built drawings.
 - c. The following procedure shall be followed:
 - 1) Immediately after these changes are constructed in place, the Contractor shall record them on the field office plans.
 - 2) Within two weeks after final inspection of the project, the Contractor shall transfer the changes marked on the field office plans onto a clean copy of plans using a red pencil. Any deletions shall be so noted and redrawn, as necessary. The Contractor shall stamp or mark the tracings "AS BUILT", and sign and date each drawing so marked.
 - 3) The Contractor shall submit the as built drawings to the Engineer for review and approval. After the Engineer approves the as-built drawings, the Contractor shall submit an electronic copy in Adobe PDF format on CD ROM.
 - 4) Any as built drawing which the Engineer determines does not accurately record the deviation shall be corrected by the State, and the Contractor shall be charged for the services.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01100 - ARCHAEOLOGICAL PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. This section covers the requirements for the protection and preservation of historical sites and values.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 CONSTRUCTION METHOD

- A. Representatives of the State will from time to time examine the area as work proceeds. If historical values are noted, the State may order a halt to the work in the vicinity of the historical values until the State can examine further. The Contractor shall notify the State if he finds anything he suspects to be of historic significance and shall discontinue further work in the vicinity of the find until the State can examine the area. In either case, further work in the vicinity of such historical or suspected historical values may proceed only upon approval by the State. Such approval can be normally expected within one week and shall in no case require more than one month.

END OF SECTION

SECTION 01109 - PERMITS AND LICENSES

PART 1 - GENERAL

1.01 GENERAL

- A. This special provision shall supplement Subsection 5.2.2 (k) "Permits, Licenses" of the GENERAL CONDITIONS.
- B. The Contractor shall be responsible for all applicable permits, charges, and fees required for completion of the project. The Contractor shall consult with all appropriate County and other governmental agencies to determine the applicable permits, charges and fees required for the Project. Unless otherwise specified in the Contract, 2 copies of all permits required for the Project shall be submitted to the Officer-in-Charge.
- C. Permits, charges, and fees required for the Project may include, but not be limited to, the following:
 - 1. Sidewalk and Driveway Permit
 - 2. Excavation Permit
 - 3. Street Usage Permit
 - 4. Chapter 55 Water Pollution Control, Hawaii Administrative Rules, Title 11, State Department of Health, permit for discharges of storm water associated with construction, discharge of hydro testing waters, discharges associated with construction activity dewatering, etc.
 - 5. Community Noise Control Permit
 - 6. Utility Excavation Permits

1.02 TIME REQUIREMENTS

- A. Time required to obtain all permits is considered part of the construction period of this contract, including the time required for the Contractor to renew any permits.

1.03 PAYMENT

- A. Payment for all costs and work covered by this section shall not be made directly but shall be considered as included in the prices bid for the various items of work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Submittals Schedule.
 - 3. Schedule of Prices.
 - 4. Payment Application.
- B. Related Sections include the following:
 - 1. SECTION 01330 - SUBMITTAL PROCEDURES for submitting schedules and reports.

1.02 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path and control the total length of the project. They must start and finish on the planned early start and finish times.
 - 2. Predecessor activity is an activity that must be completed before a given activity can be started.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of project.
- C. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either the Department or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

- F. Schedule of Prices: A statement furnished by Contractor allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Payment Applications.

1.03 SUBMITTALS

- A. Required Submittals: Submit 8 sets of the list of the required submittals, by Specification Section, within 15 days after award of the contract or upon earlier written instructions from the Contracting Officer.
 - 1. The listing shall indicate and include the following:
 - a. The number of copies required for submittal.
 - b. Planned submittal date.
 - c. Approval date required by the Contractor.
 - d. A space where the "date of submittal" can be inserted.
 - e. A space where the "date of approval" can be inserted.
 - f. A space where an "action code" can be inserted.
- B. Construction Schedule: Submit 7 sets of the Construction Schedule for review within 15 days after the award of the contract or upon earlier written instructions from the Contracting Officer.
- C. Schedule of Prices: Submit 3 sets of the Schedule of Prices integrated with the Construction Schedule for review within 15 days after the award of the contract or upon earlier written instructions from the Contracting Officer.
 - 1. Use the Department's forms for Payment applications.
- D. Payment Application: Submit the payment application at earliest possible date and no sooner than the last day of the month after all payroll affidavits, updated submittal registers, and schedules have been submitted.

1.04 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate Contractors.
- B. Construction Schedule: Coordinate Contractor's Construction Schedule with the Schedule of Prices, Submittals Schedule, loaded monthly event activity, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
- C. Schedule of Prices: Coordinate preparation of the schedule with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Prices with other required administrative forms and schedules, including the following:
 - a. The Department's Payment Application form and the Construction Progress Report continuation sheet for the event cost estimate per time period.
 - b. Submittals Schedule.

PART 2 - PRODUCTS

2.01 SUBMITTALS SCHEDULE

- A. Comply with the GENERAL CONDITIONS "SHOP DRAWINGS AND OTHER SUBMITTALS" Article. Furnish required submittals specified in this Section and in the Technical Sections. Submittals include one or more of the following: shop drawings, color samples, material samples, technical data, material safety data information, schedules of materials, schedules of operations, guarantees, certifications, operating and maintenance manuals, and field posted as-built drawings.
- B. Preparation: Furnish a schedule of submittals per Contracting Officer.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Prices, and Contractor's Construction Schedule.
 - 2. The schedule shall accommodate a minimum of 21 calendar days for the State's review, as applicable for the Island the project is located.
 - 3. Prepare and submit an updated list to the Contracting Officer at monthly intervals or as directed by the Contracting Officer. The listing shall reflect all approvals received since the last update.

2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE - GANTT CHART METHOD

- A. The construction schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. The progress chart shall indicate the order in which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment).
- B. Upon completion of the Contracting Officer's review, the Contractor shall amend the schedule as necessary to reflect the comments. If necessary, the Contractor shall participate in a meeting with the Contracting Officer to discuss the proposed schedule and changes required. Submit the revised schedule for review within 7 calendar days after receipt of the comments.
- C. Use the reviewed schedule for planning, organizing and directing the work, for reporting progress, and for requesting payment for the work completed. Unless providing an update, do not make changes to the reviewed schedule without the Contracting Officer's approval.
- D. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve progress, including those that may be required by the Contracting Officer, without additional cost to the State. The Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, or amount of construction plant, and to submit for approval any supplemental schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.
- E. Update the construction schedule at monthly intervals or when directed by the Contracting Officer to revise the schedule. Reflect any changes occurring since the last update with each invoice for progress payment. Submit copies of the purchase orders and confirmation of the delivery dates as directed. The Contracting Officer's review of the updated schedule is to check that the updated

schedule does not alter the construction performance period unless the period was revised through a change order or contract modification.

2.03 SCHEDULE OF PRICES

- A. Furnish a schedule of prices per Contracting Officer.
- B. Provide a breakdown of the Contract Sum in enough detail to facilitate developing and the continued evaluation of Payment Applications. Provide several line items for principal subcontract amounts, or for materials or equipment purchased or fabricated and stored, but not yet installed, where appropriate. Round amounts to nearest whole dollar; total shall equal the Contract Price.
- C. Each item in the Schedule of Prices and Payment Application shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

2.04 PAYMENT APPLICATION

- A. Use the Schedule of Prices as the Monthly Construction Progress Report. Each Payment Application shall be consistent with previous applications and payments. The Contracting Officer shall determine the appropriateness of each payment application item.
- B. Payment Application Times: The date for each progress payment is the last day of each month. The period covered by each Payment Application starts on the first day of the month or following the end of the preceding period and ends on the last day of the month.
- C. Updating: Update the schedule of prices listed in the Payment application when Change Orders or Contract Modifications result in a change in the Contract Price.
- D. Provide a separate line item for each part of the Work where Payment Application may include materials or equipment purchased or fabricated and stored, but not yet installed.
- E. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
- F. Provide separate line items for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- G. Payment Application Forms: Use and submit copies of the Payment Application and Construction Progress forms provided by Department. Forms are available at the Department's Public Works Division office or District office. Furnish 7 copies.
- H. Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of the Contractor.
 - 1. Entries shall match data on the Schedule of Prices and Contractor's Construction Schedule. Use updated schedules if revisions were made. Include amounts of Change Orders and Contract Modifications issued before last day of construction period covered by application.

- I. No payment will be made until the following are submitted each month:
 - 1. Monthly Estimate, 7 copies.
 - 2. Monthly Progress Report, 7 copies.
 - 3. Statement of Contract Time, 7 copies.
 - 4. Updated Submittal Register, 1 copy.
 - 5. Updated Progress Schedule, 1 copy.
 - 6. All Daily Reports, 1 copy.
 - 7. All Payroll Affidavits for work done, 1 copy.
- J. Retainage: The Department will withhold retainage in compliance with the GENERAL CONDITIONS.
- K. Transmittal: Submit the signed original and 6 copies of each Payment Application for processing.

2.05 CONTRACTOR DAILY PROGRESS REPORTS

- A. The General Contractor and all Subcontractors shall keep a daily report of report events.
- B. The form of the Contractor Daily Progress Report shall be as directed by the Contracting Officer.
- C. Submit copies of the previous week's reports on Monday morning at 10:00 a.m.
- D. Submit copies of the reports with the monthly payment request for the whole period since the last payment request submittal.
- E. Deliver the reports in hard copy, by e-mail, or web based construction management as directed by the Contracting Officer.

PART 3 - EXECUTION (Not used)

END OF SECTION

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.02 SUBMITTAL PROCEDURES

- A. Coordinate Work and Submittals: Contractor shall certify the submittals were reviewed and coordinated.
- B. Submittal Certification: Provide in MS Word when submitting electronically. HDOA engineer will provide an electronic copy of the Submittal Certification. Provide a reproduction (or stamp) of the "Submittal Certification" and furnish the required information with all submittals. Include the certification on:
 - 1. The title sheet of each shop drawing, or on
 - 2. The cover sheet of submittals in 8-1/2-inch x 11-inch format, or on
 - 3. One face of a cardstock tag (minimum size 3-inch x 6-inch) tied to each sample. On the sample tag, identify the sample to ensure sample can be matched to the tag if accidentally separated. The opposite face of the tag will be used by the HDOA engineer to receive, review, log stamp and include comments.
- C. All submittals for material, equipment, and shop drawings listed in the contract documents shall be required and shall be reviewed by the HDOA engineer prior to any ordering of materials and equipment.
- D. Variances: The Contractor shall request approval for a variance. Clearly note any proposed deviations or variances from the Specifications, Drawings, and other Contract Documents on the submittal and also in a separately written letter accompanying the submittal.

E. Submittal Certification Form (stamp or digital)

CONTRACTOR'S
NAME: _____

PROJECT: _____

DOA JOB NO: _____

As the General Contractor, we checked this submittal and we certify it is correct, complete, and in compliance with Contract Drawings and Specifications. All affected Contractors and suppliers are aware of, and will integrate this submittal into their own work.

SUBMITTAL NUMBER: _____ DATE RECEIVED: _____

REVISION NUMBER: _____ DATE RECEIVED: _____

SPECIFICATION SECTION NUMBER/
PARAGRAPH NUMBER: _____

DRAWING NUMBER: _____

SUBCONTRACTOR'S NAME: _____

SUPPLIER'S NAME: _____

MANUFACTURER'S NAME: _____

NOTE: DEVIATIONS FROM THE CONTRACT DOCUMENTS ARE PROPOSED AS FOLLOWS (Indicate "NONE" if there are no deviations)

CERTIFIED BY: _____

Note: Form can be combined with Design Consultant's Review stamp.

- F. Unless otherwise noted, the Contractor shall submit to the HDOA engineer for their review four (4) copies of all shop drawings, piping layout, and/or catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment) required for the construction. Drawings shall be submitted in sufficient time to allow the Engineer not less than twenty (20) regular working days for examining the drawings.
- G. The drawing shall be accurate, distinct, and complete and shall contain all required information, including satisfactory identification of items, units and assemblies in relation to the contract drawings and specifications.

- H. Unless otherwise approved by the Engineer, shop drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp on the drawings or other approved means that the Contractor has checked the shop drawings and that the work or equipment shown is in accordance with contract requirements and has been checked for dimensions and relationship with work of all other trades involved. All deviations from the plans and specifications shall be listed. The practice of submitting incomplete or unchecked shop drawings for the Engineer to correct or finish will not be acceptable, and shop drawings which, in the opinion of the Engineer, clearly indicate that they have not been checked by the Contractor will be considered as not complying with the intent of the contract documents and will be returned to the Contractor for resubmission in the proper form.
- I. When the shop drawings have been reviewed by the Engineer, two sets of submittals will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the drawing may be rejected and one set will be returned to the Contractor with such changes or corrections indicated, and the Contractor shall correct and resubmit eight copies of the drawings, unless otherwise directed by the Engineer. No changes shall be made by the Contractor to the resubmitted shop drawings other than those changes indicated by the Engineer. The resubmittal shall be so indicated on the shop drawing.
- J. The review of such drawings and catalog cuts by the Engineer shall not relieve the Contractor from responsibility for correctness of the dimensions, fabrication details, and space requirements or for deviations from the contract drawings and specifications, unless the Contractor has called attention to such deviations, in writing, by a letter accompanying the drawings and the Engineer approved the change or deviations, in writing, at the time of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, he shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.
- K. The approval of the above drawings, lists, prints, specifications, or other data shall in no way release the Contractor from his responsibility for the proper fulfillment of the requirements of this contract nor for fulfilling the purpose of the installation nor from his liability to replace the same should it prove defective or fail to meet the specified requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 SUBMITTAL REGISTER AND TRANSMITTAL FORM

- A. Contractor shall use submittal register and transmittal forms as directed by the HDOA engineer.
- B. Review the specification technical sections and prepare a comprehensive listing of required submittals. Furnish submittals to the HDOA engineer for review.

- C. Contractor shall separate each submittal item by listing all submittals in the following groups with the items in each group sequentially listed by the specification section they come from:
 - 1. Administrative
 - 2. Data
 - 3. Tests
 - 4. Closing
- D. Contractor shall separate all different types of data as separate line items all with the column requirements.
- E. Contractor shall send monthly updates and reconciled copies electronically to the HDOA engineer and the Design Consultant in MS Word or MS Excel or other format as accepted by the HDOA engineer.

END OF SECTION

SECTION 01430 - ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This section covers prevention of environmental pollution and damage as the result of construction operations under this contract and for those measures set forth in other sections of the TECHNICAL SPECIFICATIONS. For the purpose of this specification, environmental pollution and damage 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 utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise, solid waste, as well as other pollutants.

1.02 SUBMITTALS

- A. The Contractor shall submit an environmental protection plan in accordance with provisions as herein specified. Environmental protection plan shall include but not be limited to the following:
 1. Methods for protection of features to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection; i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archaeological, and cultural resources.
 2. Procedures to be implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures set out in accordance with the environmental protection plan.
 3. Drawings showing locations of any material storage areas, structures, sanitary facilities, and stockpiles or spoil material.
 4. Environmental monitoring plans for the job site, including land, water, air and noise monitoring.
 5. Training for personnel during the construction period.

1.03 IMPLEMENTATION

- A. After receipt of Notice to Proceed, the Contractor shall submit in writing the above environmental protection plan for approval by the Engineer within 5 days after Notice to Proceed. Approval of the Contractor's plan will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.

1.04 SUBCONTRACTORS

- A. Assurance of compliance with this section by subcontractors will be the responsibility of the Contractor.

1.05 NOTIFICATION

- A. The Engineer will notify the Contractor in writing of any observed noncompliance with the aforementioned Federal, State or local laws or regulations, permits, and other elements of the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Engineer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Engineer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspension.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 PROTECTION OF ENVIRONMENTAL RESOURCES

- A. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine activities to areas defined by the drawings and specifications.

3.02 PROTECTION OF LAND RESOURCES

- A. Prior to the beginning of any construction, the Contractor shall identify all land resources to be preserved within the Contractor's work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including tree, shrubs, vines, grasses, topsoil, and land forms without special permission from the Engineer. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.
- B. Work Area Limits: Prior to any construction, the Contractor shall mark the areas that are not required to accomplish all work to be performed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor shall convey to his personnel the purpose of making and/or protection of all necessary objects.
- C. Protection of Landscape: Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques.
- D. Reduction of Exposure of Unprotected Erodible Soils: Earthwork brought to final grade shall be finished as indicated and specified. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Runoff from the construction site shall be controlled by construction of diversion ditches, benches, and berms to retard and divert runoff to protected drainage courses.

- E. Disposal of Solid Waste by Removal From Project Site: The Contractor shall transport all solid waste off the project site and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal.
- F. Disposal of Chemical Waste: Chemical waste shall be stored in corrosion resistant containers, removed from the work area and disposed of in accordance with Federal, State, and local regulations.

3.03 PROTECTION OF FISH AND WILDLIFE RESOURCES

- A. The Contractor shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to and damage of fish and wildlife.

3.04 PROTECTION OF AIR RESOURCES

- A. The Contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with the State of Hawaii Public Health Regulations, Chapter 43, "Air Pollution Control." Special management techniques as set out below shall be implemented to control air pollution by the construction activities which are included in the contract.
- B. Particulates: Dust particles, aerosols, and gaseous by-products from all construction activities and processing and preparation of materials shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant site, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards mentioned above to be exceeded or which would cause a hazard or a nuisance. Sprinkling or other methods approved by the Engineer will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated at such intervals as to keep the disturbed area damp at all times. The Contractor must have sufficient competent equipment available to accomplish this task. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.
- C. Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.
- D. Odors shall be controlled at all times for all construction activities, processing and preparation of materials.
- E. Monitoring of air quality shall be the responsibility of the Contractor. All air areas affected by the construction activities shall be monitored by the Contractor.

3.05 PROTECTION FROM SOUND INTRUSIONS

- A. The Contractor shall keep construction activities under surveillance, and control to minimized damage to the environment by noise.

3.06 POST CONSTRUCTION CLEANUP

- A. The Contractor shall clean up areas used for construction.

3.07 RESTORATION OF LANDSCAPE DAMAGE

- A. The Contractor shall restore all landscape features damaged or destroyed during construction operations outside the limits of the approved work areas. Such restoration shall be in accordance with the plan submitted for approval by the Engineer. This work will be accomplished at the Contractor's expense.

3.08 MAINTENANCE OF POLLUTION CONTROL FACILITIES

- A. The Contractor shall maintain all constructed facilities and portable pollution control devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.09 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

- A. The Contractor shall train his personnel in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities (vegetative covers and instruments required for monitoring purposes) to ensure adequate and continuous environmental pollution control.

END OF SECTION

SECTION 01505 - MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This section covers the requirements for mobilization and demobilization.
- B. Mobilization: Mobilization shall consist of the transporting, assembling, constructing, installing, and making ready for use at the job site, all the equipment, machinery, structures, utilities, materials, labor, and incidentals necessary to do the work covered by this contract.
- C. Demobilization: Demobilization shall consist of the dismantling and removal of the above-mentioned equipment, machinery, structures, utilities, materials, and incidentals, and the cleaning up of the site.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 GUIDELINES

- A. If the Contractor utilizes private lands other than the sites provided by the Department for mobilization purposes, the provisions of this section shall apply, and the mobilization and demobilization work on said private lands shall be in accordance with the agreement between the Contractor and the land owner.
- B. Any and all additional mobilization or demobilization costs in excess of the maximum amounts specified in the Proposal shall be included in the appropriate unit prices bid in the Proposal. The Contractor shall not receive any compensation for mobilization and demobilization in addition to those specified in the Proposal.
- C. All equipment, machinery, buildings, utilities and incidentals mobilized and demobilized under this section shall remain the property of the Contractor.

3.02 PAYMENT

- A. Maximum bid amount. The maximum bid allowed for this item is an amount not to exceed six percent (6%) of the TOTAL SUM BID, excluding the bid price of mobilization and any allowance or force account items. If the Proposal submitted by the bidder indicates an amount in excess of the allowable maximum, the indicated amount shall be reduced to the allowable maximum and the sum of all items in the Proposal Schedule shall be adjusted to reflect any such reduction. For the purpose of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the sum of all items in the Proposal Schedule, adjusted in accordance with the foregoing, shall be used, and the bidder's Proposal shall be deemed to have been submitted for the amounts as reduced and adjusted in accordance herewith.
- B. Payment. Mobilization shall be paid for on a lump sum basis. Partial payments shall be made as follows:
 - 1. When 5% of the original contract amount is earned, exclusive of mobilization charges, 50% of the amount bid for mobilization for the subarea shall be paid;

2. When 10% of the original contract amount is earned, inclusive of the previous mobilization charges, 75% of the amount bid for mobilization shall be paid;
3. When 20% of the original contract amount is earned, inclusive of the previous mobilization charges, 100% of the amount bid for mobilization shall be paid.

END OF SECTION

SECTION 01530 - BARRICADES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This work shall consist of furnishing, installing and maintaining barricades in accordance with the requirements of the contract.
- B. Barricade application shall be provided for in the latest edition of the FHWA publication, Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), and as amended.

1.02 SUBMITTALS

- A. Barricade Shop Drawing and/or Product Data

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Lumber: Lumber for rails, frames and braces shall be dry, sound, undamaged, well seasoned, and free from any defect which may impair their strength and durability.
- B. Hardware: Nails shall be galvanized wire nails. As many and as large a size as is practicable shall be used.
- C. Paints: Paints shall be exterior enamel paint of the best grade or first line as made by approved manufacturers.
- D. Sheet Reflecting Material: Sheet reflecting material shall conform to the applicable requirements of Subsection 712.20(C) of the "Standard Specifications for Road and Bridge Construction".
- E. Alternate Designs: Alternate barricade designs such as plastic molded barricades may be used subject to the Engineer's approval. The Contractor shall submit shop drawings or catalog cuts for approval.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. General: Barricades shall be constructed in a first class, workmanlike manner in accordance with details shown on the plans and as specified herein.

Barricades shall be in good condition and approved by the Engineer for use within the project limits. Barricade application and installation shall be as shown on the plans and as directed by the Engineer in accordance with the guidelines provided in the latest edition of the FHWA publication, Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), and any amendments or revisions thereof as may be made from time to time.

