Division of Forestry and Wildlife

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION
Honolulu, Hawaii

BOARD OF LAND AND NATURAL RESOURCES

SUZANNE D. CASE
Chairperson

CONTRACT SPECIFICATIONS AND PLANS

Job No. D00CK68A
Division of Forestry and Wildlife
Kauai Baseyard Improvements
Lihue, Kauai, Hawaii

Structural Engineer: Arnold T. Okubo & Assoc., Inc.
Electrical Engineer: H & O, III, Inc.

April 2016

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION
Honolulu, Hawaii

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Division of Forestry and Wildlife
Kauai Baseyard Improvements
Lihue, Kauai, Hawaii

Approved: _____
CARTY S. CHANG, P.E.
Chief Engineer
Engineering Division

Approved: _____
DAVID G. SMITH
Administrator
Division of Forestry and Wildlife

APRIL 2016

NOTICE TO BIDDERS
(Chapter 103D, HRS)

COMPETITIVE BIDS for Job No. D00CK68A, DOFAW Kauai Baseyard Improvements, Kauai, Hawaii 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 at DOFAW Kauai Baseyard located in Lihue, Kauai, Hawaii.

The work shall generally consist of the demolition of an existing vehicle shelter and the construction of a new vehicle structure in the same location. In addition, a new photovoltaic system will be installed. 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.

A voluntary pre-bid conference will be held at the DOFAW Kauai Lihue Baseyard, 4398D Pua Loke Street, Lihue, HI 96766, on May 18, 2016, at 10 AM.

All interested parties are invited to attend a State conducted site visit. The site visit will be held at the project site (direction and location mentioned above) on May 18, 2016, at 10 AM.

The estimated cost of construction is $1,000,000 to $1,500,000.

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 $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

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 Board of Land and Natural Resources (Board).

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 Board 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 Board 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 Board.

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 Board, 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 of Land and Natural Resources 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 Board'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 Board 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 LAND AND NATURAL RESOURCES
ENGINEERING DIVISION
State of Hawaii

JOB NO. D00CK68A
DIVISION OF FORESTRY AND WILDLIFE
KAUAI BASEYARD IMPROVEMENTS
LIHUE, KAUAI, HAWAII

_____, 2016

Chief Engineer
Engineering Division
Department of Land and Natural Resources
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 an existing vehicle shelter and construct a new vehicle shelter, and photovoltaic system, including electrical utilities, asphaltic concrete pavement work, concrete work, and miscellaneous improvements, 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. D00CK68A
DIVISION OF FORESTRY AND WILDLIFE
KAUAI BASEYARD IMPROVEMENTS
LIHUE, KAUAI, HAWAII

on file in the office of the Engineering Division for the TOTAL SUM BASE BID (Items 1 to 6) of:

_____

_____Dollars ($_____)
and will fully complete all work under this contract within 240 consecutive calendar days from the date of written notice to proceed, including date of said order, and said total sum being itemized on the following pages.

PROPOSAL

Item No.	Quantity	Unit	Description	Unit Price	Total
1.	Job	LS	Mobilization and Demobilization (Not to Exceed 10% of the Total Sum Bid)	LS	$_____
2.	Job	LS	Construct New Vehicle Shelter. Includes all demolition and removal work, site work, excavation and backfilling, earthwork, foundation and concrete work, pre-engineered metal building including roofing and siding, doors and hardwares, painting, masonry work, environmental pollution controls, asphaltic concrete paving, pavement and slab striping and markings, soil treatment for vegetation control, architectural, structural, and electrical work, all miscellaneous steel work, all materials, labor, and equipments, and all other appurtenances, complete in place.	LS	$_____
3.	Job	LS	Photovoltaic System. Includes photovoltaic panels with mounting hardware, inverters, electrical equipment, wiring, all installations and connections, all materials, labor, equipment and all other appurtenances for a photovoltaic system, complete in place.	LS	$_____
4.	Job	LS	Removal of Lead Paint. Includes all removal work, protection, disposal, testing environmental pollution control, Testing/Air Monitoring, all materials, labor, and equipments, and all other appurtenances, complete in place in accordance to Section 01715 - Existing Conditions - Asbestos/Lead/Hazardous Material Survey and Report, Section 13283 - Disturbance of Lead Paint, and Section 13288 - Testing/Air Monitoring.	LS	$_____

Item No.	Quantity	Unit	Description	Unit Price	Total
5.	Job	LS	Project Sign, complete in place.	LS	$_____
6.	---	---	Field Office, complete in place.	Allowance	$ 8,000
				Total Base Bid (Items 1-6)	$_____

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. Please indicate your recycled or non-recycled product by indicating its cost FOB jobsite unloaded in the schedule below, including applicable General Excise & Use Taxes.

DESCRIPTION	RECYCLED PRODUCT COST	NONRECYCLED PRODUCT COST
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____

The bidder requesting a recycled product preference 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.

CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS PROHIBITED

Contractors are hereby notified of the applicability of Section 11-355, HRS, which states that campaign contributions are prohibited from specified State or county government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body.

CONDITION OF AWARD

It is understood that the award of the contract will be made on the basis of the lowest responsible Total Base Bid (Items 1 to 6) selected by the Board of Land and Natural Resources. 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 Board of Land and Natural Resources reserves the right to reject any and/or all bids and waive any defects when, in the Board'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 Board of Land and Natural Resources 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 Two Hundred and No/100 Dollars ($200.00) 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 Board of Land and Natural Resources 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 Engineering Division, by recording the date of receipt of the respective addenda in the space provided below:

Addendum	Date Received	Addendum	Date Received
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 Board 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 Board.

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

LOOK AT PREVIOUS PROPOSAL IF YOU HAVE ADDITIVES FOR THE BID PROPOSAL. EACH ADDITIVE SHOULD HAVE ITS OWN TABLE OF SUB-CONTRACTORS.

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.

The notice of award, if any, resulting from this solicitation shall be posted on the Procurement System on the SPO website: http://hawaii.gov/spo2/.

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 contact. 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.

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SECTION 01019 - GENERAL SPECIFICATIONS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS: 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.

1.2 GENERAL

A. Construction Lines, Levels and Grades: The Contractor shall verify all lines, levels and elevations indicated on the drawings before any clearing, excavation or construction begins. 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 for failing to report the discrepancies before proceeding with any work whether within the area affected or not.

B. Examination of Premises: The Contractor shall contact the Engineer and obtain permission before visiting the site.

C. Notices: The Contractor shall notify the Engineer and give at least three (3) working days notice before starting any work.

D. Disruption of Utility Services: All work related to the temporary disconnection of electrical system shall be pre-arranged with the Engineer so that any disruption of such services will be kept to a minimum. In the event temporary power 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 facility's operations. Where the Contractor's operations would result in interruptions which would hamper the operations of the facilities, the Contractor shall rearrange the schedule of work accordingly.

2. The Contractor shall maintain safe passageway to and from the facility's occupied rooms and other occupied spaces for the user agency personnel and the public at all times.

F. Contractor Use of Premises

1. The Contractor shall review the applicable asbestos survey reports and insure that he fully understands their contents as to whether and where there may be asbestos containing materials (ACM) in the building(s) in which he will be working.

2. The Contractor shall inform its employees, subcontractors and all other persons engaged in the project of the presence (as applicable) of asbestos in the existing buildings at the job site in accordance with the requirements of Chapter 110, Article 12-110-2 (f) (1) (B) of the Occupational Safety and Health Standards, State of Hawaii.

3. In the event the Contractor, its subcontractor(s) and/or other persons engaged in the project must work in any building(s) on the site other than that one(s) designated in the project, the Contractor shall request copies of the asbestos survey report(s) for the building(s) from the Engineer and notify all persons as indicated in Item 2 above.

4. 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 are present in the existing buildings 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).

5. If lead testing was done and the data is appended to this Section, the Contractor shall review the data to insure understanding of lead containing paint identification and location, that the testing was for design purposes only, and that the results do not satisfy any of the requirements of the Chapter 12-148, HAR.

   a. Legend for Asbestos Survey Report

ACM	Asbestos Containing Material
USA	Unified Sampling Area. A USA is an area containing suspect ACM which are consistent throughout the entire USA. Consistent means that the material does not look or feel different within the USA.
ACBM	Asbestos Containing Building Material. These materials have been proven to contain asbestos

	through analysis of bulk samples collected during the inspection.
Friable	ACBM Material that may be mechanically broken down by moderate hand pressure to create airborne fibers. These materials have been proven to contain asbestos through analysis of bulk samples.
Non- Friable	ACBM Materials (other than friable) that have been proven to contain asbestos through analysis of bulk samples.
Friable Assumed	Materials that may be mechanically broken down by moderate hand pressure to create airborne fibers. These materials were assumed to contain asbestos and must be treated as such. No bulk samples were collected from these materials.
Non-Friable Assumed	Material (other than friable materials) that were assumed to contain asbestos and must be treated as such. No bulk samples were collected from these materials.
No Suspect Materials	This category includes those buildings where no suspect ACMs were found and no samples collected; and those buildings where suspect materials were identified and sampled but analysis proved they do not contain asbestos. This classification represents a building that does not contain ACMs covered under the Asbestos Hazard Emergency Response Act (AHERA) regulations. This does not always mean that the building is asbestos-free.
US Group	Contains 14 digits of the sample number specific to the Unified Sampling Area. The USA is analogous to the Homogeneous Area state in the regulations.

Example:	11-0005-012-001-01
11	State Identification
0005	School District or Agency Identification
012	Campus or Facility Identification
001	Building Identification
01	USA Identification

SAM# Contain the two-digit sample number specific to the individual sample vial.

CONT (Consistent) This is a visual determination by the micro-scopist based on whether the members of the Unified Sampling Area are actually taken from a consistent source material.

ASS States whether the sample is positive (Y) for asbestos content (greater than 1%) or negative (N) for asbestos content (less than or equal to 1%). Samples that contain greater than 1% asbestos will have the quantification in the appropriate column.

CHRY Chrysotile asbestos.

AMOS Amosite asbestos.

CROC Crocidolite asbestos.

ANTH Anthophyllite asbestos.

ACT/TREM Actinolite/Tremolite.

% ASB Total percentage of asbestos in the sample.

OTHER MATERIALS:

WOOL	Mineral wool, rack wool or fiber glass.
CELL	Cellulose (wood fiber, paper, or plant fiber).
MICA	Micaceous minerals (Vermiculite, Biotite, Muscovite and Chlorite).
PUMC	Pumice or Perlite.

	BIND	Binders, fillers and cements.
	OTHER	Other Material.

TOT % — Total % of all constituents of the sample.

BS Code — Bulk Sample Code. This BS Code represents the type of material that was sampled. The Bulk Sample descriptions used are as follows:

BS Code	Description
0	Unknown
1	Accoustical Plaster
2	Accoust./Therm. Plaster
3	Hardwall/Ceil. Plaster
4	Vinyl Floor Tile
5	Pipe Covering
6	Corrugated Pipe Covering
7	Wrapped Paper Pipe Cover
8	Boiler/Tank Insulation
9	Breeching/Exhaust Packing
10	Woven Paper/Tape
11	Drop or Lay-in Panel
12	Accoustical Tile (1x1)
13	Fire or Stage Curtain
14	MJP on Non-Suspect Pipe
15	MJP on Pipe Covering
16	MJP on Corr. Pipe Cover
17	MJP on Wrapped Pipe Cover
18	Fireproofing
19	Vibration Joint Cloth
20	Interior Duct Insulation
21	Exterior Duct Insulation
22	Blown-in Insulation
23	Stored Insulation
24	Debris
25	Gasket
26	Transite Pipe
27	Transite Hood
28	Asbestos Pad
29	Asbestos Glove
30	Asbestos Rope
31	Rab Asbestos
32	Electrical Wiring
33	Fire Hose

34	Fire Door
35	Fire Suit
36	Fire Brick
37	Lab Counter Top
38	Fiber Pack Kiln
39	Tongs
40	Poured in Insulation
41	Contaminated Soil
42	Tectum
43	Floor Underlayment
44	Hard Grout
45	Mortar
46	Brown/Scratch Coat
47	Oven/Autoclave Lining
48	Brake Lining
49	Theater Curtain
50	Transite Siding
51	Linoleum
52	Wallboard
60	Chalkboard
99	Other

G. Parking Policy for Contractor

1. The Contractor and its employees will not be allowed to park in zones assigned to facility personnel.

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:

1. The Contractor may use the existing toilet facilities if so designated by the Engineer; however, it is the Contractor's responsibility to keep same clean and in a sanitary condition at all times.

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 the facility 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, 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; color samples; 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, be 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 also sign and date each drawing so marked.

3) The Contractor shall submit the as-built drawings together with the marked-up field office plans to the Engineer.

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.

R. Best Management Practices

1. To avoid harming seabirds, the contractor shall not use night construction lights during the fledging season of September 15 to December 15. Contractors may use construction lights from December 16 to September 15. It is highly recommended that the lights are shielded and pointed downward. Fledging seabirds are attracted to bright lights in which they become confused and temporarily blinded, they strike man-made structures and fall to the ground.

2, To avoid harming Hawaiian bats, the contractor shall avoid trimming or cutting trees greater than 15 feet or 4.6 meters in height from June to September 15 during the birthing and pup rearing season. Trees may be trimmed, cut or removed from September 16 to May 31. For emergency situations in which a tree needs to be cut or removed inside the pupping season, please notify the DLNR – Division of Forestry and Wildlife for technical assistance.

END OF SECTION

SECTION 01090 - STANDARD REFERENCES

PART 1 - GENERAL

Wherever used in the project, the following abbreviations will have the meanings listed:

Abbreviation	Company
AA	Aluminum Association Incorporated 818 Connecticut Avenue, N.W. Washington, D.C. 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W., Suite 225 Washington, D.C. 20001
ACI	American Concrete Institute P.O. Box 19150 Detroit, MI
AEIC	Association of Edison Illuminating Companies 51 East 42nd Street New York, NY 10017
AFBMA	Anti-Friction Bearing Manufacturer's Association 60 East 42nd Street New York, NY 10017
AGA	American Gas Association 8501 East Pleasant Valley Road Cleveland, OH 44131
AGMA	American Gear Manufacturer's Association 1330 Massachusetts Avenue, N.W. Washington, D.C.
AISC	American Institute of Steel Construction 101 Park Avenue New York, NY 10017
AISI	American Iron and Steel Institute 1000 16th Street, N.W.

Abbreviation	Company
	Washington, D.C. 20036
AITC	American Institute of Timber Construction 333 West Hampden Avenue Englewood, CO 80110
AMCA	Air Moving and Conditioning Association, Inc. 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute, Inc. 1430 Broadway New York, NY 10018
APA	American Plywood Association 1119 A Street Tacoma, WA 98401
API	American Petroleum Institute 1801 K Street N.W. Washington, D.C. 20006
ARI	Air-Conditioning and Refrigeration Institute 1814 North Fort Myer Drive Arlington, VA 22209
ASCE	American Society of Civil Engineers 345 East 47th Street New York, NY 10017
ASCII	American Standard Code for Information Interchange United States of America Standards Institute 1430 Broadway New York, NY 10018
ASE Code	American Standard Safety Code for Elevators, Dumbwaiter and Escalators American National Standards Institute 1430 Broadway New York, NY 10018

Abbreviation	Company
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 345 East 47th Street New York, NY 10017
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWPA	American Wood Preservers Association 1625 Eye Street Washington, D.C. 20006
AWS	American Welding Society 2501 N.W. 7th Street Miami, FL 33125
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CBM	Certified Ballast Manufacturers 2120 Keith Building Cleveland, OH 44115
CMAA	Crane Manufacturers Association of American, Inc. (Formerly called: Overhead Electrical Crane Institute - OECI) 1326 Freeport Road Pittsburgh, PA 15238
CRSI	Concrete Reinforcing Steel Institute 180 North La Salle Street Chicago, IL 60601

Abbreviation	Company
CSA	Canadian Standards Association 178 Rexdale Boulevard Rexdale, Ontario, M9W IR3, Canada
DEMA	Diesel Engine Manufacturer's Association 122 East 42nd Street New York, NY 10017
DIS	Division of Industrial Safety California Department of Industrial Relations 2422 Arden Way Sacramento, CA 95825
EEI	Edison Electric Institute 90 Park Avenue New York, NY 10016
EIA	Electronic Industries Association 2001 Eye Street N.W. Washington, D.C. 20006
EJMA	Expansion Joint Manufacturer's Association 331 Madison Avenue New York, NY 10017
ESO	Electrical Safety Orders, California Administrative Code, Title 8, Chap. 4, Subarticle 5 Office of Procurement, Publications Section P.O. Box 20191 8141 Elder Creek Road Sacramento, CA 95820
FEDSPEC	Federal Specifications General Services Administration Specification and Consumer Information Distribution Branch Washington Navy Yard, Bldg. 197 Washington, D.C. 20407

Abbreviation	Company
FEDSTDS	Federal Standards (see FEDSPECS)
FM	Factory Mutual Research 1151 Boston-Providence Turnpike Norwood, MA 02062
HEI	Heat Exchange Institute 122 East 42nd Street New York, NY 10017
HI	Hydraulic Institute 1230 Keith Building Cleveland, OH 44115
IAPMO	International Association of Plumbing and Mechanical Officials 5032 Alhambra Avenue Los Angeles, CA 90032
ICBO	International Conference of Building Officials 5360 South Workman Mill Road Whittier, CA 90601
ICEA	Insulated Cable Engineers Association P.O. Box P South Yarmouth, MA 02664
IEEE	Institute of Electrical and Electronics Engineers, Inc. 345 East 47th Street New York, NY 10017
IES	Illuminating Engineering Society C/O United Engineering Center 345 East 47th Street New York, NY 10017
ISA	Instrument Society of America 400 Stanwix Street Pittsburgh, PA 15222

Abbreviation	Company
JIC	Joint Industrial Council 7901 Westpark Drive McLean, VA 22101
MILSPEC	Military Specifications Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. 127 Park Street, N.E. Vienna, VA 22180
NAAMM	National Association of Architectural Metal Manufacturers 100 South Marion Street Oak Park, IL 60302
NACE	National Association of Corrosion Engineers P.O. Box 986 Katy, TX 77450
NEC	National Electric Code National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210
NEMA	National Electrical Manufacturer's Association 155 East 44th Street New York, NY 10017
NESC	National Electric Safety Code American National Standards Institute 1430 Broadway New York, NY 10018
NFPA	National Forest Products Association (Formerly called: National Lumber Manufacturer's Association) 1619 Massachusetts Avenue, N.W. Washington, D.C. 20036

Abbreviation	Company
OSHA	Occupational Safety and Health Act U.S. Department of Labor San Francisco Regional Office 450 Golden Gate Avenue, Box 36017 San Francisco, CA 94102
PPIC	The Plumbing & Piping Industry Council, Inc. Suite 402 510 Shatto Place Los Angeles, CA 90020
SAE	Society of Automotive Engineers 2 Pennsylvania Street New York, NY 10001
SAMA	Scientific Apparatus Makers Association One Thomas Circle Washington, D.C. 20005
SBCC	Southern Building Code Congress 1116 Brown-Marx Building Birmingham, AL 35203
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc. 8224 Old Courthouse Road Tysons Corner Vienna, VA 22180
SSPWC	Standard Specifications for Public Works Construction Building News, Inc. 3055 Overland Avenue Los Angeles, CA 90034
TEMA	Tubular Exchanger Manufacturer's Association 331 Madison Avenue New York, NY 10017
UBC	Uniform Building Code Published by ICBO

Abbreviation	Company
UL	Underwriters Laboratories Inc. 207 East Ohio Street Chicago, IL 60611
UMC	Uniform Mechanical Code Published by ICBO
UPC	Uniform Plumbing Code Published by IAPMO
USBR	Bureau of Reclamation U.S. Department of Interior Engineering and Research Center Denver Federal Center, Building 67 Denver, CO 80225
WWPA	Western Wood Products Association (Formerly called: West Coast Lumberman's Association - WCLA) Yeon Building Portland, CA 97204

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01100 - ARCHAEOLOGICAL PROTECTION

PART 1 - GENERAL

1.01 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: 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 01330 - SUBMITTALS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: Submittals shall be required for work as called for in the plans and specifications or by the Engineer.

1.02 SUBMITTALS

A. 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 or materials, schedules of operations, guarantees, certifications, operating and maintenance manuals, and field posted as-built drawings.

B. Required Submittals: Provide a comprehensive list of the required submittals by Specification Section. Furnish this list to the Engineer within fifteen (15) calendar days after award of the contract or upon earlier written instructions from the Engineer.

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.

2. The schedule shall accommodate a minimum of twenty-one (21) calendar days for the State's review.

C. The following listing of required submittals is provided for the Contractor's convenience. The Contractor shall review the technical sections of this specification, prepare and submit a comprehensive listing of required submittals as described under Section 01019 - General Specifications.

Section No. - Title	Shop Drawings & Diagrams	Samples	Certificates (Material, Treatment, Applicator, etc.)	Mfr. Guaranty / Warranty (> 1 yr.)	Product Data, Mfr. Technical Lit., and Brochures	MSDS Sheets	Calculations	Reports (Testing, Maintenance, Inspection, etc.)	Test Plan	O & M Manual	Equipment / Fixture Listing	Schedules (Project / Installation)	Maint. Service Contract	Field Posted As-Built Dwgs.	Others
01019 - General Specifications	■	■	■	■	■	■		■		■		■	■	■	■
01581 - Project Sign	■	■										■			
02050 - Removal of Structure												■			
02200 - Earthwork	■		■	■	■	■									
02362 - Soil Treatment for Vegetation Control	■		■	■	■	■			■						
02513 - Asphaltic Concrete Paving	■		■	■	■	■		■			■	■		■	
02580 - Pavement Striping and Markings	■	■	■	■	■	■		■				■		■	
02840 - Regulatory and Warning Signs	■		■		■	■									
03300 - Concrete Formwork	■				■	■	■					■			

Section No. - Title	Shop Drawings & Diagrams	Samples	Certificates (Material, Treatment, Applicator, etc.)	Mfr. Guaranty / Warranty (> 1 yr.)	Product Data, Mfr. Technical Lit., and Brochures	MSDS Sheets	Calculations	Reports (Testing, Maintenance, Inspection, etc.)	Test Plan	O & M Manual	Equipment / Fixture Listing	Schedules (Project / Installation)	Maint. Service Contract	Field Posted As-Built Dwgs.	Others
03300 - Concrete Reinforcement	■	■	■		■	■		■				■		■	
03300 - Cast-In-Place Concrete		■	■	■	■	■		■	■			■		■	■
04220 - Concrete Masonry Unit	■	■	■		■	■									
05500 - Galvanized Steel Metal Fabrications	■		■	■	■	■		■				■		■	
07600 - Flashing and Sheet Metal	■	■	■		■	■									
07920 - Sealants		■	■		■	■									
08110 - Steel Doors and Frames	■		■	■											
08700 - Finish Hardware	■	■			■							■			
09900 - Painting		■	■	■	■	■									
13120 - Pre-Engineered Metal Buildings	■	■	■	■	■	■	■		■	■	■			■	

Section No. - Title	Shop Drawings & Diagrams	Samples	Certificates (Material, Treatment, Applicator, etc.)	Mfr. Guaranty / Warranty (> 1 yr.)	Product Data, Mfr. Technical Lit., and Brochures	MSDS Sheets	Calculations	Reports (Testing, Maintenance, Inspection, etc.)	Test Plan	O & M Manual	Equipment / Fixture Listing	Schedules (Project / Installation)	Maint. Service Contract	Field Posted As-Built Dwgs.	Others
13283 - Disturbance of Lead Paint	■		■	■	■	■			■			■			
13288 - Testing/Air Monitoring	■		■	■	■				■						
16011 - General Electrical Requirements	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
16100 - Electrical Work	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
17000 - Photovoltaic System	■	■	■	■	■	■	■	■	■	■	■	■		■	■

1.03 BIDDER'S SPECIAL RESPONSIBILITY FOR COORDINATING CONTRACTURAL WORK AND SUBMITTALS

A. The Contractor is responsible for the coordination of all contractual work and submittals.

B. The Contractor shall have a rubber stamp made up in the following format:

CONTRACTOR NAME

PROJECT: _____

_____

JOB NO.: _____

THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR. IT IS CERTIFIED 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.

DATE RECEIVED _____
SPECIFICATION SECTION _____
SPECIFICATION PARAGRAPH _____
DRAWING NUMBER _____
SUBCONTRACTOR NAME _____
SUPPLIER NAME _____
MANUFACTURER NAME _____
CERTIFIED BY _____

C. This stamp, "filled in" should appear on the title sheet of each shop drawing, on the cover sheet of submittals in an 8-1/2" x 11" format, or on one face of a cardstock tag (min. 3" x 6") tied to each sample. The tag on the samples should state what the sample is, so that if the tag is accidentally separated from the sample, they can be matched up again. The back of this tag will be used by the Engineer for his receipt, review, and log stamp and for any comments that relate to the sample.

D. All submittals for material, equipment, and shop drawings listed in the contract documents, including dimensioned plumbing shop drawings, shall be required and shall be reviewed by the Engineer, prior to any ordering of materials and

equipment.

E. Unless otherwise noted, the Contractor shall submit to the Engineer for his review eight copies of all shop drawings, pipe 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 regular working days for examining the drawings.

F. 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.

G. 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.

H. 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 drawings.

I. 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 or 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.

J. 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 (NOT USED)

END OF SECTION

SECTION 01505 - MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

This section covers the requirements for mobilization and demobilization.

1.02 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.

1.03 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

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.

All equipment, machinery, buildings, utilities and incidentals mobilized and demobilized under this section shall remain the property of the Contractor.

3.02 MEASUREMENT AND PAYMENT

Mobilization and demobilization shall be paid for at the lump-sum price bid in the Proposal Schedule. Sixty percent (60%) of the lump-sum bid price will be paid to the Contractor upon completion of mobilization at the work site. The remaining forty percent (40%) will be included in the final payment under this contract.

END OF SECTION

SECTION 01520 - FIELD OFFICE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

This work shall consist of furnishing, placing or erecting, maintaining and subsequently removing a portable, weatherproof building to be used exclusively as the field office by the Engineer.

1.02 MATERIALS

The Contractor shall furnish and install all materials necessary to complete this work.

1.03 CONSTRUCTION REQUIREMENTS

A. General: The Field Office provided shall conform to the following requirements and as directed by the Engineer.

1. The Engineer shall be consulted on the location of the field offices, including requirements for utilities connections. Arrangement for parking and storage outside on construction site shall be coordinated and accepted by the Engineer. The Contractor shall complete the building within two weeks after the notice to proceed.

2. The Engineer and his staff will have exclusive use of the building which shall be separated from any building used by the Contractor.

3. The Contractor shall comply with all local laws, ordinances, rules, and regulations pertaining to the construction of the building.

4. The Contractor shall provide a building 10 ft. x 16 ft. minimum with jalousie window and door, foundation and steps, window air conditioning unit, a telephone, electrical lighting (fluorescent) with an illumination of not less than 50-foot candles and three 120V electrical outlets. The door lock shall be independently keyed. Provide a 3'-0" x 6'-0" x 3/4" plywood table with frame and legs and a stool.

5. The Contractor shall maintain the building and all its furnishings, appliances and other equipment in good order and provide all utility services at no cost to the State for a period not to exceed 90 calendar days beyond the date of final inspection of the completed project by the State.

6. The Contractor shall disassemble or demolish and remove the building within 7 calendar days:

   a. From the end of the 90 day period specified above;

   b. Or from any time (during this 90 day period) upon receipt of written notice from the Engineer that the use of the building is no longer necessary.

7. After removal of the building, the Contractor shall clean the site of all debris and leave it presentable.

1.04 MEASUREMENT AND PAYMENT

The construction of the field office, including all equipment, labor, and material necessary to furnish and install the field office will be paid for under the "Field Office" in the Proposal Schedule.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01567 - ENVIRONMENTAL PERMITS AND POLLUTION CONTROL

PART 1 - GENERAL

1.01 GENERAL

This section covers the requirements of environmental permits and pollution control during construction activities. The Contractor shall be responsible for conformance to Title 11, Chapter 60 of the Public Health Regulations, Department of Health, State of Hawaii.

A. With the exception of those measures set forth elsewhere in these specifications, environmental protection shall consist of the prevention of environmental pollution as the result of construction operations under this contract. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utilization of the environment for aesthetic and recreational purposes.

B. The work under this section shall include the following:

1. Make sure that all permits listed in these specifications are obtained and valid for the construction period.

2. Provide all air and water quality testing and monitoring work required by the permits during construction.

3. Provide all facilities, equipment and structural controls for minimizing adverse impacts upon the environment during the construction period.

1.02 GENERAL REQUIREMENTS

A. Applicable Regulations: In order to provide for abatement and control of environmental pollution arising from the construction activities of the Contractor and his subcontractors in the performance of this contract, the work performed shall comply with the intent of the applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement, including, but not limited to the following regulations:

1. State of Hawaii, Department of Health, Administrative Rules, Chapter 55, WATER POLLUTION CONTROL: Chapter 54, WATER QUALITY STANDARDS.

2. State of Hawaii, Department of Health, Administrative Rules, Chapter 59, AMBIENT AIR QUALITY: Chapter 60, AIR POLLUTION CONTROL LAW.

3. State of Hawaii, Department of Health, Administrative Rules, Chapter 44A, VEHICULAR NOISE CONTROL.

4. State of Hawaii, Occupational Safety and Health Standards, Title 12, Department of Labor and Industrial Relations, Subtitle 8, Division of Occupational Safety and Health, Subparagraph 12-202-13, ASBESTOS DUST: Environmental Protection Agency, Code of Federal Regulations Title 40, Part 61 Subpart A, NATIONAL EMISSION STANDARDS FOR AIR POLLUTANTS and Subpart B, NATIONAL EMISSION STANDARDS FOR ASBESTOS; and U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Asbestos Regulations, Code of Federal Regulations Title 29, Part 1910.

5. Rules Relating to Soil Erosion Standards and Guidelines, April 1999, County of Kauai.

B. All permit applications and forms shall be submitted to the Department of Land and Natural Resources, Division of Boating and Ocean Recreation for review and comment prior to submission to the accepting agencies.

1.03 GUIDELINES AND CRITERIA

A. Solid Waste and Disposal

1. Construction waste, such as crates, boxes, building materials, pipes, and other rubbish shall be reduced to a size approved by the County of Kauai. Large size objects shall be reduced to a size acceptable by the County Specifications for disposal in their landfills. Other areas or methods proposed by the Contractor will be approved only if the Engineer determines that their effect on the environment is equal to or less than those described herein.

2. Removal of waste shall be a continuous on-going operation. Wastes and debris shall not be allowed to accumulate in large open piles.

3. Wind-blown wastes and debris and wastes left by workers shall be collected by the Contractor and disposed of as described above. No rubbish shall be deposited in the trench excavation for this project.

4. Conduct the fueling and lubricating of equipment and motor vehicles to protect against spills and evaporation. Dispose of lubricants to be discarded and all excess oil in accordance with State and local regulations.

5. Dispose of electrolyte solution from lead-acid batteries in accordance with hazardous regulations. Do not dump electrolyte onto the ground or into storm drains or sanitary sewers. Transport the electrolyte to a State approved hazardous waste disposal site. The method of transportation and equipment shall comply with applicable Federal and State regulations.

6. No burning of debris and/or waste materials shall be permitted on the project site.

7. 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.

8. All unusable debris and waste material shall be hauled away to an appropriate off-site dump area. During loading operations, debris and waste materials shall be watered down to allay dust.

9. 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.

10. 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 Control: Dust, which could damage crops, orchards, cultivated fields and dwellings, or cause nuisance to persons, shall be abated and control measures shall be performed. The Contractor shall be held liable for any damage resulting from dust originating from his operations.

1. The Contractor, for the duration of the contract, shall maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, and all other work areas within or without the project limits free from dust which would cause a hazard to the work, or the operations of other contractors, or to persons or property. Industry accepted methods of stabilization suitable for the area involved, such as sprinkling or similar methods, will be permitted. Chemicals or oil treating shall not be used.

2. 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.

3. 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.

4. The Contractor shall be responsible for all damage claims in accordance with Section 7.16 - "Responsibility for Damage Claims" of the GENERAL CONDITIONS.

C. Air Pollution Control

1. Emission: The Contractor shall not be allowed to operate equipment and vehicles that show excessive emissions of exhaust gases until corrective repairs or adjustments are made to the satisfaction of the Engineer.