Sand bags or other approved weights shall be provided where required or as directed by the Engineer. Sand bags or other approved weights shall not be placed on any striped barricade rail.

Steady burn and/or flashing lamps shall be required on selected barricades used during hours of darkness. Locations shall be as shown on the plans and as directed by the Engineer. Lamps shall be attached on the barricade ends closest to the traveled way and shall be visible to the motorist.

Barricades furnished and paid for as provided for as provided herein may be used for temporary detours, construction phasing, or other temporary traffic control work.

Barricades furnished and paid for use in temporary detours or construction phasing may be used for permanent location called for on the plans.

Upon completion of the construction work, barricades shall be left in place, relocated, or removed and disposed of as shown on the plans or as directed by the Engineer. Barricades left in place, or relocated to new permanent locations shall become the property of the State. Barricades directed to be removed and disposed of shall become the property of the Contractor.

- B. Painting: Wooden rails, frames and braces shall be given a prime coat and 2 finish coats of new white exterior enamel paint. Rail faces to be reflectorized may be left unpainted unless otherwise specified or directed.
- C. Reflectorization: Reflectorization of barricade rails shall be done in a first class, workmanlike manner and the attachment of reflective sheeting shall be as shown on the plans, specified herein, or as directed and approved by the Engineer.

Both vertical faces of each barricade rail shall be reflectorized as shown on the plans. Wooden rails shall be reflectorized with one of the following:

- 1. Reflective sheeting specified in Subsection 712.20(C)(4) of the "Standard Specifications for Road and Bridge Construction" and backed with a 26 gage galvanized steel sheet, or
- 2. A hardened aluminum backed reflective sheeting as specified in Subsection 712.20(C)(5) of the "Standard Specifications for Road and Bridge Construction."

- D. Color: Rails, frames and braces shall be white.

The front and back faces of barricade rails shall have 6-inch wide alternative colored and white striped sloping downward toward the traveled way at an angle of 45 degrees with the vertical. The colored stripes shall be either orange or red in accordance with the following requirements:

- 1. Orange and white stripes shall be used in the following conditions:
 - a. Construction work.
 - b. Detours.
 - c. Maintenance work.
- 2. Red and white stripes shall be used in the following conditions:
 - a. On roadways with no outlet (i.e. dead-ends, cui-de-sacs).
 - b. Ramps or lanes closed for operational purposes.
 - c. Permanent or semipermanent closure or termination of a roadway.

- E. Maintenance: Barricades shall be kept in good condition throughout their usage during construction until the end of the contract.

The Contractor shall repair, repaint, clean or replace the barricades as required and as directed by the HDOA engineer to maintain their effectiveness and appearance.

The Constructor shall immediately replace all lost, stolen or damaged barricades, lamps, sand bags and other approved weights.

Barricades used during construction phasing, temporary detours or other temporary traffic control work shall be cleaned and repaired as necessary, prior to being relocated to a permanent location shown on the plans or as directed.

No extra payment will be made for any repair work, repainting, or cleaning of barricades. The Engineer shall determine the suitable condition of each barricade and shall determine when each barricade shall be repaired, repainted or cleaned.

END OF SECTION

SECTION 01567 - POLLUTION CONTROL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Rubbish Disposal

1. No burning of debris and/or waste materials shall be permitted on the project site.
2. No burying of debris and/or waste material except for materials which are specifically indicated elsewhere in these specifications as suitable for backfill shall be permitted on the project site.
3. All unusable debris and waste material shall be hauled away to an appropriate Department of Health permitted solid waste management facility. During loading operations, debris and waste materials shall be permitted on the project site.
4. No dry sweeping shall be permitted in cleaning rubbish and fines which can become airborne from floors or other paved areas. Vacuuming, wet mopping or wet or damp sweeping is permissible.
5. Enclosed chutes and/or containers shall be used for conveying debris from above to ground floor level.
6. Clean-up shall include the collection of all waste paper and wrapping materials, cans, bottles, construction waste materials and other objectionable materials, and removal as required. Frequency of clean-up shall coincide with rubbish producing events.

B. Dust

1. The Contractor shall prevent dust from becoming airborne at all times including non-working hours, weekends and holidays in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 60 – Air Pollution Control.
2. The method of dust control and costs shall be the responsibility of the Contractor, Methods of dust control shall include the use of water, chemicals or asphalt over surfaces which may create airborne dust.
3. The Contractor shall be responsible for all damage claims in accordance with Section 7.16 – “Responsibility for Damage Claims” of the GENERAL CONDITIONS.

C. Noise

1. Noise shall be kept within acceptable levels at all times in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 46 – Community Noise Control for Oahu. The Contractor shall obtain and pay for the Community Noise Permit from the State Department of Health when the construction equipment or other devices emit noise at levels exceeding the allowable limits.

2. All internal combustion engine-powered equipment shall have mufflers to minimize noise and shall be properly maintained to reduce noise to acceptable levels.
3. Starting-up of construction equipment meeting allowable noise limits shall not be done prior to 6:45 a.m. without prior approval of the Engineer. Equipment exceeding allowable noise levels shall not be started-up prior to 7:00 a.m.

D. Erosion

1. During interim grading operations, the grade shall be maintained so as to preclude any damage to adjoining property from water and eroding soil.
2. Temporary berms, cut-off ditches and other provisions which may be required because of the Contractor's method of operations shall be installed at no cost to the State.
3. Drainage outlets and silting basing shall be constructed and maintained as shown on the plans to minimize erosion and pollution of waterways during construction.

E. Others

1. Wherever trucks and/or vehicles leave the site and enter surrounding paved streets, the Contractor shall prevent any material from being carried onto the pavement. Waste water shall not be discharged into existing streams, waterways, or drainage systems such as gutters and catch basins unless treated to comply with the State Department of Health water pollution regulations.
2. Trucks hauling debris shall be covered as required by PUC Regulation. Trucks hauling fine materials shall be covered.
3. No dumping of waste concrete will be permitted at the job-site.
4. Except for rinsing of the hopper and delivery chute, and for wheel washing where required, concrete trucks shall not be cleaned on the job-site.
5. Except in an emergency, such as a mechanical breakdown, all vehicle fueling and maintenance shall be done in a designated area. A temporary berm shall be constructed around the area when runoff can cause a problem.
6. When spray painting is allowed such spray painting shall be done by the "airless spray" process. Other types of spray painting will not be allowed.

F. Suspension of Work

1. Violations of any of the above requirements or any other pollution control requirements which may be specified in the Technical Specifications herein shall be cause for suspension of the work creating such violation. No additional compensation shall be due to the Contractor for remedial measures to correct the offense. Also, no extension of time will be granted for delays caused by such suspensions.
2. If no corrective action is taken by the Contractor within 72 hours after a suspension is ordered by the Engineer, the State reserves the right to take

whatever action is necessary to correct the situation and to deduct all costs incurred by the State in taking such action from monies due to the Contractor.

3. The Engineer may also suspend any operations which the Engineer feels are creating pollution problems although they may not be in violation of the above-mentioned requirements. In this instance, the work shall be done by force account as described in Subsection 4.2b – “Additional Work” of the GENERAL CONDITIONS and paid for in accordance with Subsection 8.4b – “Force – Account Work” therein. The count of elapsed working days to be charged against the contract in this situation shall be computed in accordance with Subsection 7.18 – “Contract Time” of the GENERAL CONDITIONS.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION (Not used)

END OF SECTION

SECTION 01581 - PROJECT SIGN

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Furnish all labor, materials and equipment necessary to construct and install all project signs as specified hereinafter.

1.02 SUBMITTAL

- A. The contractor shall provide the Engineer with six (6) shop drawings of the project sign for review and approval by the Engineer prior to ordering the sign.

1.03 LETTER STYLE

- A. Copy is centered and set in Adobe Type Futura Heavy. If this specific type is not available, Futura Demi Bold may be substituted. Copy should be set and spaced by a professional typesetter and enlarged photographically for photo stencil screen process.

1.04 ART WORK

- A. Constant elements of the sign layout - frame, outline, stripe, and official state information - may be duplicated following drawing measurements, or be reproduced and enlarged photographically using a layout template if provided. The "STATE OF HAWAII" masthead should be reproduced and enlarged as specified, using the artwork provided.

1.05 TITLES

- A. The specific major work of the project under construction is emphasized by using 3-3/4" type, all capitals. Secondary information such as location or buildings uses 2-1/4" type, all capitals. Other related information of lesser importance uses letter heights as indicated on 01581-3, upper / lower case letters.
- B. Design should follow the example on page 01581-3.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Lumber
 - 1. Panel is 3/4" exterior grade high density overlaid plywood. with resin-bonded surfaces on both sides.
 - 2. 4"x4" sign posts shall be Douglas Fir No. 1 or better.
- B. Paints & Inks
 - Screen print inks are matte finish. Paints are satin finish, exterior grade. References to Ameritone Color Key Paint are for color match only.
- C. Color:
 - 1. 1BL10A Bohemian Blue
 - 2. 2H16P Softly (White)
 - 3. 2VR2A Hot Tango (Red)
 - 4. 1M52E Tokay (Gray)

- D. Concrete: Concrete shall be class B with a 2,500 psi 28-day compressive strength.

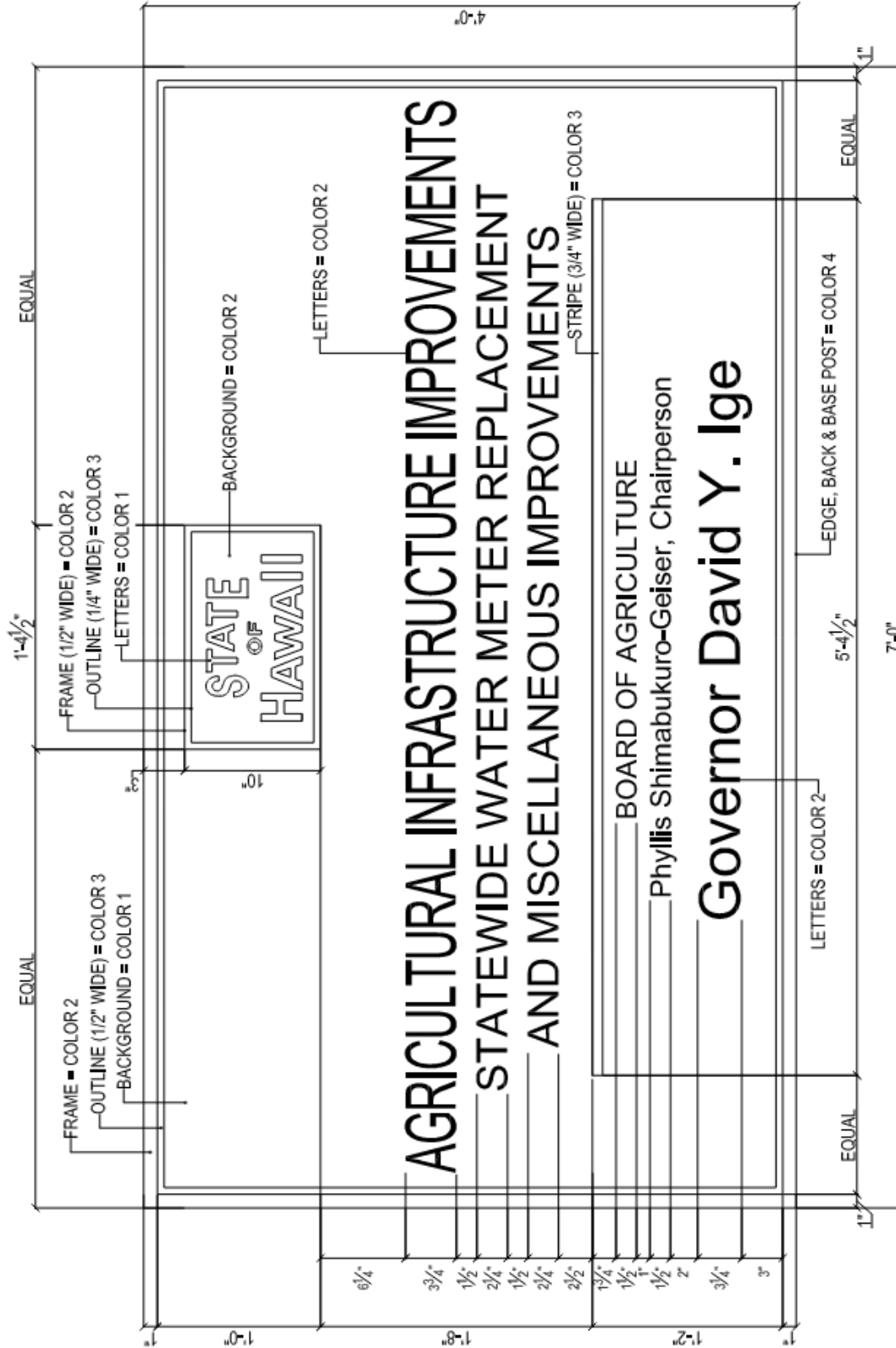
PART 3 - EXECUTION

3.01 GENERAL

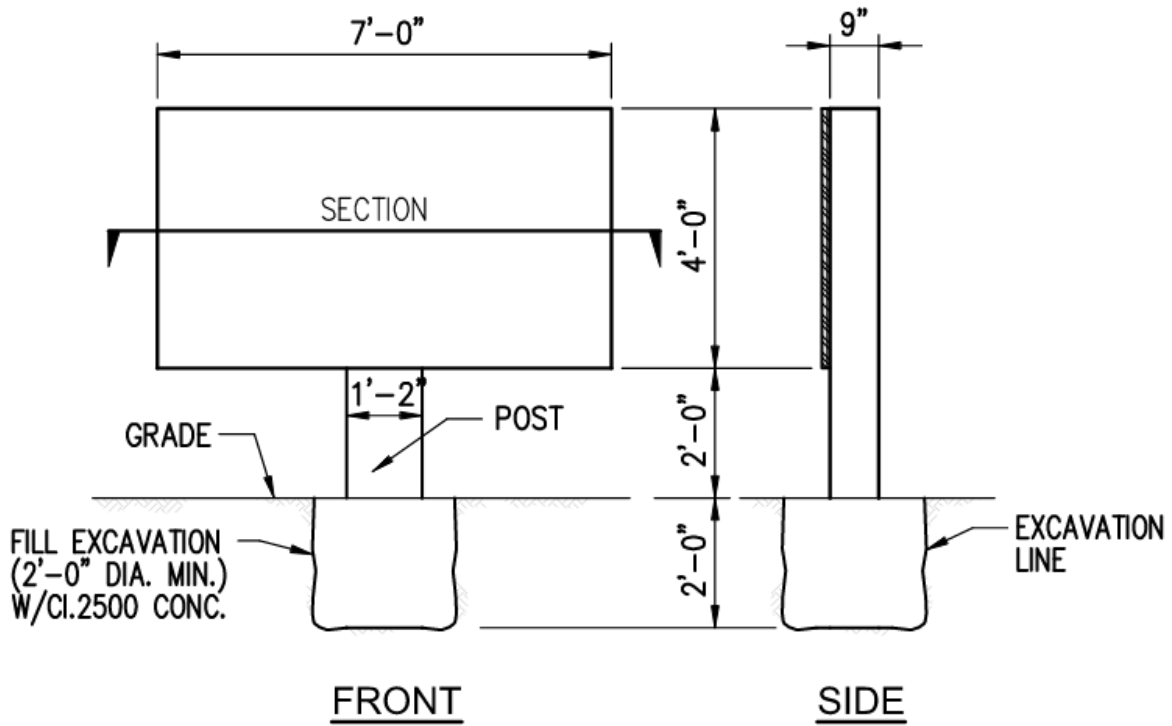
- A. The Project Sign shall be constructed with new materials as specified above.
- B. The Project Sign shall be installed, one (1) per island, at the location designated by the DOA ARM representative.
- C. The Project Sign shall be erected upon commencement of work.

3.02 MEASUREMENTS AND PAYMENT

- A. The construction of the project sign, including all equipment, labor and material necessary to furnish and install the project sign will be paid for under the "Project Sign" proposal items.

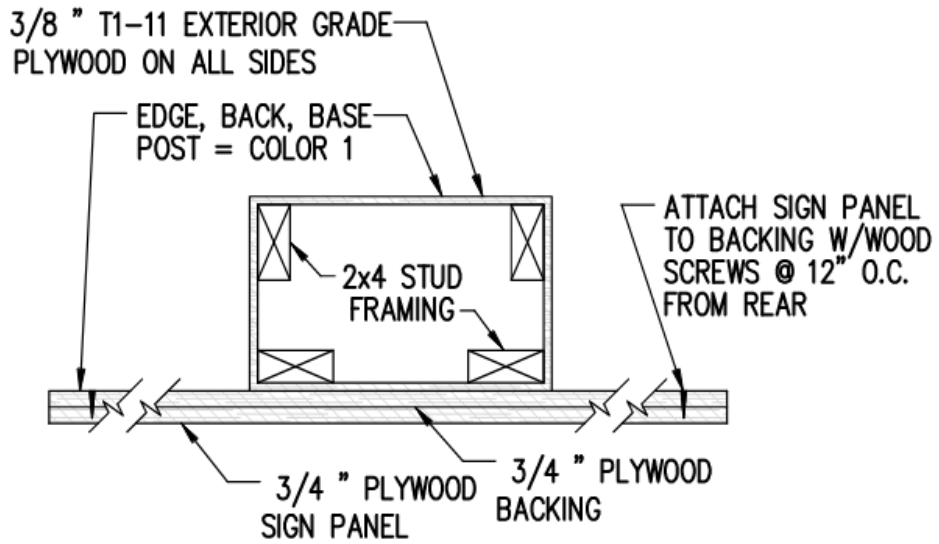


PROJECT SIGN EXAMPLE
NOT TO SCALE



ELEVATIONS

NOT TO SCALE



SECTION

NOT TO SCALE

END OF SECTION

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including the following:
 1. Project Record Documents
 2. Operation and Maintenance Manuals.
 3. Warranties.
 4. Instruction for the State's personnel.

1.02 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requiring a Final Inspection to determine Substantial Completion, complete the following items in addition to requirements of Article 7 of the GENERAL CONDITIONS.
 1. Advise the Contracting Officer of pending insurance changeover requirements.
 2. Submit specific warranties, final certifications, and similar documents.
 3. Arrange to deliver tools, spare parts, extra materials, and similar items to a location designated by the Contracting Officer. Label with manufacturer's name and model number where applicable.
 4. Complete final cleaning requirements.
 5. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
 6. Submit the O&M Manual(s) for review.

1.03 FINAL COMPLETION

- A. Preliminary Procedures: Within 10 days from the Project Acceptance Date, complete the following items:
 1. Instruct the State's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training media materials.

1.04 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit 2 copies of any updated and action taken list. In addition to requirements of GENERAL CONDITIONS Article 7 PROSECUTION AND PROGRESS, include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 1. Organize list of locations in sequential order.
 2. Organize items applying to each location by major element.
 3. Include the following information at the top of each page:

- a. Project Name and Title.
- b. HDOA Job No.
- c. Date and page number.
- d. Name of Contractor.

1.05 PROJECT RECORD DOCUMENTS AND REQUIREMENTS

A. General

1. Definition: "Project Record Documents", including Record Drawings, shall fulfill the requirements of "Field-Posted As-Built Drawings" listed in the GENERAL CONDITIONS.
2. Do not use Project Record Documents for daily construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Contracting Officer's reference during normal working hours. Maintain these documents as specified in paragraph entitled "Record Drawings" hereinafter.
3. The Designer, under contract with the State, will update the drawings to show all addendum, PCD, and sketch changes. The Contracting Officer will transmit these drawings (mylar or vellum) to the Contractor who will make all "red-line" corrections to these drawings to record the changes depicted on the Contractor's Field Posted Record ("As-Builts") by accepted drafting practices as approved by the Contracting Officer.
4. Where the recorded changes depicted on the Contractor's Field Posted Record ("As-Builts") are in the form of shop drawings, the Contractor shall provide those shop drawings on mylar or vellum sheets in the same material and size as the drawings transmitted to the Contractor. The new drawing sheets shall be titled and numbered to conform to the construction drawings and clearly indicate what information they supersede in the actual construction drawings. For example a new drawing that replaces drawing M-3, could be numbered M3a.
5. The Contractor shall bring to the attention of the Contracting Officer any discrepancy between the changes made by the Designer and those depicted on addendum, PCD, and sketch changes. The Contracting Officer will resolve any conflicts.
6. Submit final Record Documents (Field Posted Record Drawings) within 10 days after the Final Inspection Date but no later than the Contract Completion Date, unless the GENERAL CONDITIONS require an earlier submittal date.
7. The Contractor shall guarantee the accuracy of its final Record Documents. The State will hold the Contractor liable for costs the State incurs as a result of inaccuracies in the Contractor's Record Documents.
8. Prepare and submit construction photographs and electronic files, damage or settlement surveys, property surveys, and similar final record information as required by the Contracting Officer.
9. Deliver tools, spare parts, extra materials, and similar items to a location designated by the Contracting Officer. Label with manufacturer's name and model number where applicable.

10. Submit Final, corrected O&M Manual(s).

B. Record Drawings:

1. Maintain a duplicate full-size set of Field Posted Record (“As-Builts”) Drawings at the job site. Clearly and accurately record all deviations from alignments, elevations and dimensions, which are stipulated on the drawings and for changes directed by the Contracting Officer that deviate from the drawings.
2. Record changes immediately after they are constructed in place and where applicable, refer to the authorizing document (Field Order, Change Order, or Contract Modification). Use red pencil to record changes. Make Field Posted Record Drawings available to the Contracting Officer at any time so that its clarity and accuracy can be monitored.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark the contract drawings or the shop drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on contract drawings.
 - e. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - f. Locate concealed building utilities by dimension from bench marks or permanent structures. Locate site utilities by dimensions, azimuth and lengths from bench marks or permanent structures.
 - g. Note field order numbers, Change Order numbers, Contract Modification numbers, Alternate numbers, post-construction drawing numbers (PCD) and similar identification (RFI numbers) where applicable.
 - h. The Contractor shall initial each deviation and each revision marking.
3. Use the final updated Contract Drawing set plus applicable shop drawings for making the final Field Posted Record Drawings submittal.
4. Certify drawing accuracy and completeness. Label and sign the record drawings.
5. Label the title sheet and on all sheets in the margin space to the right of the sheet number, written from the bottom upward, with the title “FIELD POSTED RECORD DRAWINGS” and certification information as shown below. Provide a signature line and company name line for each subcontractor that will also certify the respective drawing. Adjust size to fit margin space.