D. Waste Waters: Construction operations shall be conducted so as to prevent discharge or accidental spillage of pollutants, solid waste, debris, and other objectionable wastes in surface waters and underground water sources.

E. Noise Control

1. Noise shall be kept within acceptable levels at all times in conformance with Title II, Administration Rules, Chapter 43, Community Noise Control for Kauai, State Department of Health, Public Health Regulations. The Contractor shall obtain and pay for 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. Construction equipment shall be equipped with suitable mufflers to maintain noise within levels complying with applicable regulations.

3. Construction operations shall be confined to the period between 7:00 a.m. and 3:30 p.m., Monday through Friday. Construction will not be permitted on weekends and legal State and Federal holidays. In the event the Contractor's operations require the State's inspectional and engineering personnel to work overtime, the Contractor shall reimburse the State for the cost of such service.

4. Starting up of construction equipment meeting allowable noise limits shall not be done prior to 7:00 a.m. without prior approval of the Engineer.

Equipment exceeding allowable noise limits shall not be started up prior to 7:30 a.m.

5. Pile driving operations shall be confined to the period between 8:30 a.m. and 4:30 p.m., Monday through Friday. Pile driving will not be permitted on weekends and legal State and Federal holidays.

6. All internal combustion engine-powered equipment shall have mufflers to minimize noise and shall be properly maintained to reduce noise to acceptable levels.

7. Noise and vibration levels shall be monitored by the Contractor at stations approved by the Engineer.

F. Erosion Control

1. The contractor shall incorporate all erosion control measures in the Best Management Practice Plan for this project. The Plans may be modified as necessary to adjust to conditions that develop during construction. Any significant changes to the Best Management Practice Plan must be submitted to the Department of Health for approval.

2. Except for specified measures which are shown in the Plans, 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 silt fences and the use of temporary mulches, mats, and gravel blankets, or the construction and use of other control devices or methods as necessary to control erosion.

3. Drainage outlets shall be maintained to minimize erosion and pollution of the waterways during construction. Surface runoff waterways during construction. Surface runoff shall be controlled in order to minimize silt and other contaminants entering the water. Should excessive siltation or turbidity result from the Contractor's method of operation, the Contractor shall install silt curtains or other silt contaminant devices as required to correct the problem. Such corrective measures shall be at no additional cost to the State.

4. The work areas and haul roads, including roadways leading to the project site, shall be continuously watered to prevent the generation of dust and shall be cleaned daily to remove all mud and droppings from construction vehicles. Mud shall be removed from the tires of all vehicles before leaving the construction site.

5. 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 basin unless treated to comply with the State Department of Health water pollution regulations.

6. Trucks hauling debris shall be covered as required by PUC Regulation. Trucks hauling fine materials shall be covered.

7. 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.

8. During interim grading operations, the grade shall be maintained so as to preclude any damage to adjoining property from water and eroding soil.

9. 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.

10. Drainage outlets and silting basins shall be constructed and maintained as directed by the Engineer to minimize erosion and pollution of waterways during construction.

11. No dumping of waste concrete will be permitted at the job-site.

12. 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.

13. 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.

G. Suspension of Work

1. Violations of any of the above requirements or any other pollution control requirements which may by specified in the Technical Specifications herein shall be cause for suspension of the work creating such violation. No additional compensation shall be due 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 cost incurred by the State in taking such action from monies due to the Contractor.

3. The Engineer may also suspend any operations which he 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 INTERIM 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 INTERIM GENERAL CONDITIONS.

1.04 ENVIRONMENTAL PROTECTION REQUIREMENTS

A. Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, State, and local regulations pertaining to the environment, including but not limited to water, air, and noise pollution. The Contractor's attention is brought to the fact that this project requires submission of and conformance to both Best Management Practices (BMP) plan and Hawaii Administrative Rules (HAR), Title II, Department of Health, Chapter 54, Water Quality Standards.

B. Dust Control: Take into consideration the requirements of Hawaii Administrative Rules, Title 11, Chapter 60.1 (HAR 11-60.1) to prevent the release of dust from construction operations, including but not limited to sandblasting. Submit a plan for containment measures (plastic or canvas screens, vacuum attachments, etc.) of dust emission for approval by the Engineer.

C. Storm Water Pollution Control: Implement applicable Best Management Practices to prevent contamination of storm water from all areas affected by construction. Best Management Practices include, but are not limited to the following:

1. Performing regular cleaning to keep areas exposed to storm water clean and free of rubbish, construction debris, spills, etc.

2. Storing material under shelter or covering material to avoid contact with storm water.

3. Enclosing outdoor sanding and painting operations to contain and collect waste.

4. Frequently vacuuming/cleaning waste from sanding and painting operations.

5. Providing a berm or dike around critical areas. Berm shall be lined with 30 mils thick (minimum) polyethylene sheeting and covered with 10 mils thick of polyethylene sheeting. The polyethylene sheeting shall be secured and maintained. Provide run-on and runoff controls to prevent leachate discharge to the surrounding area and maintain the polyethylene sheeting until the contaminated material is disposed of at a permitted facility. Load and haul contaminated materials in canvas covered trucks.

6. Controlling spills, etc.

1.05 MEASUREMENT AND PAYMENT

The cost for any environmental permits and pollution control activity specified above and in the plans shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

SECTION 01581 - PROJECT SIGN

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: Furnish all labor, materials and equipment necessary to construct and install all project sign as specified hereinafter.

1.02 SUBMITTAL

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

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

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

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 01581-2, upper / lower case letters.

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.

COLOR:	1.	1BL10A	Bohemian Blue
	2.	2H16P	Softly (White)
	3.	2VR2A	Hot Tango (Red)
	4.	1M52E	Tokay (Gray)

C. CONCRETE

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

PART 3 - EXECUTION

3.01 GENERAL

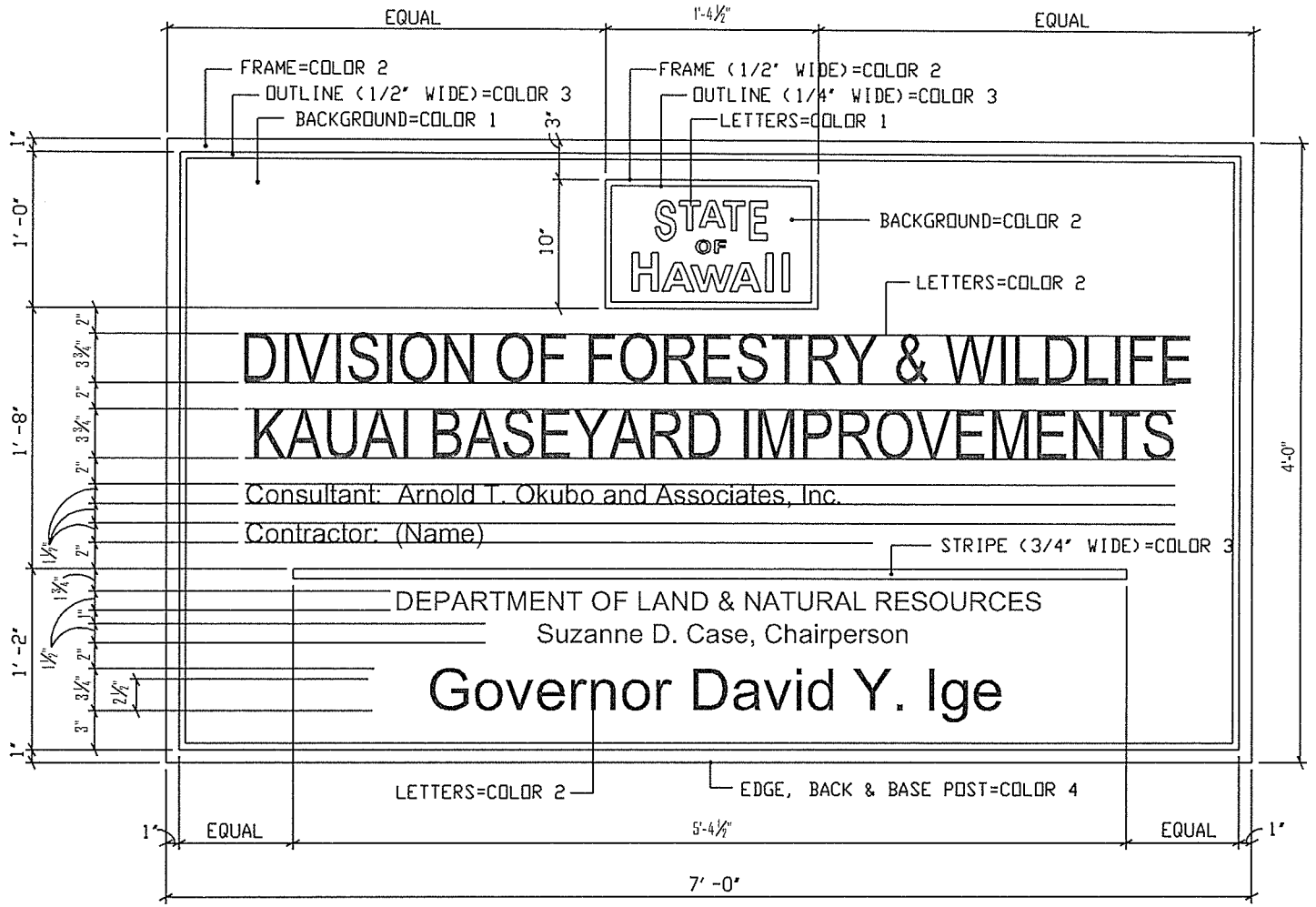
A. The Project Sign shall be constructed with new materials as specified above.

B. The Project sign shall be installed at the location indicated on the drawings or as designated by the Engineer. The project sign shall be erected upon commencement of work.

3.02 MEASUREMENTS AND PAYMENT

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 item.

END OF SECTION

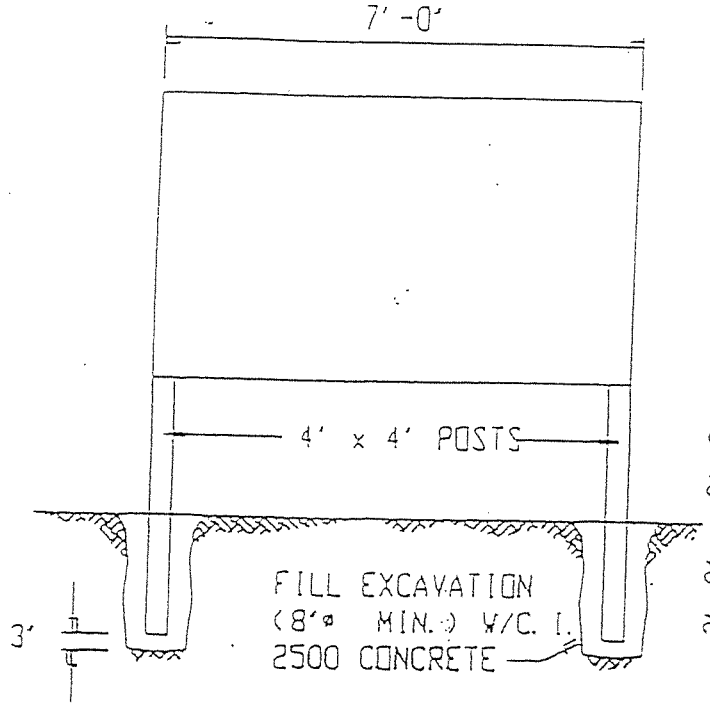


Project Sign
01581-3

Job No. D00CK68A

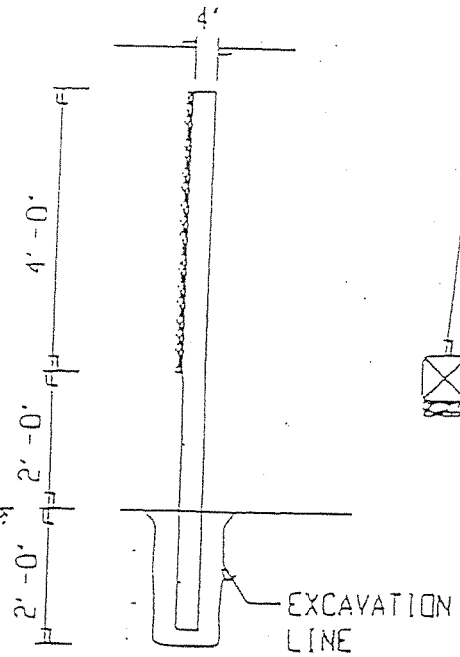
NOTE: Number of signs required 1

Project Sign
01501-4



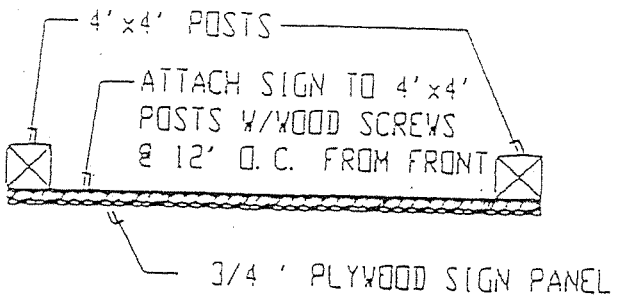
FRONT ELEVATION

NOT TO SCALE



SIDE ELEVATION

NOT TO SCALE



PLAN

NOT TO SCALE

SECTION 01591 - TEMPORARY BARRICADES

PART 1 - GENERAL

The work included in this Section shall be the furnishing, installation and removal of temporary barricades to prevent access to the various construction areas by unauthorized persons and vehicles.

1.01 GENERAL REQUIREMENTS

Description. This work shall consist of furnishing, installing and maintaining temporary barricades in accordance with the requirements of the contract.

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.

PART 2 - PRODUCTS

A. The top cross bar of the barricades shall be painted at a 45 degree angle with white and orange reflective paint. The legs shall be painted with white reflective paint.

B. Sand bags or other weights shall be placed on the barricades to prevent their tipping over. Weights shall be hung from the top cross member and/or around the legs of the barricade. Any fallen barricade shall be immediately placed upright.

C. Steady burn and/or flashing lamps shall be required on the barricades while they are up during hours of darkness.

D. The type and placement of the barricades shall comply with OSHA, state and county regulations.

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 "Hawaii Standard Specifications for Road, Bridge, and Public Works 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

A. Temporary barricades shall be placed around all areas where construction is in progress. Barricades shall be removed upon completion of construction in the area.

B. All damages barricades shall be immediately replaced.

3.01 CONSTRUCTION REQUIREMENTS

A. General: Barricades shall be constructed in a first class, workmanlike manner 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 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 directed by the Engineer. Lamps shall be attached on the barricade ends closest to the traveled way and shall be visible to the motorist and pedestrians.

Barricades furnished and paid 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 as directed by the Engineer.

Upon completion of the construction work, barricades shall be left in place, relocated, or removed and disposed of 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 specified herein, or as directed and approved by the Engineer.

Both vertical faces of each barricade rail shall be reflectorized.

Wooden rails shall be reflectorized with one of the following:

1. Reflective sheeting specified in HIDOT Subsection 712.20(C)(4) and backed with a 26 gage galvanized steel sheet, or

2. A hardened aluminum backed reflective sheeting as specified in HIDOT Subsection 712.20(C)(5).

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, cul-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.

F. The Contractor shall repair, repaint, clean or replace the barricades as required and as directed by the 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 permanent location 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.

3.02 MEASUREMENT AND PAYMENT

Furnishing, installation and removal of temporary barricades shall be considered as being incidental to the total cost of construction of the project and will not be paid for as a separate item on the Proposal Schedule.

END OF SECTION

SECTION 01715 - EXISTING CONDITIONS - ASBESTOS / LEAD / HAZARDOUS MATERIAL SURVEY

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the results of the County's survey for Asbestos, Lead and / or other Hazardous materials and is provided for the Contractor's information.

B. Related Sections include the following:
   1. SECTION 13283 - DISTURBANCE OF LEAD-CONTAINING MATERIAL for requirements of all work which disturbs LEAD PAINT.

1.02 ASBESTOS

A. The structure or structures to be renovated or modified under this contract were surveyed for the presence of asbestos containing building materials (ACBM), using 11-501 requirements and/or 11-502 requirements (when applicable). A copy of the initial survey report, as well as any subsequent supplemental survey report(s) if performed, are included in this Section.
   1. The report(s) are included, even when no ACBM was found, for the Contractor's information. Review the attached report(s) for the basis on which the negative ACBM finding was made. Contractor may perform further surveys at its own expense, only if ACBM has not been previously surveyed in accordance with H.A.R. 11-501 requirements within the Contract limits and only with approval of the Officer-in-Charge. If ACBM is found, notify the Officer-in-Charge immediately. The State will reimburse the Contractor for the testing cost if ACBM is found. Contractor shall not test any suspect ACM previously tested.