FIELD POSTED RECORD DRAWINGS

Certified By: _____

Date: _____

[Contractor’s Company Name]

6. Revise the Drawing Index and label the set “FIELD POSTED RECORD DRAWINGS”. Include the label “A COMPLETE SET CONTAINS []

SHEETS” in the margin at the bottom right corner of each sheet. Quantify the total number of sheets comprising the set.

7. If the Contracting Officer determines a drawing does not accurately record a deviation or omits relevant information, the State will correct any FIELD POSTED RECORD DRAWINGS sheet. Contractor will be charged for the State’s cost to correct the error or omission.
8. Use the final Field Posted Record Drawings sheets to create one electronic version of the set. The set shall be recorded in Adobe Acrobat PDF (Portable Document Format). Create a single indexed, bookmarked PDF file of the entire set of drawings and record on the CD. Submit one set of the final Field Posted Record Drawings sheets and the complete electronic CD set(s).

1.06 WARRANTIES

- A. Submittal Time: Submit written manufacturer’s warranties at request of the Contracting Officer for designated portions of the Work where commencement of warranties other than Project Acceptance date is indicated.
- B. Partial Occupancy: Submit properly executed manufacturer’s warranties within 45 days of completion of designated portions of the Work that are completed and occupied or used by the State during construction period by separate agreement with Contractor.
- C. Organize manufacturer’s warranty documents into an orderly sequence based on the table of contents of the Specifications.
 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 inch x 11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate 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 and prime contractor.
 3. Identify each binder on the front and spine with the typed or printed title “WARRANTIES”, Project Name and Title, HDOA Job Number, and name of Contractor.
 4. Use the final submittal of the warranties to create an electronic Adobe Acrobat PDF (Portable Document Format) version of the bound warranty documents files. Each sheet shall be separately scanned, at 600 DPI or better into a PDF file, indexed and recorded on a recordable compact disc (CD).
- D. Provide 2 sets of manufacturer’s warranties that exceed one year and one CD as part of the closing document submittals. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.07 OPERATION AND MAINTENANCE MANUALS

- A. Assemble complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment

not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 2. Maintenance Data:
 - a. Manufacturer's information, Material Safety Data Sheets, and a list of spare parts.
 - b. Name, address, and telephone number of installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Use the following 3 paragraph headings, "Notes, Cautions and Warnings", to emphasize important and critical instructions and procedures. Place the words "Notes", "Cautions", or "Warnings" immediately before the applicable instructions or procedures. Notes, Cautions and Warnings are defined as follows:
1. Note: highlights an essential operating or maintenance procedure, condition or statement.
 2. Caution: highlights an operating or maintenance procedure, practice, condition or statement which if not strictly observed, could result in damage to or destruction of equipment, loss of designed effectiveness, or health hazards to personnel.
 3. Warning: highlights an operating or maintenance procedure, practice, condition, or statement that if not strictly observed, could result in injury to or death of personnel.
- C. Organize the Operation and Maintenance Manuals into suitable sets of manageable size. Bind and index data in heavy-duty, "D" type 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Binder color shall be maroon, or if not available red. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL", Project Name and Title include building number when appropriate, DOA Job Number, Prepared For: Department of Agriculture, Prepared By: [Contractor] and Volume Number. Each binder is a single volume.
- D. Electronic Format
1. Provide all information (narratives, drawings and manual) on a Compact Disc (CD). Provide drawings and plans prepared for the O&M Manuals drawn

electronically and saved as a PDF file. Name and index the files for ease of identification and updates.

2. Provide the complete O&M Manual using Adobe Acrobat PDF (Portable Document Format) files. Each sheet shall be separately scanned into a PDF file, indexed, bookmarked, hyperlinked to the table of contents and recorded on a compact disc (CD). Scanned documents shall be scanned at 600 DPI or better. Indexes and bookmarks may be highlighted or colored text. The final submittal shall include written instructions for installing, accessing and retrieving information from the compact disc.
- E. Pre-Final Submittal: Submit 2 printed sets of Pre-Final Operation and Maintenance Manuals, for review by the Contracting Officer, at least 5 days prior to scheduled final inspection. Manuals shall be marked as Pre-Final. Make any correction noted before submitting the final Operation and Maintenance Manuals.
1. The user and the Department will each keep one copy of the Pre- Final submittal to operate and maintain the facility from the Project Acceptance Date through submission of the final submittal. Therefore, the submittal shall contain all the required information that is available at the time of submission.
 2. One set will be returned with comments. Additional review comments may include problems discovered during the O&M Manual's review, site validation, and facility start up and will be provided to the Contractor after facility Project Acceptance Date.
- F. Final Submittal: Use the final submittal of the manuals to create the electronic PDF file version of the bound Operation and Maintenance Manuals documents. Include the Submittal (100 percent) review comments along with a response to each item. Provide 1 Final sets of the printed manuals and 6 Final compact discs, (CDs) as part of the closing document submittal. Final printed manual and disks shall be marked as Final.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.01 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct the State's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually accepted times.
 3. Schedule training with the State's users, through the Contracting Officer with at least 7 days advanced notice.

4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

3.02 FINAL CLEANING

- A. General: Provide final cleaning upon substantial completion of construction. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturers written instructions unless noted otherwise. Complete the following cleaning operations before requesting final inspection for entire Project or for a portion of Project:
1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits resulting from construction activities.
 3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 4. Remove tools, construction equipment, machinery, and surplus material from Project site.
 5. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 6. Remove debris and surface dust from limited access spaces, including: roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

7. Remove labels that are not permanent.
 8. Leave Project clean and ready for use.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the State's property. Do not discharge volatile, harmful, or dangerous materials into drainage and sewer systems or onto State property. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

DIVISION 02 - SITE CONSTRUCTION

SECTION 02100 - SITE PREPARATION

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. The Notice to Contractors, Information and Instructions to Bidders, the Interim General Conditions preceding these specifications shall govern this section of the work.

1.02 GENERAL REQUIREMENTS

- A. Furnish all labor, materials, equipment and tools necessary to accomplish all clearing and grubbing work as indicated on the drawings and as specified herein.
- B. It shall be the responsibility of the Contractor to examine the project site and determine the existing conditions.
- C. Obvious conditions of the site existing on the date of the bid opening shall be accepted as part of the work, even though they may not be clearly indicated on the drawings and/or described herein or may vary therefrom.
- D. All debris of any kind accumulated from clearing or grubbing shall be disposed of at a Department of Health permitted solid waste management facility, and the whole area left clean. The Contractor shall be required to make all necessary arrangements related to the proposed place of disposal.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Construct temporary erosion control systems as shown on the plans or as directed by Hawaii Department of Agriculture (HDOA) engineer to protect adjacent properties and water resources from erosion and sedimentation. Follow construction related Best Management Practices.

1.04 JOB CONDITIONS

- A. Conditions existing at time of inspection for bidding purposes will be maintained by the State in so far as practical.
- B. Variations to conditions or discrepancy in actual conditions as they apply to site preparation operations are to be brought to the attention of the HDOA engineer prior to the commencement of any site work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SEQUENCE OF WORK

- A. All sequence of work shall be subject to the approval of the Engineer.

3.02 PROTECTION

- A. Adequate precautions shall be taken before commencing and during the course of the work to insure the protection of life, limb and property.

- B. Locate and identify existing utilities that are to remain and protect them from damage.
- C. The Contractor shall protect from damage all surrounding structures, trees, plants, grass, walks, pavements, utility boxes, etc. Any damages will be repaired or replaced by the Contractor to the satisfaction of the Engineer, at no cost to the State.
- D. Conduct operations with minimum interference to public or private accesses and facilities. Maintain access and egress at all times and clean or sweep any roadways daily or as required by the governing authority. At such times as deemed necessary by the HDOA engineer, dust control shall be provided with sprinkling systems or equipment provided by the Contractor.
- E. Protect benchmarks, property corners and all other survey monuments from damage or displacement. If a marker needs to be removed it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same.

3.03 PERMITS

- A. The Contractor shall apply for and obtain the necessary permits prior to the commencement of work. The Contractor shall pay for all fees required.

3.04 BARRICADE

- A. Erect temporary barricade to prevent people and animals from entering the project area, to the extent as approved by the Engineer. Such barricades shall not be less than 5'-0" in height. The extent of barricades may be adjusted as necessary with the approval of the Engineer. This work shall be accomplished at no extra cost to the State. Barricades shall be removed upon completion of work, and job site premises left clean.

3.05 MAINTAINING TRAFFIC

- A. The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, etc.
- B. When necessary, the Contractor shall provide, erect and maintain lights, barriers, etc., as required by traffic and safety regulations with special attention to protection of life.

3.06 CONSTRUCTION LINES, LEVELS AND GRADES

- A. The Contractor shall verify all lines, levels and elevations indicated on the drawings before any clearing, excavation or construction begin. Any discrepancy shall be immediately brought to the attention of the Engineer and any change shall be made in accordance with the Engineer's instruction. The Contractor shall not be entitled to extra payment if the Contractor fails to report the discrepancies before proceeding with any work whether within the area affected or not.
- B. All lines and grades shall be established by a Surveyor or Civil Engineer licensed in the State of Hawaii.

3.07 CLEARING AND GRUBBING

- A. Clear areas required for access to site and execution of work.

- B. The Contractor shall clear off and remove from the entire construction work area, all rubbish, grass and weeds, stumps, large roots, buried logs, garbage, boulders and other unsuitable material. Where soft wet soils are encountered, light equipment should be used.
- C. The Contractor shall grub the ground surface within the area to be graded of all grass and weeds to 2 inches below present grades. Grub out tree root structures.
- D. Any stumps and roots larger than 3 inches in diameter shall be removed to a depth not less than 18 inches below the original grade level. Fill voids with select fill to maintain indicated grade.
- E. Remove rubbish and all other construction debris from the site to a dump site that is suitable for handling such material according to state laws and regulations.
- F. No excavation or filling shall be undertaken until area has been cleared and grubbed.
- G. Perform all clearing and grubbing in accordance with Section 10, Standard Specifications for Public Works Construction, September 1986.

3.08 VERIFICATION OF EXISTING GRADES

- A. Verify existing grades, inverts, and improvements before any clearing and grubbing work is done. Immediately bring to the attention of the Engineer any discrepancy and make any changes in accordance with the Engineer's instructions. Starting of clearing and grubbing operations will be construed to mean that the Contractor agrees that the existing grades, inverts, and improvements are essentially correct as indicated. No extra compensation will be allowed if existing grades, inverts, and improvements are in error after verification thereof or if the Contractor fails to report the discrepancies before proceeding with any work.

3.09 CLEAN UP

- A. Clean up and remove all debris accumulated from construction operations from time to time, when and as directed by the Engineer. Upon completion of the construction work and before final acceptance of work, remove all surplus materials, equipment, etc., and leave entire job site clean and neat.

END OF SECTION

SECTION 02220 - STRUCTURE EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. The Notice to Contractors, Information and Instructions to Bidders, the Interim General Conditions preceding these specifications shall govern this section of the work.

1.02 GENERAL REQUIREMENTS

- A. Structure excavation includes, in addition to the items described in the referenced standard specification, dewatering and maintaining excavations dry; placing, maintaining and removal of shoring, cribbing, sheetpiling and bracing, as directed; backfilling; and excavation and backfilling for new structures.
- B. The Contractor shall be solely responsible for the means, techniques, procedures and sequences for bracing and supporting the excavation.

1.03 SUBMITTALS

- A. Base Course Product Data

PART 2 - PRODUCTS

2.01 BASE COURSE

- A. Base course under deep structures shall be No. 4 crushed rock (C33-#4), 1-1/2-inch to 3/4-inch sizes, topped with No. 6 crushed rock. Base courses shall be placed on compacted subgrade. Compact as specified in Section 31 of the Standard Specifications.

PART 3 - EXECUTION

3.01 COMPACTION

- A. Compaction shall be performed by rolling with equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the optimum moisture content that will readily facilitate obtaining the specified compaction with the equipment used. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. 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 6 inches and compacted as specified for the adjacent fill. Each layer shall be compacted as specified for the adjacent fill.
- B. Structural fill for slabs on grade shall be placed in maximum 8-inch thick compacted horizontal lifts and compacted to 95 percent of its ASTM D1557 maximum dry density.

3.02 COMPACTION TESTS

- A. Tests will be performed by the Contractor in accordance with ASTM D1557, Method D and ASTM D 1556.

3.03 DISPOSAL OF EXCESS MATERIALS

- A. Excess excavated material shall be disposed of as soon as practicable to minimize the heavy accumulation of the material. All excess material shall be removed from the job site and disposed at the Contractor's expense.

END OF SECTION

SECTION 02221 - TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. The Notice to Contractors, Information and Instructions to Bidders, the Interim General Conditions preceding these specifications shall govern this section of the work.

1.02 GENERAL REQUIREMENTS

- A. Furnish all labor, materials, tools, equipment and related items necessary for excavating and backfilling trench for drain and irrigation lines, and appurtenances in conformity with the dimensions, profiles, section and details shown on the plans. Work shall be governed by Section 11 of the "Standard Specifications for Public Works Construction," Department of Public Works, County of Maui, September 1986, Section 302 – Water Mains and Appurtenances of the "Water System Standards," Department of Water Supply, County of Maui, 2002 as amended herein. The Contractor shall be solely responsible for the means, techniques, procedures, and sequences for bracing and shoring the excavation.

1.03 SUPPLEMENTS

- A. All excavated material shall be unclassified regardless of its composition, whether soil, solid rock, coral, asphalt pavement, concrete, rubbish or other material.
- B. The installation and removal of sheeting shall be done in a manner that will not cause settlement or disturbance of the pipe cradle material.
- C. All existing ground, roadways and other improvements damaged, destroyed, or disturbed shall be, at the Contractor's expense, replace, reconstructed and restored in kind to an equal or better condition satisfactory to the Engineer.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION (Not used)

END OF SECTION

SECTION 02270 - TEMPORARY SOIL EROSION CONTROL

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. The Notice to Contractors, Information and Instructions to Bidders, the Interim General Conditions preceding these specifications shall govern this section of the work.

1.02 GENERAL REQUIREMENTS

- A. Furnish all labor, materials, services, equipment and related items necessary to implement the temporary erosion control measures as shown on the drawings, as required by these specifications and as ordered by the Engineer during the life of the contract to control water pollution through the use of berms, dikes, dams, sediment basins, fiber mats, netting gravel, mulches, grasses, slope drains, and other erosion devices or methods.
- B. Temporary erosion and siltation control measures as described herein shall be applied to any erodible material within this project, including local material sources and work areas.
- C. The Contractor shall be responsible for providing the necessary erosion control measures which are shown on the plans or which may be ordered by the Engineer. All grading operations shall be performed in conformance with the applicable provisions of the "Water Pollution Control and Water Quality Standards" contained in the "Public Health Regulations," State Department of Health.
- D. The Contractor shall be responsible for removing all silt and debris resulting from his work and deposited in drainage facilities, roadways, neighboring lands, and other areas.

1.03 SUBMITTALS

- A. Product Data for materials listed in Part 2.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Mulches: To be bagasse, hay, straw, fiber mats, netting, wood cellulose, bark, wood chips, or other suitable material acceptable to the Engineer and shall be reasonably clean and free of noxious weeds and deleterious materials.
- B. Grass: To be a quick growing species (such as rye grass, Italian rye grass, or cereal grasses) suitable to the area and which provides temporary cover that does not later compete with the permanent cover.
- C. Fertilizer and Soil Conditioners: To be a standard commercial grade acceptable to the Engineer.

PART 3 - EXECUTION

3.01 TEMPORARY EROSION CONTROL

- A. The Engineer has the authority to limit the surface area exposed by clearing and grubbing and to limit the surface area exposed by excavation, borrow and fill operations. The Engineer may also direct the Contractor to provide immediate, permanent, or temporary pollution control measures to prevent contamination of streams, lakes, ponds, drainage channels and pipes, roads, neighboring lands, and other areas.

Except for specified measures which may be shown on the plan the Contractor shall determine the appropriate erosion control measures to use. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, and slope drains, and the use of temporary mulches, matts, and grassing, or the construction and use of other control devices or methods as necessary to control erosion.

- B. The Contractor shall incorporate all erosion control measures shown in the plans. The plans may be modified as necessary to adjust to conditions that develop during construction.
- C. The Contractor shall limit the surface area exposed by grubbing, stripping of topsoil, and grading to that which is necessary for him to perform the next operation and which is within the Contractor's capability and progress in keeping the finish grading, mulching, grassing, and other such pollution control measure current.

The grubbing of the vegetative root mat and stumps and the stripping of topsoil shall be confined within the limits of grading which can be actively and continuously prosecuted within 15 calendar days. The area to be graded shall be limited to the minimum area necessary to accommodate the Contractor's equipment and work force and shall not at any time exceed 20 acres without prior approval of the Engineer.

Any area remaining bared or cleared for more than 10 calendar days and which is not within the limits of active construction shall be immediately hydro-mulch seeded or remedied as directed by the Engineer at the Contractor's expense without cost to the State. All areas where finish grading has been completed shall be grassed within 3 calendar days after the completion of grading for that area.

The maintenance of these grassed areas shall include the following:

1. Grass germination in all areas specified with 95% coverage required by the end of the maintenance period. Any area of one foot square or more in which grass has failed to grow after 30 days of maintenance shall be regressed.
2. All germinated areas shall be healthy and living at the end of maintenance period.
3. Weeds shall not exceed an area greater than 10 percent in any grass area.
4. All depressions and erosion fills shall be filled to proper grade and area regressed as required.

5. Contractor shall provide temporary irrigation to maintain all grassed areas until the landscape maintenance period has ended or until the Engineer has accepted the work.

Acceptance of the ground cover planting after the maintenance period shall be contingent upon a 80 percent coverage.

- D. The Contractor shall, at the end of each work operation in any one day, shape the earthwork in such a manner as to control and direct the runoff to minimize the erosion of soils. He shall construct earth berms along the top edges of embankments or along the property line with adjacent properties, streams and water channels, to intercept any runoff. Temporary slope drains shall be provided to carry runoff from the top of cuts and fills. Temporary facilities for controlled discharges shall be provided for runoff impounded, directed, or controlled by project activities or by any erosion control measure employed.
- E. Cut slopes shall be shaped, topsoil added if necessary, and planted as the work progresses. In no case shall the exposed surface be greater than 15 feet in height. Whenever major excavation is suspended or halted and the slope is bared for more than 15 consecutive days, the exposed surfaces shall be hydro-mulch seeded or protected as directed by the Engineer at the Contractor's expense without cost to the State.

Fill slopes shall be finished as specified and in accordance with the requirements outlined for cut slopes above.

- F. Construction of berms, cofferdams, or other such construction in or near the vicinity of streams, ponds, waterways, or other bodies of water shall be approved materials.
- G. The temporary erosion and siltation control measures outline in these specifications are minimum requirements and shall not preclude the provision of any additional measures which the Contractor may deem necessary. Damages caused by the erosion of soils and the pollution of downstream areas shall be the responsibility of the Contractor and all costs for repairing, correcting, replacing, and cleaning damaged or polluted facilities shall be borne by the Contractor.

END OF SECTION

SECTION 02362 - SOIL TREATMENT FOR VEGETATION CONTROL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This work shall consist of spraying weed killer on the prepared subgrade of the AC trenched roadway and concrete slab prior to the installation of the aggregate base course.

1.02 SUBMITTALS

- A. Prior to the start of work, the contractor shall submit to the Engineer the material product data and Material Safety Data Sheets for the material proposed for use.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Weed killer shall be "Casoron 4G", "Norosac 4G", or and approved equal for under asphalt application on new or rebuilt pavement, and shall be "Hyvar X", "Roundup" or approved equal for application to existing weeds.

PART 3 - EXECUTION

3.01 APPLICATION

- A. The weed killer shall be mixed and uniformly spread using calibrated application equipment at the maximum rates permitted for "under asphalt" use and in strict accordance with the manufacturer's label. Base course material shall be installed as soon as possible after applying the weed killer to preclude loss of germination inhibiting action.
- B. The Contractor shall notify the Engineer 24 hours before application of weed killer.

END OF SECTION

SECTION 02400 - DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. Furnish labor, materials, tools, equipment, and services for Demolition, as indicated, in accordance with provisions of Contract Documents.
- B. Completely coordinate with work of other trades as necessary.

1.02 QUALITY ASSURANCE

- A. Conduct work in accordance with OSHA and EPA requirements.
- B. National Fire Protection Association (NFPA): NFPA 241 Standards for Safeguarding Construction, Alteration, and Demolition Operations.
- C. Firms or individuals shall be qualified to perform work required under this section.

1.03 DESCRIPTION

- A. Work includes:
 - 1. Demolition of existing water meters, valves, and associated piping at each location.
 - 2. Removal and legally dispose of demolition debris off site.
 - 3. Patching and repairing any remaining holes from the demolished items inside the existing meter boxes and manholes.
 - 4. Protection of items to remain, including:
 - a. Utilities.
 - b. Other items indicated in drawings.
- B. Condition of existing structures to be demolished:
 - 1. The State assumes no responsibility for actual condition of structures to be demolished.
 - 2. The State will maintain conditions existing at time of inspection for bidding purposes insofar as practicable.

1.04 JOB CONDITIONS

- A. Perform preliminary investigations as required to ascertain extent of work.
- B. Conditions apparent by such investigation will not be allowed as cause for claims for extra costs.
- C. Before start of work, obtain and pay for permits required by authorities having jurisdiction and notify the HDOA engineer.

1.05 SUBMITTALS

- A. Submit all materials listed in Part 2 under provisions of Section 01330, "SUBMITTAL PROCEDURES."