   2. If there is ACBM outside of the areas in which work will be performed, this ACBM shall not be disturbed in any way.

B. If applicable, notify employees, subcontractors and all other persons engaged on the project of the presence of asbestos in the existing buildings in accordance with the requirements of Chapter 110, Article 12 110 2 (f) (1) (B) of the Occupational Safety and Health Standards, State of Hawaii.

C. In the event that work is required in any building or buildings on the site other than the one(s) designated within this project scope, request copies of the asbestos survey report(s) for such building(s) from the Officer-in-Charge. Based on the information contained in the additional survey(s), notify affected personnel per paragraph 1.02.B.

1.03 LEAD PAINT

A. Inform employees, subcontractors and all other persons engaged in the project that lead paint is present in the existing building(s) and at the job site. Follow the requirements of Title 12 (Department of Labor and Industrial Relations), Subtitle 8 (Division of Occupational Safety and Health), Chapter 148 (Lead Exposure in Construction), Hawaii Administrative Rules and EPA's Renovation, Repair and Painting Rule (RRP) when applicable.

B. Review the attached lead testing data which identify locations paint with lead was found. Lead testing was for design purposes only, and the results do not satisfy any of the requirements of Chapter 12-148.

C. All paint shall be considered to contain lead until proven otherwise.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 SURVEY (attached)

A. Asbestos, Lead Paint, PCB Ballasts, and Mercury Lamps Survey Report, 28 pages, dated June 30, 2015, prepared by EnvironMETeo Services, Inc.

EnvironMETeo Services, Inc.
Environmental / Industrial Health & Safety

Asbestos, Lead Paint, PCB Ballasts, and Mercury Lamps Survey Report

For:

Arnold T. Okubo & Associates
94-529 Uke'e Street, Suite 107
Waipahu, Hawaii 96797

Facility Surveyed:

Warehouse/Covered Parking Structure
Division of Forestry and Wildlife, Kauai Baseyard
4398D Pua Loke Street
Lihue, Hawaii 96766

Project:

Division of Forestry and Wildlife
Kauai Baseyard Improvements, Lihue, Kauai
Job No. D00CK68D

Conducted by:

EnvironMETeo Services, Inc. (EMET)
94-520 Ukee Street, Suite A
Waipahu, Hawaii 96797

Date of Report: June 30, 2015

EMET ID: 1402101

Table of Contents

Certification of Report

We certify that this report is based on a physical survey of EMET scope of work areas, as impacted by this project, at the warehouse/covered parking structure at the Division of Forestry and Wildlife, Kauai Baseyard, located at 4398D Pua Loke Street, Lihue, Hawaii. The survey included an inspection for asbestos-containing materials (ACM), lead-painted surfaces/building components, PCB-containing fluorescent light ballasts, and mercury-containing fluorescent light bulbs.

The survey was conducted by EnvironMETeo Services, Inc. (EMET) on June 3, 2015 and was limited to the following scope of work:

Asbestos/Lead Paint/PCB Ballasts/Mercury Lamp Investigation

1. Inspection, evaluation and sample collection of suspect asbestos-containing materials by EPA-accredited inspectors(s) in accordance with H.A.R. 11-501 from the following:

   Warehouse/Covered Parking Structure

   - Interior and exterior (including roof)

2. Lead paint inspection by EPA-accredited inspectors(s) from the areas indicated in item 1.

3. Visual inspection of fluorescent light fixtures for PCB-containing ballasts and mercury-containing bulbs from the areas indicated in item 1.

The survey results are based on analyses of samples of suspect materials collected from visually and physically accessible areas/materials.

EnvironMETeo (EMET) Services, Inc. [illegible] Business Park [illegible] Suite A [illegible]
[illegible] Telephone [illegible] Facsimile

Bulk samples of suspect asbestos-containing materials taken during the survey were analyzed for asbestos content by a National Institute of Standards and Technology (NIST)-accredited laboratory under the National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos fiber analysis. Laboratory analyses performed by Polarized Light Microscopy (PLM) for asbestos identification are in accordance with U.S. Environmental Protection Agency (EPA) Test Method 600/R-93/116.

Painted surfaces were tested for lead concentrations using an X-Ray Fluorescence (XRF) spectrum analyzer, a testing methodology approved by the EPA and the U.S. Department of Housing and Urban Development (HUD).

Approximately ten percent (10%) of each type of typical light fixtures was visually inspected on site to determine if the ballast's contain PCB and if the lamps contain Mercury.

EMET makes no warranty and assumes no liability for the inappropriate use or misuse of this document.

Clifford How
Asbestos Building Inspector
Hawaii State Certification # HIASB-0011
Lead Based Paint Risk Assessor
Hawaii Lead Certificate # PB-0149

Summary

EnvironMETeo Services, Inc. (EMET) conducted a survey for asbestos-containing materials (ACM), lead-painted surfaces/building components, PCB-containing fluorescent light ballasts, and mercury-containing florescent light bulbs at EMET scope of work areas, at the warehouse/covered parking structure at the Division of Forestry and Wildlife, Kauai Baseyard, located at 4398D Pua Loke Street, Lihue, Hawaii on June 3, 2015. The survey was conducted by Clifford How and Stephen Kaneshiro of EMET in accordance with Hawaii Administrative Rules (H.A.R) 11-501 and EMET's scope of work.

The survey was requested and authorized by Arnold Okubo of Arnold T. Okubo & Associates and performed in preparation for planned renovations.

Based on the visual inspection and laboratory results of the samples collected, ACM was not detected.

Lead-based paint was found on the following surfaces:

Lead-based Paint at Warehouse/Covered Parking Structure

- **beige metal I-beam column**
- **beige metal horizontal I-beam**
- **beige metal I-beam rafter**
- **beige metal I-beam truss**
- **beige metal auto lift**
- **beige metal electrical panel**
- **beige wood electric panel backboard**

Lead-containing paint was found on each of the remaining painted surfaces.

Approximately 10% of each type of typical light fixture was visually inspected for the presence of PCB-containing ballasts and mercury-containing lamps. All the visually inspected fluorescent light fixtures contained ballasts that were observed to have "No PCB" labeling and fluorescent light bulbs that were observed to have green tabs or labeling and are considered to be non-mercury containing bulbs.

Asbestos-Containing Material

The State of Hawaii and EPA define ACM as any material containing more than one percent (>1%) asbestos by area. This definition can be found in the following regulations:

- HAR, title 11, Department of Health, Chapter 501 (11-501), Asbestos Requirements

- HAR, title 12, Department of Labor and Industrial Relations, Subtitle 8, Hawaii Occupational Safety and Health Division (HIOSH), Part 3, Construction Standards, Chapter 145.1 (12-145.1), Asbestos)

- EPA 40 CFR Part 61, Subpart M - National Emission Standards for Hazardous Air Pollutants (NESHAP), revised July 1, 1990, Asbestos NESHAP Revision Final Rule.

Asbestos Bulk Sampling

A total of 3 samples of suspect ACM were collected and analyzed. The samples were placed in plastic containers with a unique identification number assigned to each sample and entered on a field data sheet. The sample locations were indicated on the field drawings shown in Appendix B.

EnvironMETeo (EMET) Services Inc. [illegible]
671-8383... Telephone [illegible]

Samples were collected of the following observed suspect asbestos-containing material:

Warehouse/Covered Parking Structure, Roof Suspect ACM Visually Observed

gray patch/sealant at roof edge flashing	

Asbestos Analyses

Bulk samples were analyzed for asbestos using Polarized Light Microscopy (PLM) for the identification of asbestos, in accordance with EPA Test Method 600/R-93/116. Laboratory analytical data sheets are provided in Appendix A.

Based on the visual inspection and laboratory results of the samples collected, ACM was not detected.

Lead Paint

HUD regulations, 24 CRF Parts 35, 200, 881, and 886 guidelines for the evaluation and control of lead-based paint (LBP) hazards in housing, revised April 1, 1999, define LBP as paint with a lead content of 1.0 mg/cm^2 or greater by XRF analyzer, or 0.5% wt. or 5000 ppm by Atomic Absorption (AA) analysis. The EPA regulations 40 CFR Part 745, revised July 1, 1999, similarly defined LBP as stated in HUD regulations.

However, the Occupational Safety and Health Administration (OSHA) and HIOSH regulate any activity disturbing paint that contains lead (referred to as lead-containing paint or LCP), even if the lead content is below the EPA/HUD standard for lead-based paint.

XRF test results of painted surfaces equal to or greater than 1.0 mg/cm^2 are defined as LBP in accordance with EPA and HUD regulations.

EnviroMETeo (EMET) Services, Inc. [illegible]

Lead Paint Sampling and Analyses

Painted surfaces were analyzed for lead using an XRF analyzer. A total of 41 analyses of painted surfaces/building components and calibrations were performed. A unique identification number was assigned to each test location and entered on a field data sheet. The ID number, location, description, and lead concentration of each sample are indicated in the XRF Analyzer Test Results, which are provided in Appendix C.

The test results indicate that a lead content equal to or greater than 1.0 mg/cm^2 was detected in the following:

Lead-Based Paint

XRF No. and Location	Testing Combination Component/Substrate	Condition	Color
471, Warehouse/Covered Parking Structure	I-beam column / metal	peeling	beige
472, Warehouse/Covered Parking Structure	I-beam column / metal	peeling	beige
473, Warehouse/Covered Parking Structure	I-beam column / metal	peeling	beige
478, Warehouse/Covered Parking Structure	horizontal I-beam / metal	peeling	beige
489, Warehouse/Covered Parking Structure	I-beam rafter / metal	peeling	beige
490, Warehouse/Covered Parking Structure	I-beam truss / metal	peeling	beige
491, Warehouse/Covered Parking Structure	I-beam rafter / metal	peeling	beige
492, Warehouse/Covered Parking Structure	I-beam truss / metal	peeling	beige
496, Warehouse/Covered Parking Structure	auto lift / metal	intact	beige
497, Warehouse/Covered Parking Structure	electrical panel / metal	intact	beige
500, Warehouse/Covered Parking Structure	electrical panel backboard / wood	intact	beige
501, Warehouse/Covered Parking Structure	electrical panel backboard / wood	intact	beige

The remaining sampled painted surfaces/components showed a lead content of less than 1.0 mg/cm^2 and are considered to be lead-containing paint (LCP).

EnvironMETeo (EMET) Services, Inc. [illegible]

Painted surfaces may vary in paint type, color and condition, and any damaged painted surfaces may vary significantly from area in terms of the condition and degree of damage. The results provide the lead content of all paint layers in a tested surface, as there may be more than one layer of paint on the tested surface.

PCB-Containing Fluorescent Light Ballasts and Mercury-Containing Fluorescent Light Bulbs

In response to the growing evidence of the danger posed by Polychlorinated Biphenyl (PCB), mercury, and other chemicals, Congress enacted the Toxic Substance Control Act (TSCA) in 1976. The TSCA directed the EPA to regulate all chemicals that present "an unreasonable risk of injury to health or the environment" (40 CFR 761). In 1976, the EPA issued regulations prohibiting the processing, distribution, and use of PCB's and mercury, except in sealed systems. The EPA also established strict regulations for the disposal of PCB's in chemical waste landfills.

Fluorescent light ballasts that do not contain PCB are identified as such by means of a label affixed to the ballast indicating "No PCBs". If a fluorescent light ballast does not have labeling, or the labeling is not clearly marked or is illegible, the ballast is assumed to be PCB-containing and must be disposed of in a landfill that accepts PCB's.

Fluorescent light bulbs that contain mercury in an amount below the hazardous waste threshold of 0.2 mg/L by Toxicity Characteristic Leaching Procedure (TCLP) test are identified by the presence of green colored end caps or green colored labeling. If a fluorescent light bulb does not have green end caps or green colored labeling, it should be assumed to be hazardous and treated as hazardous waste for disposal purposes.

Summary of the survey for PCB and Mercury in Fluorescent Lights

Throughout the building, a count of each type of fluorescent light fixture was recorded. A representative random sample of at least 10% of each type of fluorescent fixture was then visually inspected for labeling or indication of PCB-ballasts.

Division of Forestry and Wildlife Kauai Baseyard (Warehouse/Covered Parking Structure)

Description	Total Number of Fixtures	Number of Fixtures Inspected	No. of Inspected Ballasts Found to be PCB-containing (percentage)	No. of Inspected Bulbs Found to be Mercury-containing (percentage)
6" x 4' fixture with 1 ballast and 2 bulb	6	2	0 (0%)	0 (0%)

Limitations

This hazardous materials survey was performed to identify suspect materials in areas scheduled for planned renovations. Original building plans and specifications and those for past renovations, if any, were not available for review. Therefore, because of these limitations, the highly variable nature of building construction, and the limits to the survey as defined by EMET's scope of work, the potential remains for undiscovered hazardous materials.

This report is not a specification and should not be used as such.

Appendix A

Asbestos Survey Report

Building Information Sheet

Job Code /EMET ID	Client Name	Inspection date
1402101	Arnold T. Okubo & Associates	6/3/2015

Building Number	Bldg Name	No. of Floors Surveyed
CP	Kauai Baseyard Warehouse/Covered Parking	1

Location

4398D Pua Loke Street
Lihue, HI 96766

No. of Other Levels Surveyed: 1

Building Construction Type

STEEL FRAME

Structural Concrete with: Metal Decks, Flat Slab, Beam/Joist or Waffle Slabs; Structural Tees
Steel Frame
Wood Frame
Load Bearing Masonry

Building Use		% Floor Space
Use #1	Warehouse/Covered Parking	100
Use #2		
Use #3		

Academic Classes, Administration Offices, Food Services, Dormitory, Mechanical Spaces, Gymnasium, Laboratory, Library, Residential or Other (Specify)

ACBM PRESENT?

NO

YES = PRESENT
NO = NOT PRESENT
ASM = ASSUMED

Inspector Identification	Specific areas surveyed
Name: Clifford How	all
State of HI Certification No. HIASB-0011	
State of HI Certification Expiration Date: 8/27/2015	
Building Inspector Certification Exp. Date: 11/12/2015	

Inspector Comments

EMET's scope of work was limited to the areas listed above in Specific Areas Surveyed. This report is not a specification for the removal of asbestos-containing material and should not be used as such. Results of the presence or absence of asbestos are based on the survey and on analyses of the suspect materials encountered. Original building plans and specifications were not available for review. Therefore, because of these limitations and the highly variable nature of building construction, the potential remains for undiscovered ACM. EMET makes no warranty and assumes no liability for the inappropriate use or misuse of this document.

Sample Area Report - Area Master

EMET ID	Building Number and Name		Inspection Date
1402101	CP	Kauai Baseyard Warehouse/Covered Parking	6/3/2015

Document Number	Material ID and Description		Unified Sample Area Number
	101-CP-RA	gray patch/sealant at roof edge flashing	101-CP-RA

Drawing/Sketch Number:

A Sample Area should contain material of one and only one composition or matrix. An exception can be made in the case of layered applications of materials such as occurs with a Three Coat Plaster system, that generally matches the same physical locations. Special care must be taken while collecting samples of layered materials to enable the analysis to discern the several matrices present. Such conditions should be described in detail on the Sample Notes form for the analyst.

Unified Sample Area/Homogeneous Material	Location of Confirmed, Assumed, or New ACM within Building
gray patch/sealant at roof edge flashing	Not Applicable

SAMPLING STRATEGY DATA

Ceiling Height #1		#2	
Square Feet of Ceiling Materials			
Square Feet of Wall Materials			
Square Feet of Floor Surface			
Linear Feet of TSI			
Square Feet of Structural Steel Coatings (including over-spray)			
Square Feet of Other ACM			
Linear Feet of Other ACM			
Total square and/or linear feet of ACM in this Sample Space:			

RISK ASSESSMENT DETERMINATION

Physical Condition	Potential Damage	Water Damage
--	--	--

Visible	Reachable	Texture
--	--	--

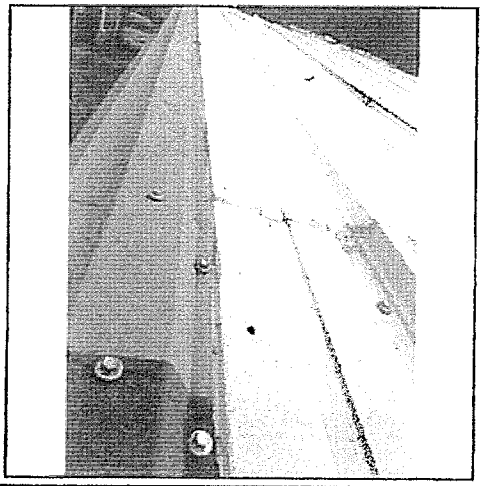
Barriers	Ventilation	If Yes	Friable Surface	
--	--	--	--	--

Air Movement	Proximity to Repair Items	Activity
--	--	--

SAMPLE ANALYSIS SUMMARY SECTION

Total Number of Samples Collected	3
Total Number of Samples Analyzed	3
ASBESTOS-CONTAINING MATERIAL ?	NO
Samples Collected by	EMET
Sample Numbers	101-CP-RA1, 101-CP-RA2, 101-CP-RA3
Samples Analyzed by	EMET
Number of Salient Designations	

PHOTOGRAPH



EMET Services, Inc. • 94-520 Uke`e Street, Suite A • Waipahu, Hawaii 96797
Phone: (808) 671-8383 • FAX: (808) 671-7979

Unified Homogeneous/Sample Area ACM - Space and Salient Cross Reference

Building ID and Name

CP	Kauai Baseyard

Building Location

4398D Pua Loke Street
Lihue, HI 96766

EMET ID

1402101

For the ACM - Space Identified as:

101-CP-R

Inspection Date: 6/3/2015

Unified Sample Area	Homogeneous Sample Area or Salient Description	Comments	ACBM Present			Material Type*			Response Action	Estimated Cost to Remove
			Suspected	Confirmed	Friable	T	DC	PD		
101-CP-RA	gray patch/sealant at roof edge flashing		YES	NO ACM						

*** Refers to Material Type and Damage Conditions**

T = Material Type	DC = Damage Condition	PD = Potential Damage Condition
S = Surfacing	ND = No Damage	NPD = No Potential Damage
M = Miscellaneous	D = Damaged	PD = ACBM w/ Potential Damage
T = Thermal Systems	SD = Significant Damage	PSD = Potential Significant Damage

**** Recommended Response Action:**

1 Isolate area and restrict access. Remove or repair ASAP.
2. Continue Operations and Maintenance (O&M) program. Remove or repair ASAP, or reduce potential for disturbance
3-5. Repair, continue O&M. Lower number indicates higher priority if all repair cannot be done immediately.
6-7 Continue O&M. Take preventive measures to reduce disturbance. Number indicates priority for removal.
8 Continue O&M until major renovation or demolition requires removal under NESHAPS, or until hazard assessment factors change.

Note: An O&M program may include enclosure and encapsulation

Sample Log and Notes

Building Number and Name		EMET ID
CP	Kauai Baseyard Warehouse/Covered Parking	1402101

Sample Area/Lot Number and Name	
101-CP-RA	gray patch/sealant at roof edge flashing

Sample Number	% Asbestos	Description of Sampled Material	Sample Location
101-CP-RA1	0	gray patch/sealant at roof edge flashing	See Sketch 101-CP-R
101-CP-RA2	0	gray patch/sealant at roof edge flashing	See Sketch 101-CP-R
101-CP-RA3	0	gray patch/sealant at roof edge flashing	See Sketch 101-CP-R

Inspector's Name	Signature	Date Samples Collected
Clifford How		6/3/2015

EMET Services, Inc. 94-520 Uke'e Street, Suite A Waipahu, HI 96797
Phone (808) 671-8383 Fax (808) 671-7979

LABORATORY REPORT

Asbestos Bulk Sample Analysis by Polarized Light Microscopy
in accordance with Test Methods EPA 600/M4-82-020 and EPA 600/9-93/116

NVLAP®

Client: Arnold T. Okubo & Associates

Address: 94-529 Uke`e Street, Suite 107

Building: Kauai Baseyard Warehouse/Covered Parking

Address: 4398D Pua Loke Street
Lihue, HI 96766

NVLAP LAB CODE 101807-0

Approved Signatory:

Sample/Homogeneous Area: 101-CP-RA Analysis Date: 6/8/2015 Report Date: 6/8/2015

Lab ID	Sample ID	Color	homogeneity	Asbestos Present	Asbestos (Type) Area %	Fibrous Components Area %	Non-fibrous Components Area %	comments
101-001	101-CP-RA1	gray	Yes	No	-	cellulose	misc. part.	
					<1	2	98	
101-002	101-CP-RA2	gray	Yes	No	-	cellulose	misc. part.	
					<1	2	98	
101-003	101-CP-RA3	gray	Yes	No	-	cellulose	misc. part.	
					<1	2	98	

Accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for the scope specific under Lab Code 101807-0.
State of Hawaii Asbestos Requirements mandates all samples to be collected by a certified Asbestos Inspector in accordance with § 11-501, 11-502, and 11-504. Results of samples collected by someone other than a certified Asbestos Inspector may be invalid
Note: EPA, OSHA, and HIOSH define "asbestos-containing material" as any material or product which contains more than one percent asbestos

*Laboratory test report may not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. *Laboratory test report relates only to items tested. *Asbestos fiber percentage is approximate - performed by visual observation only, unless otherwise indicated.	*This method is not reliable for analysis of tile or other materials when fiber size is less than 10 microns and/or below detection limit (appr. 1%) of current PLM techniques. *Samples analyzed as received by the laboratory, interpretation is responsibility of the client.

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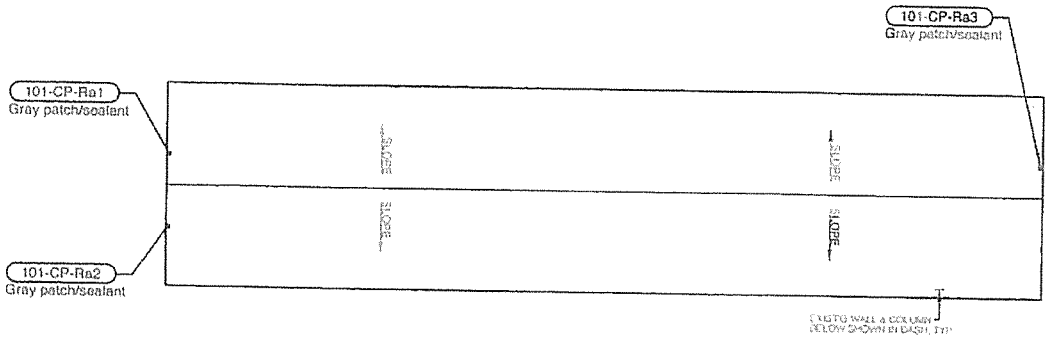
Appendix B

Asbestos Survey Sample Locations Sketch

EnviroMEDics (EMET) Services, Inc. [illegible]

ASBESTOS SAMPLE LOCATION PLAN

BLDG #	NAME OF BUILDING	ADDRESS	SKETCH #
CP	DIVISION OF FORESTRY & WILDLIFE KAUAI BASEYARD	4398D PUA LOKE STREET LIHUE, HAWAII 96766	101-CP-R 1 OF 1



LEGEND

ACM: → SAMPLE #

NON-ACM: → SAMPLE #

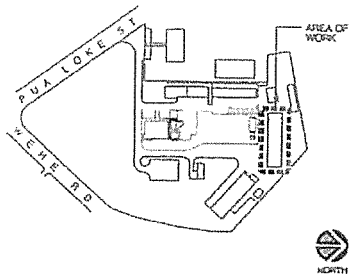
NORTH

ASBESTOS-CONTAINING MATERIALS (ACM)* :

NO ACM DETECTED IN AREAS SAMPLED

*ASBESTOS-CONTAINING MATERIAL (ACM) IS DEFINED AS ANY MATERIAL CONTAINING > 1 % ASBESTOS

THIS SURVEY WAS LIMITED IN SCOPE TO SPECIFIC AREAS AFFECTED BY PLANNED RENOVATION ACTIVITIES ONLY. THEREFORE, THIS REPORT MAKES NO WARRANTY FOR AREAS OF THE BUILDING WHICH WERE NOT INCLUDED IN THE SCOPE OF THE SURVEY.



KEY PLAN: DIVISION OF FORESTRY & WILDLIFE KAUAI BASEYARD

DIVISION OF FORESTRY & WILDLIFE
KAUAI BASEYARD "WAREHOUSE/ COVERED PARKING" - ROOF PLAN
NOT TO SCALE

EMET I.D. #1402101

EnvironMETeo (EMET) Services, Inc. 94-520 Uke'e Street, Suite A Waipahu, Hawaii 96797 Phone: (808) 671-8383 Fax: (808) 671-7979

Appendix C

Lead Survey Report

EMET

Laboratory Report

Painted Surfaces Total Elemental Lead Analyses
by X-Ray Fluorescence

EMET ID: 1402101 **Test Date: June 3, 2015**

Division of Forestry and Wildlife/Kauai Baseyard Improvements, Lihue, Kauai
Job No. D00CK68D

XRF#	Location	Component	Substrate	Condition	Color	PbC (mg/cm²)	Lead-based Paint?	Lead-containing Paint?
466	Calibration					1.00 ± 0.10		
467	Calibration					1.00 ± 0.10		
468	Calibration					1.00 ± 0.10		
469	Warehouse/Covered Parking	enclosure	wood	intact	brown	0.00 ± 0.02	no	yes
470	Warehouse/Covered Parking	siding	metal	peeling	beige	0.05 ± 0.10	no	yes
471	**Warehouse/Covered Parking**	**I-beam column**	**metal**	**peeling**	**beige**	**2.70 ± 1.40**	**yes**	**yes**
472	**Warehouse/Covered Parking**	**I-beam column**	**metal**	**peeling**	**beige**	**3.80 ± 2.20**	**yes**	**yes**
473	**Warehouse/Covered Parking**	**I-beam column**	**metal**	**peeling**	**beige**	**2.20 ± 1.10**	**yes**	**yes**
474	NULL							
475	**Warehouse/Covered Parking**	**column footing**	**concrete**	**intact**	**beige**	**2.60 ± 1.40**	**yes**	**yes**
476	NULL							
477	Warehouse/Covered Parking	siding	metal	intact	white	0.00 ± 0.02	no	yes
478	Warehouse/Covered Parking	horizontal I-beam	metal	peeling	beige	0.00 ± 0.02	no	yes
479	**Warehouse/Covered Parking**	**siding**	**metal**	**intact**	**beige**	**1.70 ± 0.50**	**yes**	**yes**
480	NULL							
481	Warehouse/Covered Parking	roof	metal	fair	beige	0.00 ± 0.02	no	yes
482	Warehouse/Covered Parking	underside of roof	metal	peeling	beige	0.01 ± 0.06	no	yes
483	Warehouse/Covered Parking	ceiling beam	metal	poor	beige	0.02 ± 0.10	no	yes
484	Warehouse/Covered Parking	roof	metal	intact	beige	0.00 ± 0.03	no	yes
485	Warehouse/Covered Parking	underside of roof	metal	peeling	beige	0.03 ± 0.16	no	yes
486	Warehouse/Covered Parking	roof	metal	fair	beige	0.00 ± 0.02	no	yes
487	Warehouse/Covered Parking	underside of roof	metal	peeling	beige	0.01 ± 0.05	no	yes
488	Warehouse/Covered Parking	edge flashing	metal	intact	olive	0.00 ± 0.02	no	yes
489	**Warehouse/Covered Parking**	**I-beam rafter**	**metal**	**peeling**	**beige**	**2.80 ± 1.70**	**yes**	**yes**
490	**Warehouse/Covered Parking**	**I-beam truss**	**metal**	**peeling**	**beige**	**3.60 ± 2.00**	**yes**	**yes**
491	**Warehouse/Covered Parking**	**I-beam rafter**	**metal**	**peeling**	**beige**	**2.80 ± 1.70**	**yes**	**yes**
492	**Warehouse/Covered Parking**	**I-beam truss**	**metal**	**peeling**	**beige**	**2.80 ± 1.70**	**yes**	**yes**
493	Warehouse/Covered Parking	window frame	wood	peeling	brown	0.00 ± 0.02	no	yes
494	Warehouse/Covered Parking	tire rack	metal	intact	red	0.01 ± 0.07	no	yes
495	Warehouse/Covered Parking	tire rack	metal	intact	beige	0.03 ± 0.06	no	yes
496	**Warehouse/Covered Parking**	**auto lift**	**metal**	**intact**	**beige**	**3.60 ± 2.40**	**yes**	**yes**
497	**Warehouse/Covered Parking**	**electrical panel**	**metal**	**intact**	**beige**	**2.60 ± 1.30**	**yes**	**yes**
498	Warehouse/Covered Parking	conduit pipe	metal	peeling	beige	0.90 ± 0.10	no	yes
499	Warehouse/Covered Parking	conduit pipe	metal	peeling	beige	0.07 ± 0.24	no	yes
500	**Warehouse/Covered Parking**	**elec panel backboard**	**wood**	**intact**	**beige**	**2.00 ± 1.00**	**yes**	**yes**
501	**Warehouse/Covered Parking**	**elec panel backboard**	**wood**	**intact**	**beige**	**1.40 ± 0.40**	**yes**	**yes**
502	Warehouse/Covered Parking	auto lift	metal	intact	dark red	0.01 ± 0.07	no	yes
503	Warehouse/Covered Parking	auto lift	metal	intact	dark red	0.01 ± 0.03	no	yes
504	Calibration					0.90 ± 0.10		
505	Calibration					1.00 ± 0.10		
506	Calibration					0.90 ± 0.10		

Determination of paint as lead-based paint by the U. S. Department of Housing and Urban Development (HUD) is based on the values in the "**PbC**" column reported in mg/cm^2 (milligrams per square centimeter). HUD regulations, 24 CFR Parts 35.200, 881, and 886; and Guidelines for the Evaluation and Control of Lead-based Paint (LBP) Hazards in Housing, dated June 1995, define LBP as paint with a lead content of 1.0 mg/cm^2 or greater.

However, OSHA and HIOSH regulate activities disturbing paint that contains lead (lead-containing paint), even if the content is below the HUD standard.

Serial #7798, Source Date 4/2014

Appendix D

Certifications

Environmental Management (EMET) Services, Inc. [illegible]

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 101807-0

EnvironMETeo Services Inc.

Waipahu, HI

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

BULK ASBESTOS FIBER ANALYSIS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2014-07-01 through 2015-06-30

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Institute of Standards and Technology

STATE OF HAWAI'I

DEPARTMENT OF HEALTH

Lead-Based Paint Activities Firm Certification

THIS IS TO CERTIFY THAT

EnvironMETeo Services, Inc.

has fulfilled the requirements of Chapter 11-41 Hawaii Administrative Rules and the Toxic Substances Control Act (TSCA) Section 402(a)(2), and has received certification as a firm pursuant to §11-41-4 HAR to conduct lead-based paint activities in Hawaii

This certification is valid from the date of issuance and expires on JUNE 19, 2013.

Date of Issue: FEBRUARY 21, 2012
Certification # PBF-0024

FOR DIRECTOR OF HEALTH

NON-TRANSFERABLE

REVOCABLE FOR CAUSE

State of Hawai'i
Asbestos Certification

Training Course Exp. Dates

W	n/a	MP	11/15/15
CS	06/02/15	PD	12/23/15
INS	11/13/15	PM	01/09/16

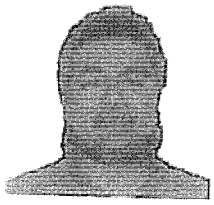
W= Worker
CS = Cont Sup
INS= Inspector
PD= Project Designer
MP= Mgmt Planner
PM= Project Monitor

How
Clifford
EnvironMETeo Services, Inc
HIASB-0011
State Exp. Date

State of Hawai'i
Lead Based Paint Activities Certification

Expiration Dates:

Inspector	n/a
Supervisor	07/24/2016
Risk Assessor	07/24/2016
Project Designer	01/23/2017
Worker	n/a



How

Clifford

Certification # PB-0149

State of Hawai'i
Asbestos Certification

Training Course	Exp. Dates		
W	n/a	MP	03/12/16
CS	n/a	PD	n/a
INS	03/12/16	PM	06/03/15

Kaneshiro
Stephen Y.
EnvironMETeo Services, Inc
HIASB-2307
State Exp. Date

W= Worker
CS= Cont /Sup
INS= Inspector
PD= Project Designer
MP= Mgmt Planner
PM= Project Monitor

State of Hawai'i
Lead Based Paint Activities Certification

Expiration Dates:
Inspector n/a
Supervisor n/a
Risk Assessor 11/05/2016
Project Designer n/a
Worker n/a

Kaneshiro
Stephen
Certification # PB-0676

End of Report

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END OF SECTION

DIVISION 2 - SITEWORK

SECTION 02050 - DEMOLITION AND REMOVAL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: The work includes demolition removal, and relocation of all construction indicated in the plans or specified herein. All materials resulting from demolition work, except as indicated or specified otherwise, shall become the property of the Contractor and shall be removed from the limits of Government property. Remove rubbish and debris from the job site daily, unless otherwise directed. Store materials which cannot be removed daily in areas specified by the Engineer. The Contractor shall pay for all necessary permits and certificates that may be required in connection with this work.