PART 2 - PRODUCTS

2.01 PATCHING MATERIAL

- A. The product used for patching and repairing any remaining holes from the demolished items inside the existing meter boxes and manholes shall be suitable for this application and as accepted by HDOA engineer.

PART 3 - EXECUTION

3.01 POLLUTION CONTROLS

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations.
- B. Construct all necessary barriers to protect remained facilities and personal.
- C. Return adjacent areas to condition existing prior to start of work or as shown on the drawings.

3.02 GENERAL DEMOLITION PROCEDURES

- A. Demolition of entire portions of structures:
 - 1. Demolish completely and remove from site.
 - 2. Use such methods as required to complete work within limitations of governing regulations.
- B. Start and complete work as established by approved schedule.
- C. Operational procedures and sequence of work are optional provided schedule is maintained.
- D. Protect property to remain:
 - 1. Repair damage caused by demolition, at no cost to the State.
 - 2. Conduct operations to prevent damage by falling debris or other cause to, structures and other facilities as well as persons.
 - 3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures.
- E. Maintain existing utilities that are indicated to remain.
 - 1. Keep in service and protect against damage during demolition.
 - 2. Do not interrupt existing utilities serving occupied or facilities in use, except as authorized by the State.
 - 3. Provide temporary services during interruptions to existing utilities, as acceptable to State.
- F. Structural demolition:
 - 1. Demolish concrete and masonry in small sections.
 - 2. Perform removal to avoid excessive loads on supporting walls.

3.03 MEASUREMENT

- A. The work described in this section will not be measured directly but shall be part of the contract lump sum bid items as applicable.

3.04 PAYMENT

- A. The work described in this section shall not be paid for directly but shall be part of the contract lump sum price bid items as applicable, and which prices shall include full compensation for all work of this section and all other applicable sections.

END OF SECTION

SECTION 02500 - ROAD PAVEMENT

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Furnish all labor, materials, tools, equipment and related items necessary to complete, in place, asphalt concrete pavement for roads in conformity with the dimensions, sections and details shown on the plans.

1.02 SUBMITTALS

- A. Product data for all materials listed in Part 2.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials for roads shall be in accordance with the following sections of the "Standard Specifications for Public Works Construction," dated September 1986, as revised, except as amended on the drawings and/or in the specifications herewith.

Subgrade	Section 29
Select Borrow Subbase Course	Section 30
Aggregate Base Course	Section 31
Asphalt Surface Treatment	Section 33
Asphalt Concrete Pavement, Mix No. 4	Section 34

- B. Weed Killer: Weed killer shall conform to the requirements of Section 02362 – SOIL TREATMENT FOR VEGETATION CONTROL.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Spray weed killer on the prepared subgrade of roads in accordance with the requirements of Section 02362 – SOIL TREATMENT FOR VEGETATION CONTROL. Notify the Engineer 24 hours before application of weed killer.
- B. Install roadways in accordance with the applicable sections noted hereinbefore.

3.02 COMPACTION TESTING

- A. Field density tests will be made by a licensed Soils Engineer retained by the Contractor. The Contractor shall notify the Engineer one week prior to the start of fine grading for the roadway subgrade so arrangements for field testing can be made by the State. The Contractor will be responsible for any corrective measure required as a result of inadequate compaction.

3.03 ADJUSTMENT OF EXISTING UTILITY STRUCTURES TO FINISHED GRADE

- A. Adjust existing utility structures to finished grade in accordance with Section 36 of the Standard Specifications.

3.04 REPAIRS OF EXISTING ASPHALT CONCRETE PAVEMENTS

- A. Repair to the original conditions and to the satisfaction of the Engineer all existing asphaltic concrete pavements that have been damaged by construction activities, including damage done by heavy equipment.

- B. Restore pavements and other improvements in accordance with Section 38 of the Standard Specifications.

END OF SECTION

SECTION 02577 - PAVEMENT MARKERS, STRIPING AND MARKINGS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Furnish all labor, materials, tools, equipment and related items necessary to accomplish the installing and removing of pavement markers, striping and markings as indicated on the drawings and specified herein.

1.02 SUBMITTALS

- A. Product Data for all materials listed in Part 2.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials shall be in accordance with Section 629 – Pavement Markers, Striping and Markings of the HAWAII STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION dated 2005 except as amended on the drawings. Paragraph concerning Measurement and Payments in the section is not applicable to this project.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation of pavement markers, striping and markings shall be in accordance with Section 629 – Pavement Markers, Striping and Markings of the HAWAII STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION dated 2005 except as amended on the drawings. Paragraph concerning Measurement and Payments in the section is not applicable to this project.

END OF SECTION

SECTION 02605 - METER AND VALVE BOXES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This section shall apply to furnishing and installing valve boxes. Unless otherwise noted, reference made to the Standard Details shall be the State of Hawaii "Approved Material List and Standard Details for Water System Construction," 2002, as amended.

1.02 METER AND VALVE BOXES

- A. Meter and Valve boxes shall be constructed of concrete, cast-in-place or pre-cast. Meter and valve boxes shall be made in accordance with the dimensions and notes shown in the Drawing Details. Minimum construction of meter boxes shall meet Department of Water Supply (DWS) County of Maui Water System Standards (2002) Meter Box Detail M5 for Meters 2-inch or smaller and Meter Box Detail M26 for Meters 4-inch or larger, except where noted on plans.

1.03 SUBMITTALS

- A. Shop Drawings and/or Product Data for meter and valve boxes.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Meter and valve boxes shall be cast-in-place concrete, concrete masonry unit and/or pre-cast concrete.
- B. Metal frames and covers shall be cast iron or fabricated with galvanized steel. Cast iron for frames and covers shall conform to ASTM Designation A-48. See specification Section 05500 – Metal Fabrication.
- C. All castings shall be of tough, close-grained, gray iron, sound, smooth, clean, and free from blisters, blowholes, shrinkage, and cold shuts.
- D. Allowance shall be made in the patterns so that the finished castings shall have the specified dimensions.
- E. The seats of valve box frames and covers shall be machined, not ground to secure FLAT AND TRUE SURFACES. Castings for Cover and Reading Lid seats shall be chipped and ground where necessary to secure FLAT AND TRUE SURFACES.
- F. All castings shall be thoroughly cleaned and painted before leaving the shop with one coat of high-grade asphaltum.

2.02 CONCRETE METER-VALVE BOX

- A. The cement shall be Portland cement conforming to ASTM Designation C150, Type I. Fine and coarse aggregates shall conform to ASTM Designation C 33 or C 330. Mixing water shall be clean and free from injurious amounts of oils, acids, alkalis, organic materials, or other deleterious substances. An admixture which increases durability and reduces permeability, and when used properly is in no way detrimental to the concrete, may be used. The combined aggregates shall

be of such composition of sizes so that the surface of the finished product shall be continuous and of a uniform texture.

- B. The maximum density of the concrete in the finished product shall be 115 pounds per cubic foot and the maximum absorption shall be 15 pounds per cubic foot. The compressive strength of the concrete shall be at least 2500 psi to be determined in a manner and at intervals satisfactory to the Department.
- C. All below grade pipe penetrations through concrete boxes shall be filled with asphalt filler around piping.

2.03 STEEL METER-VALVE BOX FRAME AND COVER

- A. Valve box covers and frames shall be made in accordance with the dimensions and notes shown on the Plan.
- B. Meter Box Frame and Cover shall be cast iron or galvanized steel with checkered surface. Meter Box Frame and Cover Detail M6 shall meet Water System Standard (2002) for Meter Box Detail M5 for Meter size 2-inch or smaller. Meter Box Frame and Cover Detail M7 shall meet Water System Standard (2002) for Meter Box Detail M26 for Meter size 4-inch. Meter Box Frame and Cover Detail M9 shall meet Water System Standard (2002) for Meter Box Detail M26 for Meter size 6-inch or larger.

2.04 SERVICE METER VALVE BOX AND COVER

- A. Valve box covers and frames shall be made in accordance with the dimensions and notes shown on the Standard Details.
- B. Meter Box Frame and Cover shall be prefabricated concrete with integral removable cover.

PART 3 - EXECUTION

3.01 METER AND VALVE BOXES

- A. The valve box and cover shall be set plumb and centered over the meter face. Backfill around the valve box shall be made by hand to 8 inches below the surface of the ground and compacted. Compaction of backfill shall be done with approved pneumatic tampers.
- B. The frame and cover shall set firmly to the top of the concrete valve box. The elevation of the top of the valve box shall be as shown on the drawings. The 6-inch thick DWS 2500 concrete slab shall be poured to secure the frame.
- C. All cast iron or galvanized steel covers shall be close fitting to avoid rattling due to the passing traffic. All defective frames and covers shall be replaced to the satisfaction of the Manager.
- D. Upon completion of installation, valve box cast iron frames and covers shall be cleaned and painted with one coat of approved asphaltum paint, and galvanized steel shall be cleaned.

END OF SECTION

SECTION 02630 - COPPER PIPE AND FITTINGS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This section covers the requirements for furnishing and installing copper pipe and fittings.
- B. Materials are usually specified in terms of the latest applicable standard specifications of the American Society of Testing Materials (ASTM), American National Standards Institute (ANSI) and American Water Works Association (AWWA). Should the standard specifications noted herein be in conflict with later revisions or amendments thereof, the Engineer shall be consulted for the applicable standard specifications.
- C. In addition, the "Water System Standards," dated 2002; with certain modifications as hereinafter specified, are hereby incorporated into and made a part of these specifications by reference and shall be applicable to all work performed by the contractor under this section.
- D. In some instances, materials are specified as acceptable items by means of the manufacturer's catalog designations or reference numbers rather than by detailed specifications. It should be clearly understood that such references are frequently changed by the manufacturer. If any reference number is found to be obsolete, the Engineer should be consulted for the latest designation.

1.02 SUBMITTALS

- A. Product Data for all materials listed in Part 2.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Copper pipe shall be rigid copper type L for buried lines and type K for exposed lines. The nominal pipe sizes are shown on the plans.
- B. Fittings shall be corrosion-resistant wrought copper or cast bronze.
- C. Solder shall be 1/8-inch diameter 95.5 tin-antimony solder and contain not more than 0.2% lead.
- D. Flux shall be non-corrosive and lead-free; 'La-Co' Flux Regular, Stay-Clean Flux, Oatey Paste Flux, #95 Tinning Flux, General Purpose Soldering Flux or approved equal.
- E. Gate Valve shall be bronze, 200 psi maximum pressure rating, 1" or 1-1/2" FPT inlet/outlet with non-rising stem, as shown on the plans.
- F. Hose Bibb shall be brass, 150 psi maximum pressure rating, 3/4" MPT inlet and garden hose thread outlet.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

- A. All piping, fittings and appurtenances specified in this section shall be installed as shown on the plans and/or in accordance with the manufacturer's directions; "Water System Standards," dated 2002; the "Uniform Plumbing Code," 2006 Edition; and "International Association of Plumbing and Mechanical Officials (IAPMO) Installation Standards," dated August 2008.

3.02 FINAL CLEANUP

- A. All debris resulting from the work of this section shall be removed from the site.

3.03 TESTING

- A. All water lines and appurtenances shall be tested at 100 psi and in accordance with the "Water System Standards", dated 2002. No leaking is acceptable.

3.04 CHLORINATION

- A. All water lines and appurtenances shall be chlorinated as specified in the "Water System Standards", dated 2002.

END OF SECTION

SECTION 02646 - SERVICE LATERALS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This section covers the requirements for furnishing and installing service laterals.
- B. The Contractor shall furnish and install all service laterals, copper pipes and appurtenances as shown on the plans. Work on the agricultural lots identified on the plans will be coordinated and verified with the Department of Agriculture (DOA) Agricultural Resource Manager (ARM) prior to the commencement of work.
- C. Unless otherwise specified, the term "appurtenances" shall include all fittings, valves, ball flange water meter valves, ball stops and any corrosion protection device, e.g. dielectric coupling which may be required.
- D. All existing Water Meters and Ball Stop Water Meter Valves shall be removed and disposed of properly, unless directed otherwise by the DOA ARM.

1.02 SUBMITTALS

- A. Product Data for all materials listed in Part 2.
- B. Verify diameter and connection of service lateral for each installation. Submit verification list to the DOA ARM prior to commencement of work.

PART 2 - PRODUCTS

2.01 COPPER TUBING

- A. Copper Service Lateral shall be soft temper Type "K" and shall conform to ASTM Designation B 88.
- B. Solder joint fittings shall be cast bronze or wrought copper and shall conform with ANSI B 16. Cast bronze shall conform with ASTM Designation B 62. Wrought copper fittings shall be made of commercially pure copper conforming with ASTM Designation B 251 or 85 15 composition red brass.
- C. Compression fittings shall be of cast bronze or stainless steel and conform to applicable AWWA, ANSI, and/or ASTM Standards.
- D. Fittings required for the various sizes and combination of service laterals and connections shall be as shown on the Standard Details.
- E. Nipples shall be of the same quality as copper pipe.
- F. Solder shall be 1/8-inch diameter, 50% tin and 50% lead content, conforming to Federal Specification QQ S 571c, composition Sn50.
- G. Flux shall be "Streamline No. 50" or LA CO self cleaning regular soldering flux or approved equal. Flux shall conform with Federal Specifications O F 506b, Type I, Form A, paste.
- H. Solder and flux shall be delivered in their original containers.

2.02 BRASS PIPE

- A. Brass Pipe shall be Grade A, Standard or Extra Strong as called for in the proposal. Pipe shall conform in all respect to Federal Specification for "Pipe; Brass, Seamless; Iron Pipe Size, Standard and Extra Strong", WW P 351(1), as amended.

2.03 BALL FLANGE METER VALVE

- A. All material that encounters contact with water shall be lead-free.
- B. All valves and fittings shall have a minimum rating of 300 psi working pressure.
- C. Unless otherwise specified, Ball Stop Valves shall conform to the requirements of AWWA C 800 84.
- D. Valve shall come equipped with solid one piece tee-head and stem.
- E. Flanges on Valve body shall match bolt patterns of the meter flange. Bolts for all flanges shall be of maximum diameter of the bolt holes and 316 Stainless Steel with Stainless Steel Nuts furnished with TRIPAC 2000 Blue Coating System.

2.04 WATER METER

- A. Water meters shall be constructed with lead-free bronze alloy NSF/ANSI Standards 61 and 372 Certified and meet AWWA Standard C700.
- B. Water meters shall have AWWA two-bolt elliptical flange on inlet and outlet. Bolts for all flanges shall be of maximum diameter of the bolt holes and 316 Stainless Steel with Stainless Steel Nuts furnished with TRIPAC 2000 Blue Coating System.
- C. Water meters shall have a Nutating Disc, Positive Displacement characteristic as the measuring element.
- D. Each water meter shall come equipped with an integral local register. The registration reading shall be U.S. gallons. The register shall not be in contact with the water being measured. The register device shall be so designed to permit removal and exchange without removal of the meter from the service installation or interruption of service water supply. The register shall be tamper protected.
 - 1. The register shall be a straight reading type with a permanently sealed magnetic drive that will prevent dirt, moisture, tampering and condensation from forming. The straight reading register shall be of the center sweep test hand with the test circle located on the periphery of the register and graduated in 100 equal parts, each tenth graduation numbered. The quantity indicated by a single revolution of the test hand shall be 100 gallons. The register shall be equipped with a separate flow indicator for detecting small rates of flow. Register change gears are not acceptable. The maximum allowable capacity of the register shall be 100 million gallons.
 - 2. The register shall have a six-odometer wheel totalization display, 360-degree test circle with center sweep hand, and flow finder to detect leaks. Numerals on the number odometer type wheels shall be not less than 5/32" in height and should be readable at a 45-degree angle from the vertical.

3. The disc nutations shall be transmitted by magnetic couplings through the top closure case of the meter. The magnetic coupling must consist of a 4 pole face charged magnet in the meter and a 4 pole radial charged magnet in the register/electronic encoder assembly. The intermediate gear train shall be combined with the register gearing and be permanently sealed and encased in a housing which shall be a glass lens and a corrosion resistant metal bottom. Register gearing shall be made of self-lubricating engineering polymer to minimize friction and maximize long life.
- E. Water meters shall comply with the following characteristics:
1. 1.5 inch Meter: Typical operating range of 2.5 gpm to 120 gpm. Maximum operating pressure should be 150 psi; maximum continuous operating flow of 80 gpm; operating range of 1.25 to 120 gpm; less than or equal to 4.8 psi pressure loss at 100 gpm continuous operation; 95% accuracy at 1.25 gpm.
 2. 2 inch Meter: Typical operating range of 2.5 gpm to 170 gpm. Maximum operating pressure should be 150 psi; maximum continuous operating flow of 100 gpm; operating range of 1.5 to 170 gpm; less than or equal to 3.3 psi pressure loss at 100 gpm continuous operation; 95% accuracy at 1.5 gpm.
 3. 4 inch Meter: Typical operating range of 10 gpm to 1250 gpm. Maximum operating pressure should be 150 psi; maximum continuous operating flow of 1000 gpm; operating range of 6 to 1250 gpm; less than or equal to 17.8 psi pressure loss at 1000 gpm continuous operation; 95% accuracy at 6 gpm.
 4. 6 inch Meter: Typical operating range of 20 gpm to 2500 gpm. Maximum operating pressure should be 150 psi; maximum continuous operating flow of 2000 gpm; operating range of 12 to 2500 gpm; less than or equal to 4.8 psi pressure loss at 2000 gpm continuous operation; 95% accuracy at 12 gpm.
 5. 8 inch Meter: Typical operating range of 30 gpm to 4500 gpm. Maximum operating pressure should be 150 psi; maximum continuous operating flow of 3500 gpm; operating range of 20 to 4500 gpm; less than or equal to 2.5 psi pressure loss at 3500 gpm continuous operation; 95% accuracy at 20 gpm.
- F. Water meter assembly shall have a Laying length as specified on drawings. Meters of shorter laying length shall provide a filler section to meet the requirement of the flange to flange laying length specified on the drawings.

2.05 SERVICE WATER VALVE

- A. All material that encounters contact with water shall be lead-free.
- B. All valves and fittings shall have a minimum rating of 300 psi working pressure.
- C. Unless otherwise specified, Ball Stop Valves shall conform to the requirements of AWWA C 800 84.
- D. Valve shall come equipped with solid one piece tee-head and stem with handle.

PART 3 - EXECUTION

3.01 SERVICE LATERALS AND CONNECTIONS

- A. Location: Service laterals and connections shall be constructed in accordance with the Standard Details as part of the project. Where practicable, laterals shall not be located adjacent to electric and telephone lines leading into the property to be served.

3.02 COVER

- A. Laterals shall have a minimum cover of 18-inches or as specified elsewhere herein.

3.03 DIAMETER

- A. Diameters of service laterals and connections shall match existing installations. Contractor is responsible to verify all field conditions.

3.04 TYPE OF LATERAL AND CONNECTION

- A. Laterals and connection shall be of copper pipe with appropriate valves, stops and fittings as described and as shown in the Standard Details.

3.05 SERVICE LATERALS, CONNECTIONS, AND PIPES

- A. Upon completion of excavation, the trench bottom shall be brought up to the required invert grade by backfilling and compacting the trench.
- B. All pipe and appurtenances shall be thoroughly inspected and tested prior to installation. The various types and sizes of service laterals and connections shall be installed at the locations shown on the plans in accordance with the Standard details.
- C. Copper Service Laterals and Pipes: All Joints and fittings for copper pipe or copper service laterals and connections shall be of the soldered type, or other types as approved by the Manager.
- D. In making solder joints, the following procedure shall be followed:
 1. Copper tube shall be cut to the desired length with a tube cutter or fine hack saw (32 tooth blade). Burrs shall be removed with a file or scraper.
 2. The outside of the end that fits into the solder cup of the fitting shall be cleaned with sandcloth or sandpaper. Dark spots shall be removed.
 3. The solder cup of the fitting shall be cleaned carefully with a wire brush, sandcloth or sandpaper. Dark spots shall be removed.
 4. Only specially prepared Streamline Solder Flux No. 50 or approved equal shall be used. Flux shall be stirred thoroughly. A light, even coating of flux shall be brushed on to the outside of the tube and half way into the inside of the fitting. ACID OR ZINC CHLORIDE SHALL NOT BE USED IN PLACE OF STREAMLINE FLUX.
 5. The tube shall be inserted into the fitting as far as it will go and turned back and forth a few times to distribute the flux evenly. THE JOINTS SHALL NOT BE WIPED (TINNED) BEFORE INSERTING INTO PLACE.

6. The fitting shall be heated uniformly with a torch until the solder melts on contact with the heated fitting. The flame shall be removed from the fitting. Solder shall be fed to the joint at only one or two points and not around the full circumference of the tube. When a ring of solder appears around the tube at the fitting, the feeding of solder shall be stopped. The excess solder shall be wiped off with a cloth.
 7. For tubes 1-1/4 inch and larger, the fitting shall be moved on the tube or tapped with a tool handle or mallet as the solder is fed. This will break surface tension and help insure even distribution of the solder.
- E. Testing
1. Tests: All pipes, laterals and appurtenances shall be hydrostatically tested separately or in conjunction with the water main.
 2. Upon completion of the test, the trench shall be backfilled as specified.

END OF SECTION

DIVISION 3 - CONCRETE

SECTION 03100 - CONCRETE FORMWORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The Notice to Contractors, Information and Instruction to Bidders, the Interim General Conditions preceding these specifications shall govern this section of the work.

1.02 SUBMITTALS

- A. Product Data for all materials listed in Part 2.
- B. Test reports identified in paragraph 3.03 H.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Plywood shall be commercial-standard Douglas Fir, moisture resistant concrete form plywood not less than 5-ply and at least 5/8 inch thick.
- B. Metal forms may be used if they will produce surfaces equal to those specified for wood forms.
- C. Forms of other materials shall not be used unless approved by the Engineer.
- D. Metal clamps and ties shall be used. Form ties for exposed concrete shall be removable either completely or to a minimum depth of 1 inch from the face of the concrete.

PART 3 - EXECUTION

3.01 TOLERANCES

- A. Forms shall be constructed so that the concrete surfaces do not deviate from established lines, grades and dimensions in excess of tolerances listed below:
 - 1. Variation from plumb:
 - In the lines and surface of walls:
 - In any 10 ft of length 1/4"
 - Maximum for the entire height of structure 1"
 - 2. Variation from the level or from the grades specified in the contract documents:
 - In slab soffits, measured before removal of supporting shores:
 - In any 10 ft of length 1/4"
 - Maximum for the entire height of structure 3/4"
 - 3. Variation in the sizes and location of sleeves, slab and wall openings: +1/4"
 - 4. Variation in cross-sectional dimension of thickness of slabs and walls:
 - Minus 1/4"
 - Plus 1/2"

3.02 INSERTS, FASTENING DEVICES AND CONDUITS

- A. Install inserts, hangers, metal ties, anchors, bolts and other fastening devices as required for attachment of other work. Properly locate all embedded items in cooperation with other trades and secure in position before concrete is placed.
- B. All electrical and mechanical conduits and fittings shall be located that they do not impair the strength of the concrete member and shall be subject to acceptance by the Engineer.
- C. Conduits in slabs and walls shall not be larger in outside diameter than 1/3 the least dimension of the member.
 - 1. Concrete Walls
 - a. Conduits larger than 1-inch outside diameter shall not be embedded vertically in any wall. Conduits shall be spaced a minimum of 10 times outside diameter and shall be placed in the middle of the wall thickness.
 - b. No conduits shall be embedded horizontally in any wall, lengthwise.
 - c. Conduits passing through walls shall not impair the strength of the wall and shall be provided with Schedule 40 galvanized steel pipe (ASTM A 53) sleeve.
 - 2. Suspended Concrete Slab
 - a. Unless shown otherwise, conduits larger than 1 inch outside diameter shall not be embedded in any concrete slab or topping. Conduits shall be spaced a minimum of 10 times outside diameter. Conduit crossings shall be avoided.
 - b. Conduits passing through slabs shall be provided with Schedule 40 galvanized steel pipe (ASTM A 53) sleeve.
 - 3. Concrete Slabs on Grade
 - a. Conduits shall not be embedded within the thickness of any concrete slab on grade.
 - b. Conduits may be placed in the subgrade below the bottom surface of slabs on grade.

3.03 CONSTRUCTION OF FORMS

- A. All concrete forms shall be placed with metal clamps and ties level and plumb in horizontal rows and vertical tiers.
- B. Where soil conditions permit excavation to accurate sizes without bracing, side forms for footings may omitted only if approved by the Engineer.
- C. Temporary access openings to forms for cleaning prior to depositing of concrete shall be provided.
- D. Unless otherwise called for on plans, all exposed concrete surfaces shall be formed with plywood. Arrangement of the plywood sheets shall be orderly and symmetrical and shall be of 4'x8' size wherever practical.

Only new or unmarred plywood shall be used. A 3/4" by 3/4" chamfer shall be provided at external corners of exposed concrete beams, slab edges and columns, unless otherwise indicated on the plans. Metal forms may be used if they will produce surfaces equal to those specified for wood forms.

- E. Rough concrete finish may be used for all unexposed concrete surfaces as indicated in Section 03300 or on the plans. Rough concrete finish shall be obtained by using clean, straight lumber or metal forms.
- F. Forms that cannot be removed shall be of material other than wood and must be approved by the Engineer.
- G. All forms other than the non-removable form described under the preceding subparagraphs shall be constructed so that they can be removed without hammering or prying against the concrete.
- H. Forms shall not be removed before the expiration of the minimum lapsed time from concrete pour shown below unless information and/or data justifying a request for a shorter period is submitted to and approved by the Engineer. Even with such approval, however, the Contractor shall be fully responsible to repair any damages that may result from early removal.

Walls	3 days
Footing side form	24 hours
Bottom forms of slab	14 days

No construction loads exceeding structural design live loads shall be supported upon any unshored portion of the structure under construction. No construction load shall be supported upon, nor any shoring removed from any part of the structure under construction until the portion of the structure has attained sufficient strength to support safely its weight and the loads placed thereon. This strength may be demonstrated by job-cured test specimens and by a structural analysis considering the proposed loads in relation to this test strength. Such analysis and test data shall be furnished by the Contractor to the Engineer.

- I. To maintain the tolerances specified in Paragraph 3.01, the formwork shall be cambered to compensate for anticipated deflections in the formwork prior to hardening of the concrete.

END OF SECTION

SECTION 03200 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The Notice to Contractors, Information and Instruction to Bidders, the Interim General Conditions preceding these specifications shall govern this section of the work.

1.02 SUBMITTALS

- A. Submit certified mill test results or laboratory test results for all reinforcing steel indicating the following: bar size; yield strength; ultimate tensile strength; elongation and bend test. Rebar chemical composition shall be provided for rebars which are to be welded.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Reinforcing steel shall be deformed bars conforming to ASTM A 615, grade as shown on plans.
- B. Welded wire fabric for concrete reinforcement shall conform to ASTM A 185 and shall be galvanized.
- C. Metal accessories such as spacers, chairs, ties and other devices necessary for properly placing, supporting and fastening reinforcement in place shall be provided. Chairs shall be galvanized. Annealed steel wire of not less than 16-gauge shall be used to secure reinforcement.
- D. Reinforcing steel to be welded shall be deformed bars conforming to ASTM A 706, Grade 60.

PART 3 - EXECUTION

3.01 TOLERANCES

- A. Bars used for concrete reinforcement shall meet the following requirements for fabricating tolerances:
 - Sheared length: +1 inch
 - Depth of truss bars: +0, -1/2"
 - Overall dimensions of stirrups, ties and spirals: +1/2"
 - All other bends: +1 inch
- B. Bars shall be accurately placed and adequately supported before the concrete is placed and shall be secured against displacement within the following tolerances:
 - Clear distance to formed soffits
 - exposed underside of beams and slabs: -1/4"
 - Minimum distance between bars: -1/4"

Where d is less than or equal to 8":

Tolerance on d : +3/8"

Tolerance on the minimum concrete cover" -3/8"

Note: The tolerance for cover shall not exceed minus one third the minimum concrete cover required under Section 3.02 H.

Where d is greater than 8":

Tolerance on d : +1/2"

Tolerance on the minimum concrete cover shall not exceed minus one third the minimum concrete cover required under Section 3.02H.

d = Distance from the extreme compression fiber to the centroid of tension reinforcement.

Longitudinal location of bends and ends of reinforcement: +2" except at discontinuous ends of members where tolerance shall be +1/2".

Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed above tolerances, resulting arrangement of bars shall be subject to approval by the Engineer.

3.02 REINFORCEMENT

- A. Reinforcing steel bars wire and wire fabric shall be provided in the sizes, lengths and configurations as indicated on plans and shall be thoroughly cleaned, before placing, of loose mill scale, loose flaky rust, oil, and all coatings that will destroy or reduce bond. If necessary, they shall be cleaned again before placing of concrete. All items shall be fabricated, positioned and secured in place as indicated in the plans and as herein specified. Annealed steel wire shall be used to secure reinforcement. Reinforcement shall be placed in specified positions not exceeding the tolerances listed in Sub-section 3.01. Unless noted otherwise, cleaning, bending and placing of reinforcement shall be done in accordance with the standard practice of the Concrete Reinforcing Steel Institute.
- B. Concrete or metal support and spacers shall be used to secure the proper spacing of reinforcement over formwork. Stirrups shall be accurately and securely wired to the bars at both top and bottom. At slabs, footings and beams in contact with earth, pre-cast concrete blocks (not bricks or hollow tile) or chairs shall be used to hold reinforcement at a proper distance above earth.
- C. Bars shall be tied at all intersections, and distances from forms shall be maintained by means of pre-cast source concrete blocks, ties, hangers, chairs or other approved supports.
- D. Bar shall be bent cold to the shapes shown on the plans. Bends shall be made around a pin having a diameter not less than 6 times the bar diameter except that for bars of larger than 1-inch diameter the pin diameter shall be 8 times the bar diameter. If required, bars may be bent in the field using a "hickey" bar.
- E. All reinforcing steel bars shall be furnished in the lengths indicated on the plans. Splicing of bars, except where shown, will not be permitted without the approval of the Engineer. Splices where permitted shall be staggered as far as possible, wired together in such a manner as to maintain the clear depth of the member and the minimum clear distance to the surface of concrete. Unless lapped in lengths as follows:

#11 bars and smaller 48d or 24 inches, whichever is larger.

Welded splices only shall be used when bar size exceeds #11.

Welding shall conform to AWS D1.4, Structural Welding Code – Reinforcing Steel. The Contractor shall notify the Engineer 48 hours prior to making any welded splices.

- F. Vertical bars in columns shall be offset at least one bar diameter at splices.
- G. Unless permitted by the Engineer, reinforcement shall not be bent after being partially embedded in hardened concrete. Improperly and/or excessively bent bars shall be replaced.
- H. Unless shown otherwise, minimum concrete protective covering for reinforcement, except for extremely corrosive atmosphere, severe exposure or fire protective covering shall be as follows:

Concrete deposited against the ground: 3 inches (except where deposited below water table).

Formed surfaces exposed to weather or in contact with the ground: 2 inches for reinforcing bars #6 or larger; 1-1/2" for reinforcing bars less than #6; except not less than 1-1/2" times maximum size of aggregate for column spirals or ties.

Interior and surfaces: 1" for slabs and walls.

- I. All reinforcement shall be inspected and approved by the Engineer prior to the closing of forms. This approval, however, shall not be construed to relieve the Contractor of his responsibility to place all reinforcement in accordance with the plans.

END OF SECTION

SECTION 03300 - CONCRETE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This specification covers the requirements for furnishing, hauling, mixing, placing, and curing of concrete.

1.02 SUBMITTALS

- A. The Contractor shall submit concrete mix design for approval.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Portland cement shall conform to the requirements of ASTM C150, Type I, for all concrete work.

- B. Concrete Aggregates

- 1. Fine aggregates shall be calcareous or basalt sands, or a combination thereof. They shall meet the grading requirements of ASTM C33 unless the concrete producer can provide past data that show that a proposed non-conforming gradation will produce concrete with the required strength and suitable workability.

If manufactured sands are used in the concrete mix, the Contractor may select and use a water-reducing and/or an air-entraining admixture as specified hereinafter to provide satisfactory workability in the concrete. The cement content of a mix shall be as specified hereinafter, and the use of an admixture shall in no way result in the reduction of the cement factor.

- 2. Coarse aggregates shall be crushed close-grained, blue lava rock meeting the grading requirements of sizes 57 or 67 (ASTM D448) or both. The maximum size of aggregate shall not be larger than 1/5 of the narrowest dimensions between sides of the forms of the member for which the concrete is to be used not larger than 3/4 of the minimum clear spacing between individual reinforcing bars or bundles of bars.

- C. Concrete Reinforcement

- 1. Reinforcing steel shall be deformed bars conforming to ASTM A615, grade as shown on plans.
- 2. Welded wire fabric for concrete reinforcement shall conform to ASTM A185 and shall be galvanized.
- 3. Metal accessories such as spaces, chairs, ties, and other devices necessary for properly placing, supporting and fastening reinforcement in place shall be provided. Chairs shall be galvanized. Annealed steel wire or not less than 16-gauge shall be used to secure reinforcement.

- D. Water used in mixing concrete shall be potable.

- E. Non-slip grit shall be an abrasive aggregate of silicon carbide or aluminum oxide.

- F. Admixture, if used, shall conform to ASTM C494 or ASTM C260 and shall be mixed in proper amount in accordance with directions of manufacturer.
- G. Curing compound shall conform to ASTM C309.

PART 3 - EXECUTION

3.01 DESIGN OF CONCRETE MIXES

- A. All concrete throughout shall be either job or plant mixture in an approved type of power operated mixer that will insure uniformity and homogeneity of the concrete produced.
- B. Mixing at jobsite shall be done in accordance with ACI 614.
- C. Ready-mixed and mixed-in-transit concrete shall be mixed to conform to the provisions of ASTM C94.
- D. Concrete shall be mixed only in such quantity as is required for immediate use. No retempering will be permitted and concrete that has started to harden shall be discarded and promptly removed from the job.
- E. Admixtures conforming to paragraph 2.1 may be used in the concrete as recommended by the supplier and approved by the Engineer.

3.02 PLACING CONCRETE

- A. No concrete shall be placed in the absence of the Engineer or his representative who shall be given one day advance notice of starting time of concrete pour.
- B. Preparation
 - 1. Concrete shall be placed upon clean, damp surfaces with no free water, or upon properly compacted fills but never upon soft mud or dry, porous earth.
 - 2. Before depositing new concrete on or against concrete which has set, all accumulation or mortar splashed upon reinforcing steel and the surfaces of forms shall be removed and the forms shall be retightened. The surfaces of previously set concrete shall be thoroughly roughened and cleaned of all foreign matter and laitance, saturated with water and slushed with a coat of cement grout. New concrete shall be placed before the grout has attained its initial set.
- C. Conveying
 - 1. Concrete shall be conveyed from mixer to forms as rapidly as practicable by methods that will prevent segregation.
 - 2. Concrete shall be deposited as nearly as practicable in its final position. Extensive spading as a means of transportation shall be avoided and in no case shall vibrators be used to transport concrete inside forms.
 - 3. Open troughs and chutes shall have a slope not to exceed 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

4. The concrete shall not be allowed to drop freely more than six feet except where specifically authorized by the Engineer. When placing operations would involve the dropping of concrete from a height of more than six feet it shall be conveyed through pipes or flexible drop chutes.
 5. If any appreciable segregation occurs through the conveying methods employed, their use shall be ordered discontinued by the Engineer and some other satisfactory method of placing concrete shall be used.
 6. All chutes, troughs, pipes and other means of conveyance shall kept clean and free from coatings of hardened cement or concrete by thoroughly cleaning with water and chipping after each pour. Water used for flushing shall be discharged away from the vicinity of the concrete or forms already in place.
- D. Depositing
1. Unless adequate protection is provided, concrete shall not be placed during rain. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish. Fresh concrete that has been deposited but has not attained its initial set shall be protected in the event of rain.
 2. Placing of the concrete shall be started at the far end of work so that each batch will be dumped against previously placed concrete, not away from it.
- E. Compaction
1. All concrete shall be consolidated by vibration so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honey-combing, pitting, or planes of weakness. All compaction shall be done by use of high frequency internal vibrators. Where the vibrator cannot be inserted into the concrete, compaction shall be done by spading, rodding, or forking.
 2. Frequency of vibrator shall be not less than 7,000 impulses per minute. The Contractor shall provide a sufficient number of vibrators to properly consolidate all concrete immediately after placing. At least one standby vibrator shall be on hand at all times during placement of the concrete.

3.03 REINFORCEMENT

- A. Reinforcing steel bars, wire and wire fabric shall be provided in the sizes, length and configurations as indicated on plans and shall be thoroughly cleaned, before placing, of loose mill scale, loose flaky rust, oil, and all coatings that will destroy or reduce bond. If necessary, they shall be cleaned again before placing of concrete. All items shall be fabricated, positioned and secured in place as indicated in the plans and as herein specified. Annealed steel wire of not less than 16-gauge shall be used to secure reinforcement. Unless otherwise noted, cleaning, bending and placing of reinforcement shall be done in accordance with the standard practice of the Concrete Reinforcing Steel Institute.
- B. Concrete or metal support and spacers shall be used to secure the proper spacing of reinforcement over formwork. Stirrups shall be accurately and securely wired to the bars at both top and bottom. At slabs, footings and beams in contact with earth, pre-cast concrete blocks (not bricks or hollow tile) shall be used to hold reinforcement at a proper distance above earth.

- C. Bars shall be tied at all intersections, and distances from forms shall be maintained by means of pre-cast concrete blocks, ties, hangers or other approved supports.
- D. Bars shall be bent cold to the shapes shown on the plans. Bends shall be made around a pin having a diameter not less than 6 times the bar diameter except that for bars of larger than 1-inch diameter the pin diameter shall be 8 times the bar diameter. If required, bars may be bent in the field using a "hickey" bar.
- E. All reinforcing steel bars shall be furnished in the lengths indicated on the plans. Splicing of bars, except where shown, will not be permitted without the approval of the Engineer.

3.04 CONCRETE SLABS ON GRADE

- A. Concrete slabs on earth shall be placed over a structural fill as specified in another section.
- B. All slabs shall be reinforced with 6 x 6 - W1.4 by W1.4 welded wire fabric unless otherwise shown or called for on the plans.
- C. Care shall be taken in handling and placing the reinforcement as follows:
 - 1. Reinforcing fabric shall not be rolled over by trucks, buggles or wheelbarrows, nor trampled to the extent that it is bent out of the plans of the fabric. Material which has been so bent that it cannot be laid out flat shall be rejected.
 - 2. Reinforcing fabric shall be positively set, either prior to or during the placement of concrete, to the levels required within the slabs as indicated on the plans or as otherwise called for herein.
- D. A bond-break filler shall be provided where edge of slab abuts any vertical surface and where indicated on plans. Width of filler strips shall equal depth of floor slab.

3.05 FINISHING OF SLABS

- A. Broom Finish for Slabs: The concrete slabs shall be given a coarse transverse scored texture by drawing a broom across the surface. The operation shall follow immediately after steel trowelling.

3.06 REPAIR OF DEFECTS

- A. After forms have been removed, any concrete which is not constructed as shown on the plans or is out of alignment or level beyond required tolerances or which shows a defective surface which in the opinion of the Engineer cannot be properly repaired or patched shall be removed.
- B. Where concrete which is exposed to view requires repairing or patching, the texture of the surface of such repair or patch shall closely match that of the surrounding surface.

3.07 CURING AND PROTECTION

- A. All concrete shall be cured for a period of not less than seven (7) days by one of the methods listed below. During this curing period, the concrete shall be maintained with minimal moisture loss at a relatively constant temperature. Fresh concrete shall be protected from heavy rains, flowing water, mechanical

injury, and injurious action of the sun. Curing method selected must be compatible with the finish to be applied to the concrete.

Curing shall immediately follow the finishing operation.

- B. Water Curing: If cured with water, concrete shall be kept wet by mechanical sprinklers, by ponding, or by any other method which will keep the surfaces continuously wet.
- C. Saturated Sand Curing: Surfaces cured with sand shall be covered with a minimum of one inch thickness of sand which shall be kept uniformly distributed and continuously saturated during the entire curing period.
- D. Curing Compounds: Curing compounds shall not be used on concrete surfaces that are to receive paint finish, acid stain or resilient flooring, except those that are recommended by the manufacturer to be compatible with the applied finish. The Contractor shall submit to the Engineer a letter certifying that the curing compound is compatible with the applied finish. Application shall be in accordance with the manufacturer's recommendations. If curing, sealing or other compounds are used which are incompatible with applied finish, such compound shall be thoroughly removed by grinding with a terrazo grinder.
- E. Waterproof Paper: Waterproof paper or opaque polyethylene film conforming to ASTM C171 may be used. The paper or film shall be anchored securely and all edges sealed or applied in such a manner as to prevent moisture escaping from the concrete.

3.08 SAMPLING AND TESTING

- A. Sampling - ASTM C 172: Collect samples of fresh concrete to perform tests specified. ASTM C 31 for making test specimens.
- B. Slump Tests - ASTM C 143: Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved admixture provided that the water-cement ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 10 cubic yards (maximum) of concrete.
- C. Compressive Strength Tests - ASTM C 39: Make four test cylinders for each set of tests in accordance with ASTM C 31. Test one cylinder at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. Provide concrete cylinders for compression tests not less than once a day, nor less than once for each 100 cubic yards of concrete, nor less than once for each 5,000 square feet of surface for slabs or walls. If the average strength of the 28-day test cylinders is less than $f'c$ and a maximum of one single cylinder is less than $f'c$ minus 300 psi, take three ASTM C 42 core samples and test. If the average strength of the 28-day test cylinders is less than $f'c$ and two or more cylinders are less than $f'c$ minus 300 psi, take six core samples and test. Concrete represented by core tests shall be considered structurally adequate if the average of the three cores is equal to at least 85 percent of $f'c$ and if no single core is less than 80 percent of $f'c$. Locations represented by erratic core strengths shall be retested. Remove concrete not meeting strength criteria and provide new, acceptable concrete at no additional cost to the State. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

D. Testing: All sampling and testing shall be performed by an independent testing agency and all test results submitted to the Engineer for approval. All cost of sampling and testing shall be borne by the contractor.

END OF SECTION

SECTION 03400 - PRECAST CONCRETE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This section covers the requirements for furnishing and installing all precast concrete members.

1.02 QUALITY ASSURANCE

- A. Quality Control: The finish surface appearance shall be uniform and of satisfactory type as normally obtained from high quality casting.

1.03 REFERENCES

- A. ACI 318-77: Standard Building Code Requirements for Reinforced Concrete
- B. ASTM C33-81: Specification for Concrete Aggregates
- C. ASTM C150-81: Specification for Portland Cement

1.04 SUBMITTALS

- A. Shop Drawings: Submit for review completely detailed shop drawings of all precast concrete members in accordance with Section 01330 SUBMITTAL PROCEDURES. Show all dimensions, architectural details, reinforcing steel, inserts, connections, openings and lifting devices. Mark each member for identification; show mark on erection plan and place legibly on unit at time of casting. Do not fabricate members before shop drawings are reviewed and accepted.
- B. Should design requirements necessitate a modification or change in architectural features or details, submit drawings of such modifications for review and make all such modifications without additional compensation.

PART 2 - PRODUCTS

2.01 MATERIALS AND USES

- A. Cement: ASTM C150
- B. Concrete Aggregates: ASTM C33: Size of coarse aggregate no larger than 3/4 inch but not exceeding space and cover requirements of reinforcing steel.
- C. Steel Plates: ASTM A36
- D. Concrete: Regular weight structural concrete having a nominal unit weight of 150 lb. per cubic foot. Minimum ultimate compressive strength of concrete: 4,000 psi at 28 days.
- E. All Metal Inserts, Plates and Appurtenances built into members which will not be entirely encased in concrete: Galvanized ferrous metal or noncorrodible nonferrous metal. Galvanized ferrous metal: Conform to requirements of ASTM A123 and ASTM A153 as applicable.