1.02 SUBMITTALS: Submit proposed demolition and removal procedures to the Engineer for approval before work is started. Procedures shall provide for coordination with other work in progress and a detailed description of methods and equipment to be used for each operation, and sequence of operations.

1.03 DUST CONTROL: Take appropriate action to check the spread of dust to the surrounding area and to avoid the creation of a nuisance in the surrounding area. Do not use water if it results in hazardous or objectionable conditions, such as flooding or pollution. Comply with all dust regulations imposed by local air pollution agencies.

1.04 PROTECTION

A. Existing Improvements: Protect existing improvements that are to remain in place, that are to be reused, or that is to remain the property of the Engineer by temporary covers, shoring, bracing, and supports. Repair items damaged during performance of the work or replace with new. Do not overload structural elements. Provide new supports or reinforcement for existing construction weakened by demolition, removal, and relocation work. Construction equipment and vehicles shall neither be permitted on, nor shall be stored on the existing work that is to remain in place.

B. Trees: Protect trees within the project site which might be damaged during demolition with a 6-foot high fence. Erect fence a minimum of 5-feet from the trunks of individual trees or follow the outer perimeter of branches of clumps of trees. Restore trees scarred or damaged by Contractor equipment or operations to their original condition or replace as determined by the Engineer. The Engineer shall approve restoration prior to its initiation.

C. Public Safety: Where pedestrian and driver safety is endangered in the work or storage areas, use traffic barricades with flashing lights. Notify the Engineer prior to beginning any such work. The Contractor shall conduct operations with minimum interference to streets, driveways, and passageways, etc.

D. Explosives: Use of explosives will not be permitted.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXISTING FACILITIES

A. Demolish and remove portions of existing structures and facilities required to construct improvements indicated on the plans.

B. Concrete: Where concrete work is to be removed, sawcut concrete along straight line to a depth of not less than 1 inch. Make each cut in walls and slabs perpendicular to the face and in alignment with the cut in the opposite face. The remainder of the concrete shall be broken out, provide that the broken area is concealed in the finished work, and the remaining concrete is sound.

3.02 DISPOSITION OF MATERIALS

A. Title to Materials: Title to all materials and equipment to be removed, except as specified otherwise, is vested in the Contractor upon receipt of notice to proceed. The Engineer will not be responsible for the condition or loss of, or damage to, such property after notice to proceed. Materials and equipment shall not be viewed by prospective purchasers or sold on the site. Burning or burying of materials on the site will not be permitted.

B. When removing the materials for the property, truck loads shall be trimmed and loaded as to prevent spillage.

C. Unsalvageable Materials. Noncombustible and combustible materials shall be disposed of outside the limits of project site at the Contractor's responsibility and expense.

3.03 SHORING REQUIREMENTS

A. Contractor shall provide shoring for existing and new work during all phases of construction. All existing work to remain shall be protected as specified herein.

B. Submit drawings showing the proposed shoring layouts and all pertinent details. No work shall commence until shoring drawings have been approved and shoring drawings are available at the construction site.

3.04 CLEAN-UP

A. Debris and Rubbish: Remove and transport debris and rubbish in a manner that will prevent spillage into ocean or streets and adjacent areas. Clean-up spillage from ocean, streets and adjacent areas.

B. Regulations: Comply with Federal, State, and Local hauling and disposal regulations.

3.05 MEASUREMENT AND PAYMENT

Demolition and Removal shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

SECTION 02100 - SITE PREPARATION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: The work to be performed under this section shall include clearing the premises of all obstacles and obstructions, the removal of which will be necessary for the proper reception, construction, execution and completion of the other work included in this contract.

1.02 RELATED WORK: Removal of Structure (Section 02050)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Maintenance of Traffic: The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, passageways, etc.

B. When necessary, the Contractor shall provide and erect barriers, etc., with special attention to protection of personnel.

C. Protection: Throughout the progress of the work protection shall be provided for all property and equipment, and temporary barricades shall be provided as necessary. Work shall be done in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, and the State of Hawaii's Occupational Safety and Health Standards, Rules and Regulations.

D. Fires: No burning of fires of any kind will be allowed.

E. Reference Points: Bench marks, etc., shall be carefully maintained, but is disturbed or destroyed, shall be replaced as directed, at the Contractor's expense.

F. Disposal: All materials resultant from operations under this Section shall become the property of the Contractor and shall be removed from the site. Loads of materials shall be trimmed to prevent droppings.

3.02 EXISTING UTILITY LINES: The existence of active underground utility lines within the construction area is not definitely known other than those indicated in their approximate locations on the Drawings. Should any unknown line by encountered during excavation, the Contractor shall immediately notify the Engineer of such discovery. The Engineer shall then investigate and issue instructions for the preservation or disposition

of the unknown line. Authorization for extra work shall be issued by the Engineer only as he deems necessary.

3.03 CLEARING AND GRUBBING

A. The Contractor shall clear the premises of all obstacles and obstructions, the removal of which will be necessary for the proper reception, construction, execution and completion of other work included in this contract.

B. After clearing has been completed, the entire site shall be stripped of the organically contaminated near-surface soils to a minimum depth of 6 inches. Remove trees and roots to a minimum of 3 feet below existing ground level. Remove all large roots in excess of 2 inches in diameter, and backfill and compact the resulting depression. All debris accumulated from this operation shall be completely removed from the premises by the Contractor.

C. The Contractor shall protect from injury and damage all surrounding trees, plants, etc., and shall leave all in as good as condition as at present. Any damage to existing improvement shall be repaired or replaced by the Contractor to the satisfaction of the Engineer.

3.04 CLEAN UP OF PREMISES: Clean up and remove all debris accumulated from building operations from time-to-time as directed. Upon completion of the construction work and before final acceptance of the contract work, remove all surplus materials, equipment, scaffoldings, etc., and leave entire job site raked clean and neat to the satisfaction of the Engineer.

3.05 MEASUREMENT AND PAYMENT: Site preparation will not be measured nor paid for directly, but shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made therefor.

END OF SECTION

SECTION 02200 - EARTHWORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section includes the furnishing and installing complete-in-place all earthwork and its appurtenances as indicated on the plans and specifications.

1.02 STANDARD SPECIFICATIONS

Work covered under this section shall follow the below listed sections of the County's "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" dated September 1986 and the "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION", dated September 1984 as revised, except as amended in the plans and/or specifications herewith. (Paragraphs concerning Measurement and payment in the Sections are not applicable to this project.)

A. Structure Excavation and Backfill ..... Section 13

B. Crushed Rock ..... Section 15

C. Portland Cement and Concrete ..... Section 39

1.03 GENERAL REQUIREMENTS

A. It shall be the responsibility of the Contractor to examine the site and determine for himself the existing conditions.

B. 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.

C. All debris of any kind accumulated from clearing shall be disposed of from the site, and the whole area left clean. The Contractor shall be required to make all necessary arrangements relative to the proposed place of disposal.

1.04 CLEARING AND GRUBBING: The Contractor shall clear off and remove from the entire area within the area to be improved, all vegetation, stumps, large roots, buried logs, garbage and other unsuitable material.

1.05 REMOVAL AND REPAIR WORK

A. General: The Contractor shall exercise every precaution to preserve and protect all structures, walkways or utility improvements which are to remain or be

relocated. Portions of walkway and pavement which are to remain shall be saw cut neat and true to line. Restore all pavement and curbs upon completion of the work.

1.06 SEQUENCE OF WORK: All sequence of work shall be subject to the approval of the Engineer.

1.07 PROTECTION

A. Barricade: Erect temporary barricade as necessary to prevent people from entering into project area, to the extent as approved by the Engineer. Such barricade 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 of Hawaii.

B. Take all precautions and safety measures as required to protect the State of Hawaii free and harmless from liability of any kind. Conduct operations with minimum interference to streets, driveways, sidewalks, passages, etc.

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

D. The Contractor shall protect from damage all surrounding structures, trees, plants, grass, walks, pavement, etc. Any damage will be repaired or replaced by the Contractor to the satisfaction of the Engineer.

1.08 PERMITS: The Contractor shall obtain and pay for necessary permits prior to the commencement of work.

1.09 MAINTAINING TRAFFIC

A. The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, traffic, activities, 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.

1.10 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 begins. Any discrepancy shall be immediately brought to the attention of the Engineer and any change shall be made in accordance with his instruction. The Contractor shall not

be entitled to extra payment if he fails to report the discrepancies before proceeding with any work whether within the area affected or not.

B. All lines and grades shall be verified and established by a Surveyor or Civil Engineer licensed in the State of Hawaii.

C. The laying out of base lines, establishment of grades and staking out the entire work shall be done by a licensed Surveyor or licensed Civil Engineer. He shall be solely responsible for their accuracy. Erect and maintain substantial batter boards showing construction lines and levels.

1.11 CLEAN UP: 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 jobsite clean and neat.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Yard fill: Suitable material from the excavation may be used for fill with the approval of the Engineer.

B. Structural Fill: New structural fill below exterior concrete slabs or paving, with allowance for depth of cushion fill, shall be aggregate base course.

C. Topsoil: Imported, fertile, friable soil of loamy character having normal amounts of natural humus, free from subsoil, clay, refuse, roots, weeds, noxious weeds, nematodes or other deleterious matter, and free from toxic amounts of either acid or alkaline elements and capable of sustaining healthy plant life. Stones and earth lumps shall not be greater than one inch in largest dimension. Red humic latosol soils, or types known as "Palely clay" or "Lualualei clay" are unacceptable. Topsoil excavated in connection with the construction of this project may be used in lieu thereof. Topsoil is subject to approval by Engineer.

D. Capillary Barrier under concrete slab shall be No. 67 crush rock or S4C material.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Protective Measures

1. All excavations shall be protected and guarded against danger to life, limb

and property.

2. Shoring, cribbing and logging, as required to safely preserve the excavations and earth banks, free from damages resulting from the work shall be provided and installed by the Contractor.

3. All excavations shall be kept free from standing water. The Contractor shall do all pumping and draining that may be necessary to remove water to the extent required in carrying on the work. Grading shall be controlled so that the ground surface is properly sloped to prevent water run-off into structural foundation and open trenching excavations.

4. The existence of active underground utility lines transversing the construction area other than shown is not definitely known. Should any be encountered during excavation, the Contractor shall not disconnect same without authorization from the Engineer but shall inform the latter immediately of each discovery. The Engineer shall investigate and issue proper authorization for procedure.

B. General

1. Excavation shall be done to the lines and grades indicated. Concrete slabs, concrete curbs, asphaltic concrete pavement, etc., not indicated to remain shall be removed or broken up into pieces of sizes permitted in other paragraphs of this section. When incorporated in fill, broken up pieces shall be well mixed with finer materials filling all spaces between the pieces.

2. Excavation for footing, foundation, etc., shall have level beds on unfilled, undisturbed, firm bearing, with stepped level where necessary. Small soft spots shall be compacted to unyielding firmness. If soil conditions are suitable and approved, footing cuts may be made to exact size of footings.

3. Excavated materials declared unusable by Engineer shall be removed from the site at the Contractor's expense.

3.02 BACKFILL

A. Yard Area

1. Yard fill where no concrete slab occurs shall be in 6" layers (compacted thickness) compacted to 90% of maximum density.

2. The areas not covered by asphalt paving or concrete slab shall be graded

to conform to finish contours, with allowance for depth of water into construction areas.

B. Structural Fill

1. In advance of preparing the subgrade or depositing a specified layer of material, existing material within the area where such material is to be placed, which in the opinion of the Engineer is unsuitable as a subgrade foundation, shall be removed and resulting space refilled with approved material and compacted.

2. Backfilling shall progress so that excessive unbalanced load is not introduced against any structure.

3. New structural fill material shall be placed in layers not to exceed 6" per compacted layer and compacted to 95% maximum density.

4. In the event of insufficient amount of structural fill or yard fill is derived from earthwork operations, import the necessary materials without any additional cost to the State. Such imported materials shall meet the requirements as specified for each category of materials.

5. The subgrade shall be graded and compacted to 95% maximum density.

6. Under slabs the cushion fill as specified shall be compacted to a level surface to 95% maximum density. Capillary barrier shall be No. 67 crush rock or S4C material.

C. Grading

1. Grading work shall conform with the County's Grading Ordinances.

2. Rough Grading: The areas not covered by asphalt paving or concrete slab up to the contract zone limit shall be graded to conform to finish grades, with allowance for depth of topsoil. Contractor shall take the necessary precautions to prevent drainage of water into the construction area.

3. Finish Grading: Areas not covered by asphalt paving, concrete slabs and structures shall be graded to finish grade with allowance for a 4" layer of topsoil as required. Areas to be compacted to 90% of maximum density before placing topsoil. Topsoil shall be spread evenly, compacted lightly and raked to a uniform plane at required contours and grades.

3.03 TESTING: Upon the Engineer's request, materials and compaction of subgrade and fill shall be tested by an independent testing agency approved by the Engineer and all compaction test results shall be submitted to the Engineer for approval. All cost of testing shall be borne by the Contractor. Compaction testing for each compacted layer or subgrade shall be made at location as directed by the Engineer. All test results must be approved before proceeding with placing of topsoil, or base course unless otherwise directed by the Engineer.

3.04 MEASUREMENT AND PAYMENT

Earthwork shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

SECTION 02210 - TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This work shall consist of excavating and backfilling for the water system, sanitary sewers and appurtenances to the lines and grades shown on the plans, as directed by the Engineer, and as specified herein. The work includes sheeting and bracing, dewatering, hauling and disposing of unsuitable excavated materials.

1.02 STANDARD SPECIFICATIONS: Unless otherwise modified herein, work under this section shall conform to the below listed sections of the "Hawaii Standard Specifications for Road and Bridge Construction", dated 2005, as amended, of the State Department of Transportation, Highway Division, hereinafter referred to as "DOT Standard Specifications", pertinent sections of the "Water System Standards, Volume 1", dated 1985, and the "Approved Material List and Standard Details for Water System Construction, Volume 2", dated 1985, of the Counties of Hawaii. All references to measurement and payment shall be deleted.

A. Excavation and Backfill for Miscellaneous Facilities.....Section 204

B. Water System ..... Section 624

C. Sewer System ..... Section 625

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS: After the pipe or appurtenant structure is installed, inspected, and approved by the Engineer, the trench shall be backfilled with native material and/or imported materials as described herein below.

A. Water System Facilities: Pipe cushion and backfill material shall conform to the requirements of Section 209 of the Water System Standards.

B. Sewer System Facilities: Pipe cushion and backfill material shall conform to the requirements of Section 703.21 of the DOT Standard Specifications.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Opened Length: Trenches in existing improved roads, pedestrian walkway, and paved areas shall not be opened for more than 150 feet in advance of the pipe laying unless specifically authorized by the State Engineer. In other areas, the

trenches shall not be opened for more than 200 feet. No jumping of excavation will be permitted unless authorized in writing by the Engineer.

B. Trench Width: The trench width shall be the specified width for the pipe size to permit proper laying and jointing of the pipes, and where concrete jacket is called for, the width shall be increased accordingly. If the Contractor excavates beyond the specified width and such action results in greater load of overburden than the pipe is designed for, the Contractor shall replace the pipe with one of higher strength or provide a higher class of bedding to withstand the extra load at his own expense.

C. The top edges of the trench shall be neatly cut along well-defined lines. In overbreaks, the Contractor shall backfill and repave the overbreak areas at his own expense.