PART 3 - EXECUTION

3.01 FABRICATION

- A. Requirements set forth in Section 03300 CONCRETE apply to fabrication of precast members, except as otherwise specified herein.
- B. Precast concrete members: Cast in smooth, rigid forms to sizes, lengths, and profiles indicated on drawings. Properly vibrate concrete while being placed in forms. Local surface patching to obtain a smooth finish will be permitted only where extent of such work is minor, and where appearance is not adversely affected. Chamfer all exposed edges. Width of precast concrete members shall be determined by the Contractor with approval of the Engineer.
- C. Roughen upper surfaces of precast members after being screeded level.
- D. Cast all flange openings larger than 3 inches in greatest dimension or having an area of more than 9 square inches into members at time of fabrication and properly reinforce. Smaller flange openings may be cut in field pending review by Engineer.
- E. Incorporate welding clips, inserts, anchors, and anchor bolts indicated on drawings or required into precast members at time of fabrication.

3.02 INSTALLATION

- A. The Contractor shall provide adequate strongbacks, straps, braces and pick-up points so that the precast panels can be erected and installed without damage. The Contractor shall provide any additional reinforcing required for erection stresses. No precast members shall be handled until the concrete has attained 75 percent of its specified ultimate compressive strength or until the concrete has cured a minimum of 7 days, whichever is longer.
- B. Remove protruding elements of all lifting devices after erection of members.
- C. Protect members during all lifting, transportation, and handling operations, against overstress, damage to surfaces, and excessive forces. Do not install cracked and damaged members; only minor surface patching will be permitted.
- D. Perform erection in a workmanlike manner using competent experienced workmen in accordance with previously mentioned ACI Code and best accepted practice. Locate all connections and welds in accordance with accepted shop drawings. Have welded connections inspected and accepted before being covered by concrete topping.
- E. Set precast members in correct alignment and level as indicated on drawings.
- F. Make no holes or cuts in precast members larger than 3 inches in field except with permission of Engineer. Power driven fasteners for securing ductwork, piping, electric conduit, electric fixtures, and other mechanical and electrical equipment to precast members may be used only in those locations permitted by Engineer.
- G. Finish of concrete surfaces exposed to view shall be as specified in Section 03300 CONCRETE.

END OF SECTION

DIVISION 04 - MASONRY

SECTION 04220 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 GENERAL

- A. This section covers the requirements for furnishing and installing concrete masonry units; for furnishing, hauling, mixing, placing and curing concrete; and the furnishing and placing of all reinforcing required as shown on the plans or directed by the Engineer.

1.02 SUBMITTALS

- A. Certificates: A signed certification that the masonry units comply with ASTM C90 and the curing requirements specified herein shall be submitted by the masonry manufacturer to the Engineer upon request.

1.03 STORAGE AND HANDLING

- A. Masonry Units: Shall be carefully stacked prior to use and shall be protected from physical damage. All units shall be handled with reasonable care to prevent marring or damaging of faces, edges, corners of units. In no case shall dumping of units from hand trucks or wheelbarrows be permitted.

Where used in exposed wall construction, any unit with exposed face or faces having chips, cracks, or other imperfections more than 1-inch in dimension shall be rejected.

- B. Mortar and Grout Materials: Portland cement, masonry cement, lime and admixtures shall be stored in such a manner as to prevent deterioration or contamination with foreign matter. Cement which has become caked, partially set or otherwise deteriorated, or any material which becomes damaged or contaminated, shall be rejected variations to conditions or discrepancy in actual conditions as they apply to site preparation operations are to be brought to the attention of the HDOA engineer prior to the commencement of any site work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Hollow Concrete Masonry Units: Shall be load-bearing units and shall conform to the requirements of ASTM C90, "Hollow Load-Bearing Concrete Masonry Units," Grade N-11. Units shall be 2-core type, 8" nominal height, 16" nominal length and thickness as indicated. Units for jamb, corner, sill, lintel and other special shapes shall be provided as required.

All units shall be sound, free of cracks, straight and true. They shall be either steam cured or cured under atmospheric conditions for a minimum of 30 days. Color shall be standard with manufacturer.

- B. Portland Cement: Shall conform to ASTM C150, Type I or Type II.
- C. Hydrated Lime: Shall conform to ASTM C207, Type S.
- D. Aggregate for Use in Mortar: Shall conform to ASTM C144.

- E. Aggregate for Use In Grout: Shall conform to ASTM C404, with grading in accordance with ASTM D448, No. 10.
- F. Water used in mixing mortar or grout shall be potable.
- G. Admixture, if used, shall conform to ASTM C494 and shall be mixed in proper amount in accordance with directions of manufacturer.
- H. Horizontal Reinforcement: Shall be trussed or ladder design with #9 gauge, deformed side rods and welded #12 gauge or larger cross rods, ("Dur-O-Wal", "Wal-Lok", "Blok-Mesh", or approved equal), or as otherwise indicated on the plans.
- I. Masonry Cement: Shall be such quality that a one-part masonry cement to 2 1/2 parts masonry aggregate mix tested in accordance with ASTM C270 shall have a minimum 28-day compressive strength of 2,000 psi. ("Supermortar" by Cyprus Hawaiian Cement Corp., "Kaiser Mortar" by Kaiser Cement & Gypsum Corp., or approved equal).

PART 3 - EXECUTION

3.01 PLACING REINFORCEMENT

- A. Reinforcement shall be free from scale, loose flaky rust or other coatings that will destroy bond. It shall be straight except for bends around corners or where bends or hooks are detailed. Size and spacing shall be as indicated on the drawings.
- B. Vertical reinforcement, where positioned by dimension on a drawing section, shall be accurately placed and tied at top and bottom and at intervals not to exceed 192 diameters of the reinforcement (8' for #4 bars; 10' for #5 bars). Dowels and splices shall be lapped as indicated but not less than 40 diameters or 24" whichever is longer. At corners and ends of walls, including those abutting concrete, one #5 bar shall be installed in the end cell and that cell shall be filled with grout. Bars adjacent to corners and ends of walls shall extend the full height of walls.
- C. At intersections, corners and splices, horizontal reinforcing shall be placed, bent and lapped. Ends laps shall be at least 40 diameters.

3.02 PLACING ANCHORS

- A. Work with other trades shall be coordinated as necessary to set into tile walls all anchors, bolts, nailing blocks, etc. Anchors shall be grouted around with sufficient mortar to make them secure.

3.03 MORTAR AND GROUT MIX

- A. The proportioning of materials for mortar and grout shall be by volume and done in such manner that the specified proportions can be controlled and accurately maintained. Fine aggregate shall be measured in a damp loose condition. Mixing shall be by a mechanical batch mixer for at least 3 minutes for mortar and 5 minutes for grout. Hand mixing shall be permitted only for small batches of 3 cu. ft. or less.

B. Mortar shall be freshly prepared and uniformly mixed in one of the following proportions:

1. 1 part Portland cement
1/4 part hydrated lime
2-1/4 to 3 parts sand or aggregate
2. 1 part masonry cement
1 part Portland cement
4-1/2 to 6 parts sand or aggregate
3. 1 part masonry cement
2-1/2 parts sand or aggregate

Admixture may be added in accordance with manufacturer's specifications. Sufficient water shall be used to provide a workable consistency. Mortar shall be used and placed in final position within 2-1/2 hours after mixing.

C. Grout shall be freshly prepared and uniformly mixed in the following proportion:

- 1 part Portland cement
2 parts sand and 2 part gravel OR
1-1/4 parts to 3 parts aggregate

(not more than 1/10 part lime to 1 part Portland cement may be added)

Sufficient water shall be used to produce a consistency just fluid enough for pouring without segregation. Grout shall be used and placed in final position within 90 minutes after mixing, but shall in no case be used after initial set has occurred.

In any event, the grout shall attain not less than 2,000 psi 28-day compressive strength.

3.04 LAYING

- A. General: All masonry units shall be handled so that edges and faces will not be chipped, spalled, or cracked. All beds on which masonry is to be laid shall be cleaned. All work shall be built plumb, level, and true, within the tolerances specified below, and shall be laid up with whole units except at closures. Masonry units in walls shall be laid so that one face of the wall is a true flat plane. Unless otherwise indicated on the drawings, this shall be on the inside face. All cutting and fitting as may be required for and necessary to accommodate other trades shall be done neatly using a power driven carborundum saw. It shall be the responsibility of the Contractor to control any dust pollution caused by the cutting operations. All drilling and cutting of small holes shall be neatly done. Bolts, anchors, ties, conduits, and similar items for the installation of work under other Sections of these specifications shall, as far as practicable, be placed as the work progresses.

B. Tolerances: Shall be as follows:

1. Plumb: Maximum allowed variation from plumb shall be as follows:

	Tolerance
Partitions, columns, end walls, and baffle walls	1/4" in 5'
	3/8" in 10'
	1/2" in 20'
	3/4" in 40'

"Plumb tolerances" shall apply to open ends as well as to faces of walls.

2. Level: Maximum allowed variations from level shall be 3/8" in 20'.

3. Tools: The following tools and methods shall be the minimum or acceptable type:

- a. Plumb and level shall be determined by level and/or pull string method.
- b. Leveling for runs shall be minimum 4' length, though a shorter level may be used for cross-leveling of units.

C. Masonry units shall not be wet before being used, and wet units shall be dried to a moisture content less than 30% by weight before being laid. Where no bond pattern is shown, the wall shall be laid up in straight uniform course with regular running bond.

D. Masonry units in first course shall be laid with shell mortar beds not exceeding 3/4" in thickness. Webs adjoining cells containing reinforcement shall also be bedded in mortar to prevent escape of grout. Vertical head joints shall be buttered well for a thickness equal to the face shell of the block and these joints shall be shoved tightly so that the mortar bonds well to both blocks. Joints shall be solidly filled from the face of the block to the depth of the face shell.

E. If it is necessary to move a block so as to open a joint, the block shall be removed from the wall, cleaned and set in fresh mortar.

F. Mortar joints shall be straight, clean and in thickness of 3/8". All exposed horizontal and vertical joints shall be tooled with a 1/2" to 5/8" round bar at least 14" long to produce a dense, slightly concave surface well bonded to the block at the edges. Tooling shall compact the mortar, pressing the excess mortar out of the joint rather than gouging it out. Use a 3/8" diameter half-round molding to simulate a concave horizontal joint between a concrete bond beam and the hollow tile wall below. Where walls are to receive plaster or where unexposed such as below finish grade (and where special glazed finish is indicated) the joints shall be struck flush.

G. All hollow masonry units shall be built to preserve the unobstructed vertical continuity of the cells to be filled. Walls and cross webs forming such cells to be filled shall be full-bounded in mortar to prevent leakage of grout.

H. All cells containing reinforcement shall be filled solidly with grout in lifts not exceeding 8' unless otherwise shown on the plans. Other cells, where indicated to be solid for anchors or such items, shall also be filled. When grouting is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the pour of grout 1-1/2" below the top of the uppermost unit.

- I. Care shall be taken to prevent mortar splashes. All forms shall be made tight and concrete or grout spilled on the wall shall be washed off immediately before it can set up. Walls shall be protected against stains and excess mortar shall be wiped off the surface as the work progresses. After the wall is constructed it shall not be saturated with water for curing, cleaning, etc.

3.05 CLEANING

- A. At the completion of the work, all holes defective mortar joints in exposed masonry shall be pointed and where necessary defective joints shall be cut out and repointed. All exposed masonry shall be thoroughly cleaned of mortar drippings, sand and splashes during the course of the work. No smoothing of a wall surface which produces a "bright spot" when painted will be accepted. All adjoining work subject to damage shall be carefully protected.

Upon completion of work, all surplus, waste materials, rubbish and debris shall be removed from premises, leaving same in clean and satisfactory condition.

3.06 MEASUREMENT AND PAYMENT

- A. Concrete masonry units shall not be measured and paid for directly but shall be considered as incidental to and included in the contract unit price for the structure.

END OF SECTION

DIVISION 05 - METALS

SECTION 05100 – MISCELLANEOUS METAL

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. The Notice to Contractors, Information and Instructions to Bidder, the Interim General Conditions preceding these specifications shall govern this section of the work.

1.02 GENERAL REQUIREMENTS

- A. The extent of miscellaneous metal work is shown on the drawings, including steel equipment supports, grating and other work shown or required.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following except as otherwise indicated:
 - 1. AISC "Specifications for Structural Steel for Buildings" including the "Commentary."
 - 2. AWS D1.1 "Structural Welding Code."
- B. Qualifications for Welded Work
 - 1. Qualify welding processes and welding operations in accordance with the AWS "Standard Qualification Procedure."
 - 2. Provide certification that welders to be employed in the work have satisfactorily passed AWS qualifications test within the previous 12 months. If recertification of welders is required, retesting will be the Contractor's responsibility.
- C. Source Quality Control
 - 1. Materials and fabrication procedures are subject to inspection and tests in the mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 - 2. Promptly remove and replace materials or fabricated components that do not comply.
- D. Design and Members and Connections: All details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at the site whenever possible without causing delay in the work.

1.04 SUBMITTALS

- A. Product Data for all materials listed in Part 2.
- B. Submit shop drawings including complete details and schedules for fabrication and shop assembly of members.
- C. Engineer's review of shop drawings will be for general conformance to the design only. Compliance with requirements for materials and fabrication and erection is

the Contractor's responsibility. Review of shop drawings will not relieve the Contractor of his responsibility to provide work in accordance with the contract drawings and specifications.

1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standards AWS symbols, and show size, length, and type of each weld.
2. Provide setting drawings, templates, and directions for the installation of anchor bolts and other anchorages to be installed by others.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site at such intervals to ensure uninterrupted progress of the work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay the work.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Rolled Steel Plates, Shapes and Bars: ASTM A 36, except where other type steel is shown.
- B. Anchor Bolts: ASTM A 307, regular hexagon type bolts, galvanized.
- C. Machine Bolts and Nuts: Shall conform to ASTM Standard A 307 and shall be the regular hexagon-bolt type, galvanized.
- D. Washers: Round washers shall conform to ANSI B18.2231, Type B. Beveled washers shall be square, smooth and sloped so that contact surfaces of bolt head and nut are parallel. The diameter of hole of square-beveled washers shall be 1/16-inch greater than the B size for bolts not larger than 1 inch, and 1/8 greater than the bolt size for bolts larger than 1 inch. Washers shall be galvanized.
- E. Electrodes for Welding: Comply with AWS Code. Use E70XX electrodes.
- F. Structural Steel Primer Paint: Manufacturer's or fabricator's standard, fast-curing, lead-free, "universal" primer; selected for good resistance to normal atmospheric corrosion, for foundation for field-applied topcoats despite prolonged exposure.
- G. Galvanizing: Provide hot-dip galvanized, as follows:
 1. ASTM A 153 for galvanizing iron and steel hardware.

2. ASTM A 123 for galvanized rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.
- H. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, comply with the Military Specifications DOD-P-21035 (Ships).
- I. Zinc Dust-Zinc Oxide Primer: Primer paint for galvanized steel, complying with Federal Specification TT-P-64 lb. Type II.

2.02 FABRICATION

- A. Shop Fabrication and Assembly
 1. Fabricate and assemble structural assemblies in the shop to the greatest extent possible. Fabricate items in accordance with AISC Specifications and as indicated on the final shop drawings.
 2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
 3. Where finishing is required, complete the assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in the final structure free of markings, burrs, and other defects.
 4. Contractor shall be responsible for all error of detailing, fabrications, and for correct fitting of all structural members.
- B. Welding shall be done by approved certified welders who have been previously qualified by tests. Welding shall be in accordance with AWS D1.1. Any welds that are found to be defective must be cut out and replaced. "Code for Arc and Gas Welding in Building Construction," latest edition, Sections II, III, and IV formulated by American Welding Society, shall be followed in design and execution of structural welding.
 1. All welding shall be done by electric-arc process with coated rods, not fluxed, so as to produce shielded arc, and shall comply with the requirements of above specified manual.
 2. Surfaces, seams, or joints to be welded shall be free from rust, scale, grease, and other foreign material.
 3. All welds shall be ground and pressed smooth and all weld flux, slag, and spatter shall be completely removed.
 4. Connections not indicated shall be designed and provided by the Contractor and shall be made to conform to AISC Specification for Structural Steel Buildings. Develop full strength of members in all connections. One sided connections will not be permitted.

2.03 SHOP PAINTING

- A. General: Material specifically indicated to be painted shall be shop painted whenever possible. Paint exposed surfaces, including the initial 2-inch below finish surface, of partially embedded steel members.
 1. Do not paint surfaces that are to be welded.

2. Apply 2 coats of paint to surfaces that will be inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.
- B. Shop Painting: Remove all mill scale, rust, dirt and other deleterious materials. Clean all surfaces in accordance with Steel Structure Painting Council, SSPC No. 6 Commercial Blast Cleaning. Immediately after cleaning and before any rust has formed, shop paint with primer. The application shall be made to a uniform dried film thickness of not less than 1.5 mil. Damaged areas shall be promptly repaired with primer.
- C. Field Painting: After erection, entire work shall be in neat, clean, and acceptable condition, ready to receive finish coats of paints.
1. Field welds and any abrasions in shop coat shall be cleaned and primed with same paint as that used for shop coat.
 2. All bolts, washers, and nuts used in connecting structural members shall be cleaned of all rust, oil or grease and given one coat of primer.

2.04 GALVANIZING

- A. All work, unless noted otherwise, shall be galvanized after fabrication. "Fabrication" shall include all operations such as shearing, punching, bending, forming, welding, and maintaining surfaces of material to be smooth and free from projections, barbs and icicles resulting from galvanizing process. Repair damaged areas of galvanized surfaces with zinc galvanizing repair paint. Prime galvanized surfaces with zinc dust oxide.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which miscellaneous metal work is to be installed, and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in manner acceptable to the Erector.

3.02 INSTALLATION

- A. General: Install in accordance with AISC Specifications and as herein specified. Work shall be erected plumb, square and true to line and level.
- B. Surveys: Check line and elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices before installation proceeds. Discrepancies will be reported immediately to the Engineer. Do not proceed with erection until corrections have been made, or until compensating adjustments have been agreed upon with the Engineer.
- C. Anchor Bolts: Furnish anchor bolts and other connectors required for securing miscellaneous metal to foundations and other in-place work.
1. Furnish templates and other devices as necessary to presenting bolts and other anchors to accurate locations.
- D. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of non-bonding materials and roughen to improve bond to surfaces. Clean the bottom surfaces of base and bearing plates.

1. Set remain. Finish loose and attached base plates and bearing plates for structural members on welds or other adjusting devices.
 2. Tighten the anchor bolts after the supported members have been positioned and plumbed. Do not remove wedges or shim, but if protruding, cut off flush with the edge of the base or bearing plate prior to packing with non-shrink grout.
 3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids exposed surface, protect installed materials, and allow to cure in strict compliance with the manufacturer's instructions, or as otherwise required.
- E. Gas Cutting: Do not use gas-cutting torches in the field for correcting fabrication. Cutting will be permitted only on secondary items that are not under stress. Finish gas-cut sections equal to a sheared appearance when permitted.

3.03 FIELD QUALITY CONTROL

- A. Correct deficiencies that inspections have indicated to be not in compliance with requirements. Perform additional tests at Contractor's expense, as may be necessary to reconfirm any non-compliance of the original work, and as may be necessary to show compliance of corrected work.

3.04 CLEANING

- A. Upon completion of work, all surplus materials, rubbish and debris shall be removed from premises, leaving same in clean and satisfactory condition.

END OF SECTION

SECTION 05500 – METAL FABRICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. This section covers the requirements for furnishing and installing metal fabrications which are not part of structural steel or other metal systems.

1.02 REFERENCES

- A. American Institute of Steel Construction (AISC):
 - 1. M011-80 Manual of Steel Construction, "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."
- B. American National Standards Institute (ANSI):
 - 1. A10.3-77 Safety Requirements for Powder Actuated Fastening Systems.
 - 2. A14.3-84 Safety Requirements for Fixed Ladders.
 - 3. B18.2.1-81 Square and Hex Bolts and Screws Inch Series Including Hex Cap Screws and Lag Screws.
 - 4. B18.2.2-72 Square and Hex Nuts.
 - 5. B18.5-78 Round Headed Bolts.
 - 6. B18.22.1-72 Lock Washers.
- C. American Society for Testing and Materials (ASTM):
 - 1. A 36-84a Structural Steel.
 - 2. A 48-83 Gray Iron Castings.
 - 3. A 53-84a Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - 4. A 120-82 Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.
 - 5. A 123-84 Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.
 - 6. A 143-74 (84) Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - 7. A 153-82 Zinc Coating (Hot Dip) on Iron and Steel Hardware.
 - 8. A 307-86 Carbon Steel Externally Threaded Standard Fasteners.
 - 9. A 325-86a High-Strength Bolts for Structural Steel Joints.
 - 10. A 500-84 Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 11. A 501-84 Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

12. A 525-86 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements.
 13. A 526-80 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
 14. A 687-84 Steel Bolts and Studs.
 15. A 780-80 Repair of Damaged Hot-Dip Galvanized Coatings.
 16. A 786-84 Rolled Steel Floor Plates.
 17. B 633-78 Electrodeposited Coatings for Zinc on Iron and Steel.
- D. American Welding Society (AWS)
1. B 3.0-77 Welding Procedure and Performance Qualification.
 2. D 1.1-86 Structural Welding Code, Steel.
- E. Federal Specification (FS)
1. FF-P-395B Pin, Drive, Guided and Pin Drive, Powder Actuated.
 2. FF-S-85C & Am-1 Screws, Cap, Slotted and Hexagon Head.
 3. FF-S-92B & Am-1 Screws, Machine: Slotted, Cross Recessed or Hexagon Head.
 4. FF-S-111D Screw, Wood.
 5. FF-S-325 & Int. Am-3 Shield, Expansion; Nail, Expansion, and Nail, Drive Screw (Devices, Anchoring, Masonry).
 6. FF-W-84A & Am-3 Washers, Lock (Spring).
 7. GGG-D-777B Driver, Projectile Unit, Powder Actuated (High Velocity) (Above Water Only); Pin, Drive Powder Actuated; and Cartridge, Powder Actuated Tool.
- F. Occupational Safety and Health Standards, State of Hawaii (OSHS): Chapter 126 Welding, Cutting and Brazing.