D. The trench width below the level two (2) feet above the top of the pipe shall not exceed the six (6) inches beyond the payment trench width specified in the referenced Standard Details. From a level two (2) feet above the top of the pipe to existing ground, the width of trench excavation shall extend as nearly vertical as practicable and/or be confined to the minimum work area required for construction and shall not extend beyond existing structures or utilities adjacent to the pipe alignment, unless otherwise authorized by the State Engineer.

E. Stockpiling Material: The placing of stockpiles of excavated materials, pipes and construction materials adjacent to the trench excavation shall be prohibited on roads and walkways and areas adjacent to roads and walkways where stockpiling of material may create a hazardous condition. The Contractor shall haul and store the materials at a site approved by the State Engineer and haul to the job site as required at no additional cost to the State. Access to existing roadways, pedestrian walkways, fire vehicle access lanes, fire hydrants and meters shall be provided at all times.

F. Unsuitable Excavated Materials: When unsuitable material is encountered at the excavation, the Contractor shall be responsible for hauling and disposing of the material. The hauling and disposal shall be considered as incidental to the excavation work and no additional payments will be made. The Engineer shall determine if the excavated material is unsuitable.

G. Pipe in Embankment: For installing pipe in new embankment, the embankment shall first be constructed to a height of two pipe diameters (O.D.) above the established pipe invert or as indicated on the plans, and for a distance each side of the pipe location of not less than five pipe diameters. The trench shall then be excavated with sides as nearly vertical as soil condition will permit and the pipe

installed.

3.02 ADDITIONAL EXCAVATION: When the subgrade material below the established trench grade is deemed unsuitable by the Engineer, the Contractor shall excavate below grade to such depth and width as directed by the Engineer. The excavated area below grade shall be filled with aggregate in 6-inch compacted layers and brought up to within 6 inches of the invert grade or to the bottom of the concrete jacket or cradle.

3.03 OVEREXCAVATION: Any part of the trench excavated below the established grade or beyond the maximum permitted width, other than work under "3.02 Additional Excavation", shall be refilled and compacted with select material by the Contractor at his own expense.

3.04 SHEETING AND BRACING: Wherever necessary, the Contractor shall properly sheet and brace the open trench to render it safe and secure from possible slides and to protect existing improvements and properties. The sheeting and bracing shall be removed before completing the backfill.

3.05 DEWATERING

A. Unless authorized in writing by the Engineer, trenches shall be kept free from water during the installation, testing, and backfilling of pipes. The Contractor shall be responsible for any damages to adjacent properties resulting from his dewatering operation.

B. Discharge from dewatering operations shall not be drained directly onto streets or drainage ways. In areas where a storm drainage system has been installed, the discharge shall be conveyed to the nearest storm drain, by the use of pipes or other suitable means acceptable to the Engineer. The discharge shall be filtered or otherwise treated to comply with all applicable Federal, State and County regulations concerning water pollution prior to its release into adjacent waterways or drainage systems.

3.06 PLACING AND COMPACTING: Backfilling operations shall not commence until approved by the Engineer or his authorized representative.

A. First Lift: The first lift shall be backfilled by hand shoveling and tamping or by power equipment supplemented by hand shoveling and tamping so that the backfill material is in contact with the entire periphery of the pipe. The Contractor shall exercise care in backfilling to ensure that the pipe is not damaged nor moved from its installed position.

B. Intermediate Lift: The backfill shall be moisture-conditioned to above the optimum moisture content, placed in maximum 8-inch level loose lifts, and

mechanically compacted to not less than 90 percent relative compaction.

C. Final Lift: The surface 2-foot lift shall be placed and compacted in accordance with Section 02200 "Earthwork" and Section 02233 "Aggregate Base Course". Where trenches are below pavement or building areas, the upper 2 feet of the trench backfill below the pavement or building subgrade shall be compacted to at least 95 percent relative compaction.

3.07 MEASUREMENT AND PAYMENT: Trench excavation and backfill will not be measured nor paid for directly, but shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made therefore.

END OF SECTION

SECTION 02362 - SOIL TREATMENT FOR VEGETATION CONTROL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This work shall consist of spraying weed killer on the prepared roadway subgrade prior to the installation of the base course and where called for on plans and on existing growth prior to application of asphalt and concrete pavement in the case of resurfacing jobs.

1.02 SUBMITTALS: 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 - MATERIALS

2.01 MATERIALS: Weed killer shall be "Casoron 4G", "Norosac 4G", or an approved equal for under asphalt application and concrete pavement on new or rebuilt pavement.

PART 3 - EXECUTION

3.01 APPLICATION: The under asphalt and concrete 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.

In treatment of existing growth on resurfacing jobs, the weed killer shall be mixed and uniformly sprayed in strict accordance with the manufacturer's label.

Nut grass shall be retreated two (2) days after initial application and again if growth still exists.

The Contractor shall notify the Engineer 24 hours before application of weed killer.

3.02 MEASUREMENT AND PAYMENT: Soil treatment for vegetation control will not be measured nor paid for directly, but shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

SECTION 02513 - ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section shall include the furnishing and installing complete-in-place all asphaltic concrete paving and its appurtenances as indicated on the plans and specifications.

1.02 STANDARD SPECIFICATIONS:

Work shall be in accordance with the below-listed sections of the County's "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", dated September 1986 and the "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION", dated September 1984 as revised, except as amended in the plans and/or specifications herewith. (Paragraphs concerning Measurement and Payment in the Sections are not applicable to this project.)

1. Subgrade ..... Section 29
2. Aggregate Base Course ..... Section 31
3. Asphalt Surface Treatment ..... Section 33
4. Asphalt Concrete Pavement ..... Section 34
   (Mix and thickness shall be as indicated on the plans)
5. Asphalt Concrete Resurfacing ..... Section 35
6. Restoring Pavement and Other Improvements ..... Section 38

PART 2 - PRODUCTS

2.01 MATERIALS: Materials for pavement areas shall be constructed in accordance with the above listed sections of the County's "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", dated September 1986.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Installation of pavement materials shall be in accordance with the applicable sections noted hereinbefore.

B. Weed killer shall be applied on the prepared subgrade of the area to be paved as specified in Section 02362. Contractor shall notify the Engineer 24 hours before application of weed killer.

3.02 REPAIR OF EXISTING A.C. PAVEMENT: Any existing asphaltic concrete pavement including roads that have been damaged by construction activities shall be repaired to the

original condition and to the satisfaction of the Engineer. Damage done by heavy equipment, especially on roads and yard areas not stable for such equipment, shall be repaired to the original condition and to the satisfaction of the Engineer.

3.03 MEASUREMENT AND PAYMENT

Asphaltic Concrete Paving will not be measured nor paid for directly, but shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made therefor.

END OF SECTION

SECTION 02580 - PAVEMENT STRIPING AND MARKINGS

PART 1 - GENERAL

1.01 GENERAL: Furnish all materials, labor and equipment required to accomplish the installing and removing of pavement markers, striping and markings as indicated on the drawings and specified herein.

1.02 ACCESSIBILITY GUIDELINES: Furnishing and installation of all items in this section shall comply with Americans with Disabilities Act Accessibility Guidelines (ADAAG), 36 CFR Part 1191.

PART 2 - PRODUCTS

2.01 MATERIALS:

Materials shall be in accordance with the following Section 629 - Pavement Markings of the State of Hawaii STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND PUBLIC WORKS CONSTRUCTION dated 1994 as revised, except as amended in the plans and/or specifications herewith. Paragraphs concerning Measurements and Payments in the sections are not applicable to this project.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Installation and removal of pavement markers, striping and markings shall be in accordance with Section 629 - Pavement Markings of the "Hawaii Standard Specification for Road and Bridge Construction," dated 2005 except as amended on the drawings. (Paragraph concerning Measurements and Payments in the section is not applicable to this project.)

B. All existing pavement markers, striping and markings in conflict with the new pavement markers, striping or markings shall be removed.

3.02 MEASUREMENT AND PAYMENT:

Pavement Striping and Markings will not be measured nor paid for directly, but shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made therefor.

END OF SECTION

SECTION 02840 - REGULATORY AND WARNING SIGNS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section covers the requirements for furnishing and installing sign panels, regulatory and warning signs and sign structures and performing all incidental work.

1.02 STANDARD SPECIFICATIONS: Unless otherwise modified herein, work under this section shall conform to the below sections of the "Hawaii Standard Specifications for Road and Bridge Construction", dated 2005, as amended, of the State Department of Transportation, Highways Division, hereinafter referred to "DOT Standard Specifications". All references to measurement and payment shall be deleted.

A. Traffic Control, Regulatory, Warning, and Miscellaneous Signs ..... Section 631

B. Markers ..... Section 632

1.03 SUBMITTALS: The Contractor shall be responsible for submitting six (6) sets of shop drawings of all work pertinent to the fabrication of the signs.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete for sign structures shall be of the class specified on the plans.

B. Other materials shall meet the requirements specified on the following subsections of Division 700 - "Materials" of the "DOT Standard Specifications", as amended.

1.	Signs	750.01
2.	Sign Posts	750.02
3.	Fasteners for Signs	750.03

C. Sign Posts. Unless specified otherwise in the plans, 2-inch galvanized standard pipe or 2 x 2 inch 12 gauge square tube post shall be used for Regulatory and Warning Sign posts.

2.02 REGULATORY AND WARNING SIGN SUPPORTS

A. The Contractor shall submit shop drawings for approval prior to assembling in accordance with the requirements of Section 501 - Steel Structures, of "DOT

Standard Specifications".

B. All welding shall be continuous and shall conform to the requirement of Section 501 of the "DOT Standard Specifications".

C. The weld metal at transverse joints shall extend to the sleeve, making the sleeve an integral part of the joint. Longitudinal welds shall be made by the submerged arc process. Welds except fillet welds shall be ground flush with the base material.

D. Unless otherwise specified, all exposed surfaces including the inside of the tubular posts and arms shall be hot-dip galvanized after fabrication. The upper 10 inches of anchor bolts shall be hot-dip galvanized. Galvanizing shall be in accordance with the requirements of Section 501 - Steel Structures, of "DOT Standard Specifications.

E. Where aluminum sign supports are used, they shall conform to the requirements of Section 750.05(B) - Aluminum Supports, of "DOT Standard Specifications".

PART 3 - EXECUTION

3.01 FABRICATING SIGNS

A. Panels shall be assembled in the shop and checked for straightness, alignment and dimensions. Variations shall be corrected to the satisfaction of the Engineer.

B. Sign panels shall be carefully and securely installed as shown on the plans. Chipped or bent signs shall be replaced at the Contractor's expense.

3.02 MOUNTING OF SIGNS: Permanent signs shall be erected on posts as shown on the plans or as directed. The posts shall be set plumb at the required locations.

3.03 MEASUREMENT AND PAYMENT: Regulatory and Warning Signs will not be measured nor paid for directly, but shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made therefor.

END OF SECTION

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: The work shall include the furnishing of all labor, materials and equipment necessary to construct complete in place all cast-in-place concrete as shown on the plans and as specified herein.

1.02 TESTING AND INSPECTION

A. Mill Laboratory Test, Reports and Affidavits - furnished by the manufacturer, certifying that all materials delivered to the project conform to these specifications, when requested by the Engineer.

B. Test Cylinders for Compressive Strength and Slump - The Contractor shall pay for and hire an independent testing laboratory to make and test cylinders for compressive strength and slump of concrete. The Contractor shall make all necessary arrangements or accommodations to obtain these samples and shall pay for all cost of testing and sampling. Compressive strength specimens shall be made in accordance with ASTM C 31, two sets of three (3) standard cylinders for each days pour and of each concrete class placed on that day, unless otherwise directed. The compressive strength test shall be performed in accordance with ASTM C 39, a minimum of one set for each 100 cubic yards, of each concrete class placed in that day. Notwithstanding, this established rate, however, the Engineer may request for additional concrete test cylinders for slump and compressive strength tests in whatever quantity he deems and/or necessary from any concrete pour for that days pour. The Contractor shall make and test the additional cylinders at his own expense. One specimen tested at 7 days, one specimen tested at 28 days and one specimen retained in reserve for later testing if required.

1.03 CONCRETE MIX DESIGN

A. All concrete shall consist of Portland Cement - Type II, fine and coarse aggregate, admixture, air entraining agent and water.

B. All concrete shall have a 28 day compressive strength of 4,000 psi. All concrete shall have a maximum slump of 3-½" plus or minus ½". For 28 day compressive strengths, the cement content in bags of cement per cubic yard of concrete shall be 6.50 bags for 4,000 psi concrete. W/C ratio shall not exceed 0.40.

C. Submit concrete mix design to the Engineer for approval. Note that concrete strength requirement is minimal only. No claim for extra compensation for the furnishing of concrete of greater strength in order to accomplish other

requirements above specified will be considered by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland Cement - shall conform to "Standard Specifications for Portland Cement", ASTM C150, Type II, for all concrete work.

B. Aggregates for Concrete - shall conform to "Standard Specifications for Concrete Aggregates" ASTM C33, except that local aggregates that have been shown by tests or actual service to produce concrete of required strength, durability and wearing qualities, may be used when approved by the Engineer.

1) Fine Aggregates - Calcareous or basalt sand and No. 4 crushed rock of close grained, hard, bluish gray lava rock. Fine aggregate shall be clean, free from salt, vegetable loam, earth, elongated pieces, disintegrated rock or other deleterious substances.

2) Coarse Aggregates - Broken stone obtained from clean, hard, blue lava rock or other approved inert materials of similar characteristics, free from disintegrated stone and all adherent coatings. Maximum size of aggregate shall be 1 - inch.

C. Water - used in mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials or other substances that may be deleterious to concrete or reinforcement. Non-potable water shall not be used.

D. Admixture

1) Admixtures: The Contractor shall use a superplasticizer or high range water reducer admixtures conforming to ASTM C494 to compensate for the increased water demand when micro silica is added to the concrete, and shall be compatible with calcium nitrite solutions. Do not use admixtures containing chlorides.

2) Air entraining agent, conforming to ASTM C260 shall be used per manufacturer's recommendation for 4% air.

E. Reinforcing Steel - shall be epoxy coated, deformed bars conforming to ASTM A615, Grade 60, except bars for stirrups and ties may be Grade 40.

F. Joint Sealants - shall be polysulfide or urethane compound conforming to ASTM C920 and for exterior use or other approved equal. Color to be selected by the

Engineer.

G. Epoxy Grout and Epoxy Bonding Compound - shall be two component resins, polysulfide free, high modulus, high strength epoxy adhesive. Mix with quartz granules when grouting anchor bolts. Epoxy shall be "Sikudur Hi-Mod" as manufactured by Sika Chemical Co. or other approved equal.

H. Welded Wire Fabric - Conform to the requirements of the "Standard Specifications for Welded Steel Wire Fabric for Concrete Reinforcement" ASTM A 185, or "Standard Specifications for Welded Deformed Steel Wire Fabric for Concrete Reinforcement" ASTM A 497. Welded wire fabric shall be flat sheets and galvanized.

I. Bar Supports - Furnish in accordance with "Details and Detailing of Concrete Reinforcement", ACI 315. Use stainless steel, or plastic coated galvanized or plastic supports to prevent surface staining where supports are in contact with an exposed concrete surface. Where concrete is to be sandblasted, use plastic coated supports only. Use nylon, epoxy or plastic coated tie wire.

J. Expansion Joint Filler - shall be preformed, non extruding type, conforming to AASHTO M153, Type 1, thickness as shown on the drawings.

K. Backup Rod Filler - shall be enclosed cell sponge rubber conforming to Federal Specifications HH-E-341a, Type 1, Class A.

L. Materials for Curing Concrete -

a. Impervious Sheeting: Waterproof paper, polyethylene sheeting, or polyethylene coated burlap conforming to ASTM C 171.

b. Liquid Membrane-Forming Compound: ASTM C 309, white-pigmented, Type 2, free of paraffin or petroleum.

c. Liquid Chemical Compound: A suitable sealer-hardener designed for sealing and hardening in addition to curing of the concrete, applied by the method and at the rate recommended by the manufacturer. It shall not reduce the adhesion of tile, paint, roofing, waterproofing, or other material to be applied to the concrete. The chemical compound shall be free of petroleum resins or waxes.

M. Non-Shrink Grout - shall conform to ASTM C 1107 with no ASTM C 827 shrinkage. Grout shall be non-metallic.

N. Expansion Joint Filler - A pre-molded material of ½ inch thickness, unless

otherwise noted, composed of fiberboard impregnated with asphalt conforming to ASTM D 1751.