1.03 QUALITY ASSURANCE

- A. Qualification of Welding Work: AWS B 3.0, for welding processes and welding operations.
- B. Codes and Standards: Comply with codes, specifications and standards, referred to in this specification, except where provisions in this specification or drawings exceed such requirements.

1.04 SUBMITTALS

- A. Shop Drawings: Shop drawings for each fabricated items showing fabrication, assembly and erection details, sizes of members, fastening, supports, anchors, clearances, and necessary connections to work of other trades.

- B. Product Data: Manufacturer's product data showing references to industry standards for expansion anchor bolts.

1.05 PRODUCT HANDLING

- A. Transport and store material with adequate protection against damage. Store items in an enclosed area free from contact with soil and weather.
- B. Remove and replace damaged items with new items.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Rolled Steel Shapes, Plates and Bars: ASTM A 36, unless otherwise indicated.
- B. Structural Tubing: ASTM A 500, Grade B or ASTM A 501, unless otherwise indicated.
- C. Steel Pipes: ASTM A 53, Type E or S, Grade B. Minimum standard weight class, or ASTM A 120 Schedule 40 (standard weight), unless otherwise indicated.
- D. Fittings for Steel Pipe: Standard malleable iron fittings, unless otherwise indicated.
- E. Steel Rods and Anchor Bolts: ASTM A 36 or ASTM A 307 Grade A, unless otherwise indicated.
- F. Bolts and Nuts: ASTM A 325, unless otherwise indicated.
- G. Steel Sheets: ASTM A 525 or ASTM A 526 as applicable, commercial quality hot-dipped galvanized steel unless otherwise indicated.
- H. Cast Iron Gratings: ASTM A 48, Class 40, gray cast iron, unless otherwise indicated.
- I. Floor Plates: ASTM A 786 steel plate. Minimum 14 gauge, unless otherwise indicated.
- J. Welding Electrodes: AWS D1.1, E 70 Series Electrodes, unless otherwise indicated.
- K. Galvanizing Repair Material: ASTM A 780, zinc based alloys, zinc rich paint or zinc for spraying.
- L. Steel and Iron: AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings"; if not specified otherwise, use standard mill finished structural steel shapes or bar iron.
- M. Anchors and Fasteners: Where exposed, shall be of same material, color, and finish as metal to which applied. Provide zinc-coated or stainless steel fasteners for exterior use and where built into exterior walls. Select fasteners for type, grade, and class best suited for purpose.

1. Expansion Anchor Bolts: FS FF-S-325, Group II, Type 3, Class 3, made of zinc plated steel, or ASTM B 633, Sleeve type unless shown otherwise on drawings.
 2. Lag Screws and Bolts: ANSI B18.2.1.
 3. Toggle Bolts: ANSI B18.2.1 and ANSI B18.5.
 4. Bolts, Nuts, Studs and Rivets: ANSI B18.2.2 or ASTM A 687.
 5. Screws: FS FF-S-85, or FF-S-92, or FF-S-111.
 6. Lock Washers: FS FF-W-84, circular washers ANSI B18.22.1.
 7. Powder Driven Fasteners: FS FF-P-395 or GGG-D-777. Use when permitted by ANSI A10.3. Follow safety provisions of ANSI A10.3.
- N. Metal Surface, General: For fabrication of work of this Section which will be exposed to view, use only those materials which are smooth and free from surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness.

2.02 FABRICATION

- A. Shop Fabrication: Fabricate and assemble items in shop to greatest extent possible by mechanics skilled in trade and in accordance with manufacturer's directions. Form metalwork to shape and size, with sharp lines, angles, and true curves. Fabricate work to allow for expansion and contraction of materials. Provide welding and bracing of adequate strength and durability, with tight, flush joints, dressed smooth and clean.
- B. Metal Surfaces: Shall be clean and free from mill scale, flake rust and rust pitting; well formed and finished to shape and size, with sharp lines, angles, and smooth surfaces. Shearing and punching shall leave clean true lines and surfaces. Weld or rivet permanent connections. Use welds and flush rivets and finish flush and smooth on surfaces that will be exposed after installation. Do not use screws or bolts where they can be avoided; when used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening.
- C. Construction: Thickness of metal and details of assembly and supports shall give strength and stiffness for minimum loads specified or indicated. Joints exposed to weather shall be formed to exclude water.
- D. Fastening: Provide necessary rabbets, lugs, and brackets so that work can be assembled in a neat and substantial manner. Drill holes for bolts and screws. Form joints exposed to weather to exclude water. Conceal fastening where possible.
- E. Welding: AWS D1.1 for welding of steel. Weld to prevent permanent distortion of connected parts. Weld continuously along entire area of contact (except where tack welding is permitted. Do not tack weld exposed connections). Grind smooth visible welds in finished installation and clean welds immediately by chipping or wire brushing. Comply with OSHA, Chapter 126.

2.03 TREATMENT

- A. Ferrous Metal Surfaces:
 - 1. General: Metal fabrications made of ferrous metals shall be galvanized except items embedded in concrete and unless otherwise indicated.
- B. Galvanizing
 - 1. Surface Preparation:
 - a. Prepare surfaces as required by initial surface condition.
 - b. Pre-clean steelwork utilizing an alkaline cleaner, acid pickle and flux.
 - 2. Coating Application:
 - a. ASTM A 123, galvanize steel members, fabrications, and assemblies after fabrication where practicable by the hot dip process.
 - b. ASTM A 153, galvanize bolts, nuts and washers and iron and steel hardware components.
 - c. ASTM A 525, galvanize steelsheets.
 - d. ASTM A 143, safeguard products against steel embrittlement.
 - 3. Coating Weight:
 - a. ASTM A 123, paragraph 5.1 of ASTM A 123 or ASTM A 153, Table 1 as appropriate.
 - b. ASTM A 525, for steelsheets ASTM A 525, minimum G 90 weight.
 - 4. Surface Finish: Continuous, adherent, as smooth and evenly distributed as possible and free from any defect detrimental to stated end use of coated article.
 - 5. Adhesion: Withstand normal handling consistent with nature and thickness of coating and normal use of article.
 - 6. Treatment: Do not treat freshly galvanized or passivated surfaces with oils, grease, or chemicals which might interfere with adhesion of subsequent paint primers and coatings.
 - 7. Galvanizing Repair: ASTM A 780, whenever damage exceeds 3/16 inch in width, repair galvanized items damaged by welding cutting or by excessively rough handling during shipping or installation. Do not heat surfaces that repair paint has been applied to.

2.04 ANCHORAGE, FASTENINGS, AND CONNECTIONS

- A. Anchorage: Provide anchorage for fastening work securely in place. Set anchors in concrete as the work progresses and space maximum 2 feet on centers, unless indicated otherwise. Sizes, kinds, and spacings of anchors not indicated or specified shall be as necessary for purpose, as approved. Anchorage not otherwise specified or indicated includes slotted inserts, expansion shields, and powder-driven fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screws for wood. Provide inserts of suitable and approved types where required for support or anchorage of equipment and finish construction. Inserts shall be gray or malleable iron castings or galvanized steel unless indicated or specified otherwise. Slotted inserts shall be of types required to engage with anchors, except where specified otherwise, anchors and anchor bolts in exterior walls shall be zinc-coated and all other anchors and anchor bolts shall be as a minimum heavily coated with bituminous paint.

- B. Fastenings: Do not use wood plugs in any material. Use non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish, and harmonizing with material to which fastenings are applied. Conceal fastenings where practicable. Drill and punch to produce clean true lines and surfaces. Countersink metalwork to receive hardware.
- C. Threaded Connections: Make threaded connections up tight so that threads are entirely concealed. Make bolted work up tight and nick threads or bush stem to prevent loosening. Shoulder and head, dowel and pin abutting bars. Pass small bars through larger bars and pin. Rivet, bolt, and screw heads shall be flat and countersunk in exposed work and elsewhere as required. Machine removable members and fit and secure by screws or bolts of proper size and approved spacing.
- D. Anchors and Connecting Members: Provide in concrete or masonry as work progresses, to avoid unnecessary cutting and drilling. Cut, fit, and drill as necessary so materials are properly set in place and to permit engaging work to be properly installed.
- E. Design Connections: Where not shown or indicated, connection details shall be in accordance with AISC M011 and connections shall be provided using common steel bolts. Provide necessary holes for securing work to building. Use lock washers under nuts.
- F. Built-In Work: Metal work built-in with concrete or masonry shall be formed for anchorage, or be provided with suitable anchoring devices as shown or as required. Furnish metal work in ample time for securing in place as work progresses.
- G. Grouting: Grout metal fabrications and anchors to assure filling of spaces and intimate contact of grouting materials with surface to be grouted. Place grout rapidly and continuously so as to avoid cold joints and voids.

2.05 TEMPLATES

- A. Furnish templates, other devices and instructions necessary for the setting of anchors and anchor bolts where required to accurate locations.

2.06 MISCELLANEOUS ITEMS

- A. Handrails and Railings:
 - 1. Steel Rails, Including Carbon Steel Inserts: Steel rails, including inserts in concrete, shall be steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Steel rails shall be 1 1/4-inch nominal size, schedule 40 unless otherwise indicated. Steel railings shall be hot-dip galvanized unless otherwise indicated.
 - 2. Fabrication: Jointing of posts, rail, and corners shall be by one of the following methods:
 - a. Flush-type rail fittings of commercial standard, welded and ground smooth with railing splice locks secured with 3/8-inch hexagonal-recessed-head setscrews.
 - b. Mitered and welded joints made by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth.

Railing splices shall be butted and reinforced by a tight fitting interior sleeve minimum 6 inches long.

- c. Railings may be bent at corners in lieu of jointing, provided bends are made in suitable jigs and that the pipe is not crushed.
- B. Miscellaneous Plates and Shapes: ASTM A 36. Provide for items that do not form a part of structural steel framework, such as lintels, sill angles, support framing for ceiling-mounted items, miscellaneous mountings and frames.
- C. Safety Nosings: Cast aluminum with cross-hatched abrasive-surfaces, or extruded aluminum with abrasive inserts. Provide nosing minimum 4 inches wide and 1/4-inch thick and terminating at maximum 6 inches from the ends of threads for stairs and as indicated for platforms and landings. Provide safety nosings with anchors embedded in concrete and with tops flush with top of traffic surface.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which metal fabrications are to be installed. Should any condition be found unsuitable, no work shall be done until unsuitable conditions have been corrected and are acceptable to Contractor. Proceeding with work will imply acceptance of the conditions by Contractor.

3.02 PREPARATION

- A. Field Verification: Verify measurements in field, as required, for work fabricated to fit job conditions. Examine adjoining work on which metal fabrication work is in any way dependent on for workmanship or fit. Provide corrective work as may be necessary.
- B. Coordination: Coordinate placement of anchorage in concrete or masonry construction with other trades.

3.03 INSTALLATION

- A. General: Install plumb, square, straight, rigid, and true; accurately fit with tight joints and intersections. Brace work adequately, reinforce, and anchor in place.
- B. Isolation of Metals: Where dissimilar metals are in contact with one another, or with concrete, separate for prevention of corrosion by approved methods and/or materials.
- C. Support and Anchors: Provide supporting members, fastenings, framing, hangers, bracing, brackets, straps, bolts, angles and similar items required to set or connect miscellaneous metal items including suitable anchors, expansion shields and similar items for attachment to structure. Install expansion anchor bolts as recommended by manufacturer.
- D. False Work: Provide guys, braces and false work for temporary support of parts of the work and remove when work is self-supporting.

3.04 FIELD TOUCH UP

- A. Provide field touch up on galvanized metals not embedded in concrete or masonry as specified under item "Galvanizing Repair."

- B. Provide field touch up on ungalvanized metals not embedded in concrete or masonry as specified under Section 09900-Painting.
- C. After erection, prime bolts, anchors, field welds and abrasions with same primer as used for metal work.

END OF SECTION

DIVISION 13 - SPECIAL CONSTRUCTION

SECTION 13286 - ASBESTOS-CONTAINING MATERIAL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The work shall include the incidental removal and disposal of asbestos-containing transite irrigation pipes. Existing irrigation pipes in the project area may be composed of asbestos-concrete (transite).

1.02 CONTRACTOR QUALIFICATIONS

- A. The Contractor or Subcontractor performing the asbestos work shall submit to the Engineer a copy of his current C-19 License from the State Department of Commerce and Consumer Affairs.

1.03 PATENT DEVICES, MATERIAL, AND PROCESSES

- A. The Contractor's use of any patented devices, materials, or processes in the performance of work under this contract is governed by the Interim General Conditions of this contract, as amended.

1.04 SUBMITTALS

- A. All items outlined in item 1.05 paragraph C below.

1.05 SCOPE OF WORK

- A. In performing removal and disposal of transite pipes, all possible safeguard, precautions, and protective measures should be utilized to prevent exposure of any individual to asbestos particulates.
- B. Work Specified in this Section
 1. Furnish all labor, materials, and equipment necessary to carry out the safe removal and disposal of asbestos-containing material (ACM) in compliance with all applicable laws and regulations from all surfaces as identified in the specifications and drawings, including all incidental and pertinent operations. The asbestos work shall generally include:
 - a. Removal and disposal of asbestos-concrete (transite) irrigation pipes;
 - b. Related removal work as described in the contract documents.
 2. Cleaning shall include the pre-cleaning, wet wiping, and HEPA vacuuming of affected surfaces.
 3. In general, the principal items of work shall be as follows:
 - a. Protection of all on-site personnel and visitors.
 - b. Set-up and erection of barriers, posting of signs, securing of work areas and occupied areas.
 - c. Erection of decontamination units (if used).
 - d. Establishment of a "Regulated Area." Isolation of the work area from the rest of the irrigation system.
 - e. Removal of the ACM pipe.
 - f. Disposal of the ACM at an approved disposal site.
 - g. Clean-up of asbestos work areas to the satisfaction of the Engineer.
 4. The Contractor shall obtain the services of an independent air monitoring firm and shall pay for all sample and analytical services called for in this section.

C. Submittals

1. Detailed schedule with actual start and completion dates for each phase of the asbestos work shall be prepared using bar graph method or Critical Path Method (CPM) showing gross project logic from beginning to completion and identifying any critical interfaces such as product delivery, coordination or various work items, etc. The schedule shall be formulated on day/week basis. The schedule shall be updated weekly and 8 copies submitted to the Engineer.
2. Notices: As early as possible, but prior to commencement of work as regulated by each agency, and not fewer than 10 working days before commencement of any on-site project activity, send written 10 days notice in accordance with 40 CFR Part 61.145 Subpart M, of the proposed asbestos abatement work with copies to the Engineer and to the following:
 - a. The Administrator of the Environmental Protection Agency (EPA) Regional Office having jurisdiction over the project.
 - b. Department of Health, State of Hawaii, Honolulu, Hawaii. Notification of Demolition and Renovation, Ref" Title 40 CFR 61, National Emission Standards for Hazardous Air Pollutants; Asbestos HESHAP Revision; Final Rule, November 20, 1990.
3. Manufacturer's Data: Submit 8 copies of manufacturer's specifications, installation instructions and field test procedures for each material and all equipment related to asbestos handling and include other data as may be required to show compliance with these specifications and proposed uses.
4. Samples: Submit samples of the following items for approval prior to ordering materials:
 - a. Plastic Sheeting: Three 8-1/2" x 11" pieces of each thickness and type with labels indicating actual mil thickness.
 - b. Surfactant: 8 copies of manufacturer's literature including all laboratory data, mixing and application instructions.
 - c. Tapes and Adhesives: 8 copies of manufacturer's literature including all laboratory data.
 - d. Warning Labels and Signs: 8 copies of examples of all required signage.
 - e. Protective Clothing: 8 copies of manufacturer's literature on all protective clothing and one sample of each item which will be returned to the Contractor.
5. Respirator Equipment: 8 copies of manufacturer's literature on all respirator equipment and one sample of each item which will be returned to the Contractor.
6. Shop Drawings: Submit to the Engineer 8 copies of shop drawings for the following items as a minimum:
 - a. Descriptions of any equipment to be employed in this Section.
 - b. Security provisions, if any, in and around the project area.
 - c. Outline of work procedures to be employed.
7. Documentation for Instruction: Submit to the Engineer documentation that each and every individual, including foremen, supervisors, other company personnel or agents and any other individual who may be exposed to airborne asbestos fibers, who may be responsible for any aspects of

asbestos work activities, or who is allowed or permitted to enter areas where such exposure may occur, has had instruction on the hazards and health effects of asbestos exposure, on the relation between smoking and asbestos exposure in drastically increasing the risk of lung cancer, on the nature of the activities and operations which create a risk of asbestos exposure and the necessary protective steps, on use and fitting of respirators, (in accordance with OSHA Asbestos Standard 29 CFR 1926.1101, Appendix D, Qualitative Fit Test Protocol), on protective dress, on use of showers, on entry and exit from the work areas under normal and emergency conditions, on all aspects of work procedures and protective measures, and on all provisions of 29 CFR 1926.1101. Document that each and every employee understands this instruction.

This documentation shall be an outlined format of the instruction and shall be signed by all employees engaged on this project and by all individuals before being allowed within the project site. The documentation must include an assumption of the potential risk of exposure by that individual and a release of liability of the Consulting Engineer and the State for any such exposure. The Contractor shall be responsible for keeping the documentation up to date and submitting subsequent changes, amendments, or additions to the Engineer before any additional employee or individual, not currently on the list, is allowed within the project site.

8. Documentation From Physician: Submit to the Engineer documentation from a physician that all employees or agents who may be exposed to airborne asbestos have been provided with an opportunity to be medically monitored to determine whether they are physically capable of working while wearing the respirator required without suffering adverse health effects. In addition, document that all individuals permitted within the project site have received medical monitoring or had such monitoring made available to them as required in OSHA 29 CFR 1926.1101. The Contractor must be aware of and provide information to the examining physician about unusual conditions in the workplace environment (e.g., high temperature, humidity, chemical contaminants) that may impact the employee's ability to perform work activities. The Contractor shall keep and make available to all affected individuals the record and the results of such examinations.
9. HEPA Vacuums: Submit manufacturer's certification that vacuums conform to ANSI Z9.2-79, *Fundamentals Governing the Design and Operation of Local Exhaust Systems*, as applicable to this project.
10. Air Supply Equipment and Respirators: Submit notarized certifications that air supply equipment and respirators meet all requirements of OSHA and EPA. Document HIOSH approval of all respiratory protective devices utilized on site. Include manufacturer's certification of HEPA filtration capabilities for all cartridges and filters.
11. Rental Equipment: When rental equipment is to be used in asbestos work areas or to transport asbestos contaminated waste, a written notification concerning intended use of the rental equipment must be provided to the rental agency with a copy submitted to the Engineer.

12. Entry Log: Maintain a log of all personnel other than the Contractor's employees and agents who enter the work area while asbestos work is in progress until after final clearance is received. A sample form is provided in this Article. The log shall contain the following information as a minimum and certified copies shall be submitted to the Engineer weekly:
 - a. Date of visit
 - b. Visitor's name, employer, business address, and telephone number
 - c. Time of entry and exit from work area
 - d. Purposed of visit
 - e. Type of protective clothing and respirator worn
 - f. Certificate of release signed and filed with the Contractor

13. Waste Disposal Manifest Forms
 - a. Submit copies of all transport manifests, trip tickets and disposal receipts for all asbestos containing waste materials removed from the work area.
 - b. Final payment will not be made until copes of all trip tickets and disposal receipts have been furnished to the Engineer.

- D. Product Handling: Deliver materials to the site in original packages, containers, or bags fully identified with manufacturer's name, brand, and lot number. Store materials in a dry well-ventilated space, under cover, off the ground, and away from surfaces subject to dampness or condensation as approved by the Engineer. Material that becomes contaminated with asbestos shall be disposed of in accordance with applicable regulations. Replacement materials shall be stored outside the contaminated work area until asbestos work is completed.

- E. Protection
 1. Site Security: The work area is to be restricted only to authorized, trained, and protected personnel. These may include the Contractor's employees, employees of subcontractors, the Engineer and his representatives, State and local inspectors, and any other designated individuals. A list of authorized personnel shall be established prior to job start.
 - a. Entry to the work area by unauthorized individuals shall not be permitted without the express approval of the Engineer. Any such entry shall be reported immediately to the Engineer by the Contractor.
 - b. A Visitor's Log shall be maintained.
 - c. Subject to the approval of the Engineer, the Contractor shall have control of security in the work area and in proximity of Contractor's equipment and materials.

 2. Site Protection and Safety: As a minimum, follow the requirements of EPA, HIOSH (State of Hawaii), OSHA, and NIOSH. Take all cautions necessary to ensure there is no asbestos contamination to those areas not included in the work schedule.

 3. Protective Covering: The Contractor shall provide and install protective covering on an "as required" or "upon request by Engineer" basis. Protective covering shall be clean plastic sheets.

 4. Safeguarding of Property: The Contractor shall take whatever steps may be necessary to safeguard his work and also the property of the State and other individuals in the vicinity of his work area during the execution of this Contract. He shall be responsible for and make good on any and all

damages caused by his or his employees' negligence. No structure will be loaded such that the weight of the load will endanger the structure.

5. Completed Work: The Contractor shall provide all necessary protection for surfaces encapsulated under this Article.

F. Abbreviations

1. ANSI: American National Standards Institute, Inc.
2. CFR: Code of Federal Regulations
3. HIOSH: State of Hawaii, Department of Labor & Industrial Relations, Division of Occupational Safety and Health
4. EPA: U.S. Environmental Protection Agency
5. NESHAP: National Emission Standards for Hazardous Air Pollutants
6. NIOSH: National Institute for Occupational Safety and Health
7. OSHA: Occupational Safety and Health Administration
8. USDOL: U.S. Department of Labor

G. General Requirements

1. Furnish Contractor certification, within 10 consecutive calendar days from award, that the Contractor is experienced with the EPA, OSHA, and HIOSH regulations related to asbestos, its application, removal, disposal, and treatment.
2. Furnish employee certification, within 10 consecutive calendar days from award, that employees have had instructions on the dangers of asbestos exposure, on respirator use, and decontamination. Furnish employee certification for training for a "competent person," as defined in HIOSH 12-145.1
3. Contractor shall examine and have at all times in his possession at his office (one copy) and in view at each jobsite office (one copy) a current issue of the following publications:
 - a. State of Hawaii, Division of Occupational Safety and Health (HIOSH), Construction Standard 12-145.1, Asbestos
 - b. Title 29, Code of Federal Regulations (29 CFR), Part 1926.1101, Asbestos Construction Standards, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor (USDOL)
 - c. 29 CFR 1910.134, General Industry Standard for Respiratory Protection, OSHA, USDOL
 - d. 29 CFR 1910.2, Access to Employee Exposure and Medical Records, OSHA, USDOL
 - e. 29 CFR 1910.1200, Hazard Communication, OSHA, USDOL
 - f. 40 CFR 61, Subparts A and M (Revised Subpart B), and Revised Final Rule, National Emission Standards for Hazardous Air Pollutants (NESHAP), U.S. Environmental Protection Agency (EPA)
 - g. Guidance for Controlling Asbestos-Containing Materials in Buildings, (Purple Book), EPA

- h. 29 CFR 1910.145, Specifications for Accident Prevention, Signs, and Tags, OSHA, USDOL
 - i. ANSI Z88.2-92 Practice for Respiratory Protection
- 4. The Contractor shall comply with the above requirements and any applicable State and local regulations. Where conflict or any inconsistency among requirements or with this specification exists, the more stringent requirements shall apply. Ignorance of the above requirements or of any applicable State and local regulations resulting in additional cost to the Contractor shall not be paid by the State.
- 5. All regulations shall govern these specifications, except that any more stringent specification or any specification providing greater protection against asbestos exposure, injury, loss, or liability shall control to the extent permitted by regulation. Any question regarding conflict or inconsistency between specification and/or regulations should be referred to the Engineer.
- 6. WHENEVER APPROVAL OF THE ENGINEER IS REQUIRED PRIOR TO PROCEEDING WITH OTHER WORK, THE FOLLOWING SHALL BE OBSERVED:
 - a. The Contractor shall allow the Engineer 48 hours from notification to respond to the required for inspection. If inspection is required for a Monday or day after a holiday, request shall be made two working days prior to desired time of inspection.
 - b. The Contractor shall designate one person (either a foreman or superintendent) who will be authorized to request for inspections. The name of the designated person shall be submitted in writing to the Engineer prior to commencing with the work. Request from any other person will not be considered an official request.
 - c. The designated person when requesting for inspection shall provide the following information:
 - 1) Name of caller
 - 2) Building and rooms to be inspected
 - 3) Work phase of inspection, as specified

H. Definitions

- 1. Abatement: Procedure to control fiber release from asbestos-containing building materials.
- 2. Air Monitoring: The process of measuring the fiber content of a specific, known, volume of air in a stated period of time. For this project, the most current version of the NIOSH 7400 Method of the OSHA ID-160 Method shall be used.
- 3. Amended Water: Water to which a surfactant has been added to reduce water surface tension and thereby provide a more rapid penetration.
- 4. Authorized Visitor: The Engineer, his representatives, air monitoring personnel, or a representative of any regulatory or other agency having jurisdiction over the project.
- 5. Competent Person: An employee specially trained in an EPA AHERA Supervisor training course, who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for

asbestos exposure, and who has the authority to take prompt corrective measures to eliminate them. The duties of the competent person are defined in HIOSH 12-145.1 (29 CFR 1929.1101(o)).

6. Holding Area: A secure area used for the storage of double bagged ACM before removal from the project site to an approved disposal site.
7. Fixed Object: A unit of equipment or furniture in the work area which cannot be removed from the work area without dismantling.
8. Friable Asbestos: Asbestos material which can be crumbled to dust when dry, under hand pressure.
9. HEPA Filter: A High Efficiency Particulate Absolute filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in length.
10. HEPA Vacuum Equipment: Vacuuming equipment that utilizes a High Efficiency Particulate Absolute (HEPA) filter.
11. Regulated Area: An area established by the Contractor to demarcate areas where asbestos-concrete pipe removal (designated as Class II or III asbestos work in 29 CFR 1926.1101) is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limit. Requirements for regulated areas are set out in paragraph € of 29 CFR 1926.1101.
12. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
13. Certified Industrial Hygienist: Person certified by the American Board of Industrial Hygiene. Person educated, trained, and certified in recognizing and evaluating workplace hazards and stress (in this instance, asbestos abatement and related work), and expert in providing methods and means of removing or correcting such hazards and stresses within the work environment.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Asbestos Prohibition: The Contractor shall ensure that all materials and equipment used in or for this project are asbestos-free.
- B. Products
 1. Plastic Sheeting: Minimum thickness is 6-mil polyethylene film.
 2. Plastic Bags: Minimum thickness 6-mil polyethylene file labeled as specified hereinafter.
 3. Tapes: Tape shall be capable of sealing joints of adjacent sheets of polyethylene and for attaching polyethylene sheets to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and

wet conditions, including the use of amended water. Silver cloth duct tape, minimum 2 inches wide; red or NATO orange tape, minimum 2 inches wide for exit arrows; and double-faced foam tapes, by Nashua, 3-M, Arno, or approved equal.

4. Adhesives: Adhesives shall be capable of sealing lapped sheets of polyethylene together or to finished or unfinished surfaces of dissimilar materials. Adhesives shall adhere under both dry and wet conditions. Use 3-M tapes #76, #77, or approved equal.
5. Surfactant (Wetting Agent): 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether, or equivalent, and shall be mixed with water to provide a concentration of one ounce, or more as needed, of surfactant to 5 gallons of water (an equivalent surfactant shall be understood to mean material with a surface tension of 29 dynes/cm as tested in its properly mixed concentration, using ASTM method D 1331-56 (R 1980), "Surface and Interfacial Tension of Solutions of Surface-Active Agents").
6. Warning Labels and Signs: As required by OSHA regulations 29 CFR 1926.1101 and HIOSH regulation 12-145.1. Signage shall be approved by the Engineer. Labels for asbestos debris must also meet the requirements of HIOSH 12-145.1. The generator's name and address must be attached or included in bagged or wrapped asbestos debris.
7. Protective Clothing: As specified hereinafter, the Contractor is cautioned that during the summer and fall, there is usually a tremendous shortage of coveralls due to the consumption of these items by mainland contractors for summer abatement projects. The Contractor shall have all the required sets of coveralls required for this project on island prior to the start of work. There will be no time extension for the unavailability of coveralls or related equipment.
8. Other Materials: Provide all other materials, such as, but not limited to lumber, plywood, nails, fasteners, metal studs, hardware, sealants, and caulking which may be required to properly prepare and complete this project.

2.02 TOOLS AND EQUIPMENT

- A. Provide or fabricate suitable tools for the asbestos work procedures.
 1. Water Sprayer: Airless or a pressure sprayer for amended water application as applicable.
 2. Shoring: As required to accomplish the work and meet all applicable safety regulations.
 3. Tapping Device: For pressure or "wet" tapping, preferably with positive-purge blow-off features.
 4. Other tools and equipment as necessary.

PART 3 - EXECUTION

3.01 PERSONNEL PROTECTION REQUIREMENTS

- A. The Contractor acknowledges he alone is responsible for instruction and for enforcing personnel protection requirements and that these specifications provide only a minimum acceptable standard.
- B. Provide workers with personally issued and marked respiratory equipment approved by NIOSH and accepted by OSHA and HIOSH. All work related to the removal, wrapping, and bagging of asbestos containing pipe and conduit shall be performed in NIOSH-approved half-face respirators equipped with HEPA cartridges.
- C. Workers loading and unloading asbestos debris at the project site and landfill shall wear NIOSH-approved respirators equipped with HEPA cartridges.
- D. Should any condition, for any reason, be encountered where the exposure level exceeds 0.01 f/cc or ambient background levels, the Contractor shall use "Type C" air supplied respirators, the right is reserved to require their use for any and/or all phases of the asbestos work. The State's consultant or CIH shall determine whether air supplied respirators are necessary to be used.
- E. No bearded person(s) shall be allowed on site to perform asbestos work.
- F. Provide workers with sufficient sets of disposable protective full body clothing consisting of material impenetrable by asbestos fibers and of the proper size for each individual to accommodate movement without tearing. Such clothing shall consist of full body coveralls, footwear, gloves and headgear. Provide hard hats as required by applicable safety regulations. Disposable clothing shall not be allowed to accumulate and shall be disposed of as asbestos-contaminated waste. Protective clothing shall be worn by all personnel within the work area from the start of the removal work until the work area has received its final clearance.
- G. No visitors shall be allowed in work areas, except as authorized by the Engineer. Provide authorized visitors with suitable respirators with fresh cartridges. Provide authorized visitors with suitable disposable protective full body clothing consisting of asbestos-impenetrable material of the proper size to accommodate movement without tearing. Such clothing shall consist of full body coveralls, footwear, gloves, and headgear, including hard hats and insulated rubber boots when required. The Contractor shall include in his bid the expense of a total of 4 changes of clothing and respirators per day for each day of asbestos work for visitor's use. The quantity shall accumulate and may be used at any time during asbestos work at the discretion of the Engineer.
- H. All electrical systems used for asbestos work shall as a minimum be protected with "Ground Fault Circuit Interrupters" selected and installed in strict accordance with the manufacturer's instructions, the National Electric Code and all other pertinent codes.
- I. Additional safety equipment (e.g., hardhats meeting the requirements of ANSI Z89.1-1981, eye protection meeting the requirements of ANSI Z87.1-1979, safety shoes meeting the requirements of ANSI Z41.1-1967, disposable PVC gloves) shall be provided to all workers and authorized visitors as needed.

3.02 WORK AREA PREPARATION

A. Step 1

1. Posting of Caution Signs: Post caution signs in and around the work area to comply with 29 CFR 1926.1101, HIOSH regulation 12-145.1, and all other Federal, State and local requirements. Signs shall be posted at a distance sufficiently far enough away from the work area to permit the reader to take the necessary protective measures to avoid exposure.

B. Step 2

1. Existing electrical service to the work area may be used for temporary electrical power during asbestos work, if available; however, the electrical power to the work areas will be shut down during asbestos work. Coordinate with the electrical contractor to ensure that power is available.
2. The Contractor shall verify the location(s) of available electrical service outside the work areas and shall tie into the existing system at a location approved by the Engineer.
3. Install circuit and branch wiring, with area distribution boxes located so that power is available throughout the project by use of construction type power cords.
4. Provide and maintain temporary fire protection equipment during the asbestos operations. Equipment shall be of the appropriate type to fight fires associated with the existing building materials and those materials used during the asbestos construction operations.

C. Step 3

1. Pre-construction submissions, notifications, postings, and permits have been provided and are satisfactory to the Engineer.
2. All equipment for asbestos work, clean-up, and disposal are on hand.
3. All worker training is completed, the competent person for the asbestos removal is designated, and certifications for worker training are provided to the Engineer.
4. **Notify the Engineer and get his approval prior to proceeding with removal work. Work shall not start until the Contractor receives written permission from the Engineer to commence asbestos work.**

3.03 ASBESTOS FIBER CONCENTRATIONS IN THE WORK AREA

- A. The maximum permissible exposure to airborne concentrations of asbestos fibers within the controlled work area when under respirator shall be in accordance with HIOSH 12=145.1. The work shall stop whenever these limits are exceeded and the Contractor shall remedy the condition prior to commencing the work. The expense resulting from the delays shall be the Contractor's responsibility and shall not be paid by the State.

3.04 DISPOSAL OF ACM AND ASBESTOS-CONTAMINATED WASTE (SOLID AND/OR LIQUID)

- A. As the work progresses and waste is generated, the Contractor shall transport to the authorized disposal site all waste generated each day, unless specifically approved by the Engineer to delay a disposal operation for one day. The

Contractor shall transport all waste to the predesignated disposal site in accordance with EPA regulations.

- B. Contaminated material shall be double bagged in bags with OSHA label prescribed by 29 CFR 1926.1101 (k)(8)(iii). The label shall state, "DANGER – CONTAINS ASBESTOS FIBERS – AVOID CREATING DUST – CANCER AND LUNG DISEASE HAZARD." The outside of all containers shall be clean before leaving the work area. A label with the name of the waste generator and location from which the waste was generated shall be clearly indicated on the outside of the bags per the November 20, 1990 NESHAP Revision, Final Rule, Waste Disposal Section describing marking, labeling, and offsite disposal requirements. Shipment records shall be maintained using forms described in this latest NESHAP Revision.
- C. Vehicles used for transporting waste to the disposal sites shall bear warning signs and markings as described in the November 20, 1990 NESHAP Revision, Final Rule, Waste Disposal Section and have a completely enclosed, lockable storage compartment. Storage compartments shall be plasticized and sealed with a minimum of one layer of 6 mil polyethylene sheeting on the sides and top and two layers of 6 mil polyethylene on the floor (bed). If allowed by HIOSH, waste materials, except those with sharp edges (metal lath, screws, nails, metal suspension system, etc.), properly double bagged, may be transported to the disposal site without being placed in drums, if the transporting vehicle is prepared as specified above, subject to more stringent requirements by HIOSH. The compartments shall be thoroughly wet-cleaned and/or HEPA-vacuumed, following the disposal of each load at the disposal sites at an approved location with electrical power as required. At the conclusion of the asbestos work, or before transport vehicles are used for other purposes, the polyethylene sheeting shall be properly removed and disposed of as contaminated waste. After this has been accomplished, compartments shall once again be wet-cleaned and HEPA-vacuumed in order to eliminate all debris.
- D. Workers unloading bags at the disposal sites shall be dressed in full body protective clothing and dual cartridge respirators.
- E. Waste disposal manifest forms shall be properly completed to assure custody and disposal of all ACM and asbestos-contaminated waste at approved disposal sites. Forms shall be kept on file as directed by the Engineer with copies submitted to the Engineer the next working day after each trip.
- F. NOTE: IT IS THE CONTRACTOR'S RESPONSIBILITY TO ASSURE THAT ANY LANDFILL USED FOR DISPOSAL OF ASBESTOS-CONTAINING OR ASBESTOS-CONTAMINATED WASTE IS APPROVED FOR THAT PURPOSE.
- G. Bags must be placed, and not dropped, at the site of burial. Dumping of bags from the containers will not be allowed. However, if it is acceptable to the landfill, if the bags are torn, the entire container may be buried.
- H. The Contractor shall pay a waste disposal charge for the use of any landfills. All expenses for landfills shall be the complete responsibility of the Contractor. The Contractor shall give 24 hour advance notice of all deliveries to the landfill(s). Delivery time shall be as directed by the landfill operator.

3.05 CLEANING OF THE WORK AREA

- A. SHOULD THE CONTRACTOR FAIL TO COMMENCE WORK TO CLEAN UP AND MAKE THE WORK AREA ASBESTOS FREE WITHIN ONE WORKING DAY AFTER THE CLEAN-UP THEREOF HAS BEEN REQUIRED BY THE DEPARTMENT OF AGRICULTURE, AND THEREAFTER TO EXPEDITIOUSLY COMPLETE THE SAID CLEAN-UP, THE ENGINEER MAY WITHOUT FURTHER NOTICE AND WITHOUT TERMINATION OF CONTRACT, DO THE CLEAN-UP AND DEDUCT THE COST THEREOF FROM THE CONTRACT PRICE.
- B. Remove signage required for the asbestos removal and encapsulation work. Signage applicable to job site safety and the performance of the remaining portions of the work shall remain as applicable.
- C. Completely remove all protective covering used to protect the work area. Clean asbestos-concrete fragments which have fallen into the trench. Restore existing facilities to their original condition as approved by the Engineer.

3.06 EQUIPMENT CLEANING

- A. All contaminated equipment and tools used for removal work shall be wrapped in two layers of 6-mil polyethylene sheets prior to removal from the work area. No washing of contaminated equipment and tools will be allowed at the project site.

3.07 TESTING / AIR MONITORING

- A. The testing/air monitoring requirements conforming to all applicable Federal, State, and local regulations are incorporated into this Section. The Contractor shall obtain the services of an independent air monitoring firm and shall pay for all sampling and analytical services called for in this section.
- B. Air testing shall be performed by an air monitoring and testing firm retained by the Contractor. Personnel performing air monitoring must have taken and successfully passed the NIOSH 582 course. The testing laboratory must prove proficiency in AIHA/NIOSH PAT program and the EPA/RTI program. Payment to the testing laboratory shall be by the Contractor. Any air monitoring and testing required of or initiated by the Contractor, shall be paid for by the Contractor and shall be included in the contract amount. Final clearance of the work area shall be performed by visual inspection.
- C. All work performed by said air monitoring and testing firm shall be under the supervision of a Certified Industrial Hygienist (CIH).
- D. Throughout the entire removal and cleaning operations, air monitoring shall be conducted to ensure that the Contractor is complying with this specification, EPA and OSHA regulations, and any applicable State and local government regulations. The purpose of the independent air monitoring firm's work will be to clear the work place after final cleaning of the work area, and to detect faults in the work area such as:
 - 1. Contamination outside the work area with airborne asbestos fibers.
 - 2. Exceeding the ceiling concentration for airborne asbestos fibers.
- E. Air monitoring will be conducted according to the method prescribed by 29 CFR 1926.1101 Appendix A of the OSHA regulations, the most current HIOSH 7400

method, or approved substitute per OSHA revisions 29 June 1995 (Federal Register, Vol. 60, No. 125), in addition to the following requirements:

1. **Monitoring Prior to Actual Removal:** The Contractor will provide area monitoring and establish the reference TWA (time weighted average) one day prior to the masking and sealing operations. A minimum of three samples will be taken.
 2. **Monitoring During Asbestos Removal:** The Contractor will provide personal and area monitoring to establish the TWA during exposure to airborne concentrations of asbestos. Thereafter, providing the same type of work is being performed and the TWA results do not exceed the permissible exposure level, the Contractor will provide area monitoring as directed by the Contractor's CIH. If monitoring inside or outside the asbestos work area shows airborne concentrations have reached the predetermined specified TWA, stop all work, notify the Engineer immediately, correct the condition(s) causing the increase and get the Engineer's approval prior to restarting the work.
- F. **Fibers Counted:** Airborne fibers referred to herein include all fibers regardless of composition as counted in the NIOSH 7400 method. If work has stopped due to high airborne fiber counts, air samples will be secured by the Contractor for analysis by transmission electron microscopy (TEM). Airborne fibers counted in samples analyzed by transmission electron microscopy shall be only asbestos fibers, but of any diameter and length.
- G. **Effect on Contract Sum:** If TEM is used to determine airborne fiber counts in accordance with the above paragraph, the cost of such analysis will be borne by the Contractor, at no additional cost to the State.
- H. **Personal Monitoring:** The Contractor shall perform air monitoring as required to meet OSHA and Hawaii HIOSH requirements for maintenance of TWA fiber counts.
- I. **Monitoring Results:** Fiber counting shall be completed and results reviewed by the industrial hygienist within a maximum of 16 hours. The Engineer shall however have the right to request for monitoring results within any reasonable time period. The industrial hygienist shall notify the Contractor and the Engineer immediately of any exposures to asbestos fibers in excess of the acceptable limits. The testing laboratory shall submit all certified monitoring results to the Engineer within one work day.

TEN DAY NOTICE FORM
(sample)

This form shall be completed and filed with both State and regional EPA officials at least ten (10) days before commencement of any abatement activities.

Contractor_____

Name_____

Address_____

City_____State_____Zip_____

Phone_____

Building Owner or Operator_____

Name_____

Address_____

City_____State_____Zip_____

Phone_____

Building Information_____

Age of Building_____

Use of Building_____

Address_____

City_____State_____Zip_____

Amount of Asbestos (Ft)_____Abatement Technique_____

Amount of Asbestos (Ft)_____Abatement Technique_____

Contract Dates Start_____Finish_____

Disposal Site_____

Site Name_____Operator-Owner Name_____

Address_____

City_____State_____Zip_____

Phone_____

ENTRY LOG
(sample)

DATE _____

PROJECT _____

SUPT. _____

All personnel must sign-in and sign-out each time they enter and exit the work area.
Please print clearly. Attach employee release form for all visitors.

NAME Address*, Phone*	EMPLOYER	TIME IN	TIME OUT	PURPOSE OF VISIT**	TYPE OF PPE ISSUED

*NOT required of Contractor’s employees

**Type of PPE (Personal Protective Equipment) issued to include list of protective clothing worn and type of respirator used (Type “C”, half-face/dual cartridge, etc.)

EMPLOYEE RELEASE FORM
(sample)

Employee Name _____

Employee Address _____

Employee Telephone No. _____

Union Card Number _____

Classification of Worker _____

Do you have now, or have you had in the past any respiratory problems?

Yes _____ No _____

Have you worked in the past with fiberglass materials?

Yes _____ No _____

The project you will be working on involves the removal of the asbestos from the building. Asbestos is considered a health hazard.

The company is supplying all necessary personal protective equipment (PPE), such as disposable garments and respirators, for your protection from asbestos hazards.

You shall be instructed at the commencement of the job on the required use of PPE, work procedures and work requirements. These must be rigidly adhered to. Smoking is not permitted in work areas. Disregarding of safety instructions or work procedures shall result in instant dismissal.

I acknowledge that the above stated safety instructions have been given to me by the company at the start of my work on this project. I am thoroughly familiar with these work procedures and instructions given by the company, and I have answered the above questions truthfully.

Signed _____
Employee

Date _____

ASBESTOS DISPOSAL FORM
(sample)

Date: _____

Owner or Operator of Landfill _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

Name of Landfill _____

Address _____

City _____ State _____ Zip _____

Phone _____

Hauler _____

Approximate Volume of Asbestos Received _____

Types of Container(s) Used _____

Asbestos Container labeled? _____ YES _____ NO

I certify that the above statements are true and that the landfill has been approved for the disposal of asbestos. The delivered material will be covered within 6 inches (15 cm) of non-asbestos material within 224 hours.

Signed _____

Landfill Owner-Operator

END OF SECTION