O. Concrete Splash Blocks - shall be as shown on the drawings.

P. Curing Compound - shall be compatible with the finish to be applied. Unless otherwise required, the compound shall conform to the requirements of ASTM C 309.

Q. Moisture Barrier - shall be of polyethylene film, minimum 0.006 inch thick.

R. Keyed Kold Joint - shall be galvanized.

S. Liquid Chemical Sealer-Hardener Compound - Compound shall be silicate-based solution (34% metasilcate, 2.5% organic catalyst, 63.5% water) which when mixed with water seals and hardens the surface of the concrete. Compound shall not reduce the adhesion of resilient flooring, tile, paint, waterproofing, or other material applied to concrete.

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. Concrete

1) Concrete shall not segregate nor cause bleeding. It shall work readily into corner and angles of form and around reinforcement without segregation or materials or an excess of water on the surface. It shall produce exposed surfaces of uniform color and smooth appearance without honeycomb.

2) Ready Mix Concrete - shall conform to ASTM C94 with certificates furnished by the mixing plant that concrete has a 28 day compressive strength and maximum slump as specified above. Delivery tags with each load shall indicate yardage of concrete, amount of water and amount of cement.

Plant shall have sufficient capacity so that the construction schedule can be maintained. The time elapsing between the introduction of the mixing water between the cement and the mixing aggregate and placing of the cement in final position in the form shall not exceed 45 minutes.

B. Forms

1) Forms shall be constructed to slopes, lines, shapes and dimensions shown,

installed and maintained plumb and straight and sufficiently tight to prevent leakage, and securely braced and shored to prevent displacement, and to safely support construction loads. False work shall be designed with adequate strength, rigidity and durability to successfully resist movement from wave action of the season; to safely carry the full load of fresh concrete and all construction loads without any settlement or deflection; to rigidly hold their shape and position under internal vibration of fresh concrete.

2) In no case shall the finished product deviate from established lines, grades and dimensions in excess of those tolerances listed in Section 203 of the ACI Standard Recommended Practice for Formwork (ACI 347-63). Any such deviation in excess of the allowable tolerance will be just cause for rejection of the finished product.

Exposed concrete surfaces shall be formed with new sound Plywood or lined with "Form Ply" or approved equal. Plywood shall be commercial standard Douglas Fir, moisture resistance concrete form plywood not less than 5-ply and at least 5/8" thick. Forms shall be coated with a bond breaking material prior to the placement of reinforcing steel.

3) A 3/4" x 3/4" chamfer shall be provided at all external corner of exposed concrete beams, girders, pilasters, and as shown on the drawings.

4) Forms shall not be removed before the expiration of the minimum lapsed time from concrete pour as follows:

Bottom forms of suspended slabs, beams, and pile caps . . . 21 days
Side forms of beams and pile caps . . . . . 7 days

No construction loads exceeding the structural design loads shall be supported upon any unshored portion of the structure under construction.

C. Reinforcement

1) Reinforcing steel bars and wire fabric shall be provided in sizes, lengths and configurations as indicated on the plans and shall be thoroughly cleaned before placing and again before placing of concrete to remove loose mill scale, rust, oil and all coatings that will destroy or reduce the bond. All items shall be accurately positioned and secured in place as indicated on the plans as herein specified.

2) Reinforcement shall be placed in specified positions not exceeding the ACI Building Code (ACI 318-02). Unless otherwise noted, cleaning,

bending and placing of reinforcement shall be done in accordance with the standard practice of the Concrete Reinforcing Steel Institute. Splicing of bars, except where shown, will not be permitted without the approval of the Engineer. Splices where permitted, shall be lapped 40 bar diameters unless otherwise noted on the drawings.

3) Epoxy-coated reinforcing bars supported from formwork shall rest on coated wire bar supports, or on bar supports made of dielectric material or other acceptable materials. Wire bar supports shall be coated with dielectric material for a minimum distance of 2 inches from the point of contact with the epoxy-coated reinforcing bars. Reinforcing bars used as support bars shall be epoxy-coated. In walls having epoxy-coated reinforcing bars, spreader bars where specified or indicated shall be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing bars shall be made of corrosion-resistant material.

4) Epoxy-coated reinforcing bars shall be fastened with nylon-epoxy, or plastic-coated tie wire, or other acceptable material.

5) Splices of reinforcing bars shall be made only as required or permitted by the Engineer.

6) When required or permitted, all welding of reinforcing bars shall conform to AWS D1.4 unless otherwise permitted, welding of crossing bars (tack welding) for assembly if reinforcement is prohibited. Suitable ventilation shall be provided when welding epoxy-coated reinforcing bars. After completion of welding of epoxy-coated reinforcing bars, coating damage shall be repaired. All welds and steel splice members when used to splice bars shall be coated with the same material used for repair of coating damage.

7) Unless approved by the Engineer, reinforcing bars shall not be cut in the field. When epoxy-coated reinforcing bars are cut in the field, the ends of the bars shall be coated immediately after cutting with the same material used for repair of coating damage.

8) Equipment for handling epoxy-coated bars shall have protected contact areas. Bundles of coated bars shall have protected contact areas. Bundles of coated bars shall be lifted at multiple pick-up points to minimize bar-to-bar abrasion form sags in the bundles. Coated bars or bundles of coated bars shall be stored on protective cribbing. Fading of the color of the coating shall not be cause for rejection of epoxy-coated reinforcing bars. Coating damage due to handling, shipment, and placing need not be

repaired in cases where the damage area is 0.1 square inch or less. Damaged areas greater than 0.1 square inch shall be repaired. The maximum amount of damage including repaired and unrepaired areas shall not exceed 2% of the surface area of each bar.

9) Minimum concrete cover for reinforcing steel shall be provided as follows. In no case shall reinforcement cover be less than the requirements of ACI 318-10.

A. Concrete cast against or permanently exposed to earth . . . . . 3"

B. Concrete exposed to earth or weather:
#6 thru #18 bars . . . . . 2"
#3 - #5 . . . . . 1 1/2"

C. Concrete not exposed to weather or in contact with ground:
Slabs and walls:
#11 and smaller . . . . . 3/4"

10) All reinforcement shall be observed by the Engineer prior to closing of forms. This, however, shall not be construed to relieve the Contractor of his responsibility to place all reinforcing in accordance with the plans.

D. Inserts - Provide and install all concrete anchors, and bolts, and other fastening devices required and as shown on the plans.

All anchors and bolts shall be stainless steel Type 316. Such embedments shall be securely fastened and rigidly held against movement during other work and the placing of concrete.

E. Depositing Concrete

1) No concrete shall be placed in the absence of the Engineer who shall be given one week advance notice of placing of concrete.

2) All sawdust, chips and other construction debris, extraneous matter and excessive water shall be removed from interior of forms. Surfaces shall be clean before placing of concrete.

3) Concrete shall be deposited as nearly as practicable in its final position. In no case shall vibrators be used to transport concrete inside the forms. Concrete shall be thoroughly compacted by use of high frequency internal vibrators so that the concrete is thoroughly worked around the reinforcement, around embedded items and into corners of forms,

eliminating all pockets which may cause honeycombing, pitting or plans of weakness.

4) Use no concrete that has partially hardened or become contaminated by foreign materials, or been retampered.

5) Generally, carry on concreting as a continuous operation until placing of an individual section is completed.

F. Curing and Protection

ACI 301 unless otherwise specified. Begin curing immediately following form removal. Avoid damage to concrete from vibration created by blasting, pile driving, movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, and oil stains. Do not allow concrete to dry out from time of placement until the expiration of the specified curing period. Do not use membrane-forming compound on surfaces where appearance would be objectionable, on any surface to be painted, where coverings are to be bonded to the concrete, or on concrete to which other concrete is to be bonded. If forms are removed prior to the expiration of the curing period, provide another curing procedure specified herein for the remaining portion of the curing period. Provide moist curing for those areas receiving liquid chemical sealer-hardener or epoxy coating.

G. Moist Curing

Remove water without erosion or damage to the structure.

H. Ponding or Immersion

Continually immerse the concrete throughout the curing period. Water shall not be more than 10 degrees C less than the temperature of the concrete. For temperatures between 4 and 10 degrees C, increase the curing period by 50 percent.

I. Fog Spraying or Sprinkling

Apply water uniformly and continuously throughout the curing period. For temperatures between 4 and 10 degrees C, increase the curing period by 50 percent.

J. Pervious Sheeting

Completely cover surface and edges of the concrete with two thicknesses of wet sheeting. Overlap sheeting 150 mm over adjacent sheeting. Sheeting shall be at least as long as the width of the surface to be cured. During application, do not drag the sheeting over the finished concrete nor over sheeting already placed. Wet sheeting thoroughly and keep continuously wet throughout the curing period.

K. Impervious Sheeting

Wet the entire exposed surface of the concrete thoroughly with a fine spray of water and cover with impervious sheeting throughout the curing period. Lay sheeting directly on the concrete surface and overlap edges 300 mm minimum. Provide sheeting not less than 450 mm wider than the concrete surface to be cured. Secure edges and transverse laps to form closed joints. Repair torn or damaged sheeting or provide new sheeting. Cover or wrap columns, walls, and other vertical structural elements from the top down with impervious sheeting; overlap and continuously tape sheeting joints; and introduce sufficient water to soak the entire surface prior to completely enclosing.

L. Liquid Membrane-Forming Curing Compound

Seal or cover joint openings prior to application of curing compound. Prevent curing compound from entering the joint. Apply in accordance with the recommendations of the manufacturer immediately after any water sheen which may develop after finishing has disappeared from the concrete surface. Provide and maintain compound on the concrete surface throughout the curing period. Do not use this method of curing where the use of Figure 2.1.5 in ACI 305R indicates that hot weather conditions will cause an evaporation rate exceeding one kg pf water per square meter per hour.

M. Application

Unless the manufacturer recommends otherwise, apply compound immediately after the surface loses its water sheen and has a dull appearance, and before joints are sawed. Mechanically agitate curing compound thoroughly during use. Use approved power-spraying equipment to uniformly apply two coats of compound in a continuous operation. The total coverage for the two coats shall be 5 square meters maximum per L of undiluted compound unless otherwise recommended by the manufacturer's written instructions. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel. Immediately apply an additional coat of compound to areas where the film is defective. Re-spray concrete surfaces subjected to rainfall within 3 hours after the curing compound application.

N. Protection of Treated Surfaces

Prohibit pedestrian and vehicular traffic and other sources of abrasion at least 72 hours after compound application. Maintain continuity of the coating for the entire curing period and immediately repair any damage.

O. Liquid Chemical Sealer-Hardener

Apply sealer-hardener to interior and exterior floors not receiving floor covering and floors located under access flooring. Apply the sealer-hardener in accordance with manufacturer's recommendations. Seal or cover joints and openings in which joint sealant is to be applied as required by the joint sealant manufacturer. The sealer-hardener shall not be applied until the concrete has been moist cured and has aged for a minimum of 30 days. Apply a minimum of two coats of sealer-hardener.

P. Curing Periods

ACI 301 except 10 days for retaining walls, pavement or chimneys, 21 days for concrete that will be in full-time or intermittent contact with seawater, salt spray, alkali soil and waters. Begin curing immediately after placement. Protect concrete from premature drying, excessively hot temperatures, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to approval by the Contracting Officer.

3.02 FINISHING OF SLAB

A. Finish A - Scratched Finish. After the concrete has been placed, struck off, consolidated and leveled, the surfaces shall be roughened with stiff brushes or rakes (cross-scratched) before final set.

B. Finish B - Light Troweled Finish. After the concrete has been placed, struck off, consolidated and leveled, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared and/or when the mix has stiffened sufficiently to permit the proper operation of a power-driven float. The surface shall then be consolidated with power-driven floats of the impact type except in thin sections. Hand floating with wood or cork-faced floats shall be used in locations inaccessible to the power-driven machine. The slab shall then be steel troweled to a uniform, smooth texture.

C. Finish C - Troweled Finish. The surface shall be finished first with impact power floats, as specified above for Finish B, then with power trowels and finally with steel hand trowels. The first troweling after power floating shall be done by a power trowel and shall produce a smooth surface which is relatively free of

defects but which may still contain some trowel marks.

Additional troweling shall be done by hand after the surface has hardened sufficiently, the final troweling shall be done to a point when a ringing sound is produced as the trowel is moved over the surface. The finished surface shall be free from any trowel marks and shall be uniform in texture and appearance. On surfaces intended to support floor coverings, any defects of sufficient magnitude to show through the floor covering shall be removed by grinding.

D. Finish D - Broom Finish. The concrete slab shall be given a coarse transverse scored texture by drawing a broom across the surface. The operation shall follow immediately after steel-troweling performed under Finish B above.

E. Finish E - Non-Slip Finish. The surface shall be given a dust-on application of abrasive aggregates. Finish with steel trowel but avoid over-troweling. The rate of application of abrasive aggregates shall be not less than 25 pounds per 100 square feet or application shall be in strict accordance with the manufacturer's recommendations.

F. Finish F - Swirled Finish. After the concrete surface has been struck off, darbied, power floated and steel troweled, the surface shall be given a swirl float finish. The float should be worked flat on the surface in semi-circle or fan-like motion.

G. Finishing Tolerances - for slabs shall be in accordance with the following:

1. Finish shall be true planes within + or - 1/4" in 10 ft., as determined by a 10 ft. straightedge placed anywhere on the slab in any direction.

   Unless otherwise shown on the plans, all slabs shall meet this tolerance. The tolerances will be checked prior to moving of forms or shores.

3.03 SECTION OF FLOOR FINISHES

A. Unless otherwise indicated on plans, the following floor finishes shall be used:

1. Finish A - Scratched Finish. For surfaces intended to receive bonded applied cementitious applications (such as setting beds for ceramic tile or quarry tile) on the first floor where no membrane is called for.

2. Finish B - Light Troweled Finish. For surfaces intended to receive roofing, waterproofing and membrane (such as setting beds on membranes, second floor and above).

3. Finish C - Troweled Finish. For interior floors and floors intended to

receive floor coverings.

4. Finish D - Broom Finish. For sidewalks, and vehicle slabs.

5. Finish E - Non-Slip Finish. For interiors and exterior steps/stairways, landings, ADA ramps, and walkway.

3.04 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 to which shows a defective surface which in the opinion of the Engineer cannot be properly repaired or patched shall be removed at no additional cost to the state.

B. Where cast-in-place concrete which is exposed to view or designated architectural requires repairing or patching, the texture of the surrounding surface. If the concrete is to remain unpainted, the surface color shall also be closely matched to that of the surrounding surface.

C. All tie holes and all repairable defective areas shall be patched immediately after form removal as follows:

1. All honeycomb concrete shall be chipped out to sound concrete but in no case to a depth of less than 1 inch. If possible, edges of the chipped-out areas shall be undercut.

2. Rock pockets, form tie holes, deep holes not too large in areas, other holes with relatively high ratio of area, and similarly confined areas shall be dry packed. After the area to be patched has been thoroughly cleaned and dampened, the mortar, which shall consist of 1 part cement, 2-1/2 parts sand passing a #16 screen, and only enough water to produce a mortar that will stick together upon being molded into a ball by slight pressure of the hands, shall be placed in the holes in layers having a compacted thickness of about 3/8". Each such layer shall be solidly rammed over its entire surface using a hardwood stick and a hammer.

3. Shallow depressions where lateral restraint cannot be obtained, voids behind reinforcement, and holes extending through concrete sections shall be patched using a commercially prepared bonding agent, a stiff mortar mix of 1 part cement and not more than 2-½ parts sand. For filling holes in exterior surfaces, an epoxy bonding agent shall be used. Application of the bonding agent shall be in strict conformance with the manufacturer's instructions.

4. An epoxy-and-sand mixture may be used in lieu of mortar-and-bonding agent mixture for any of the patching above. The preparation of the surface to receive the patch, as well as the mixture proportions of the epoxy-and-sand, shall be in strict conformance with the manufacturer's instructions.

D. Except for concrete required to be removed under the specification and concrete which is not constructed as shown on the plans or is out of alignment and/or level beyond allowable tolerances may be patched using an epoxy-and-sand mixture.

The proportions of the mix and the preparation of the surface to receive the patch shall be in strict conformance with the manufacturer's instructions except as or unless otherwise specified herein. The minimum thickness of the patch shall be 1/4" No "feathering" to a lesser thickness will be permitted.

Misalignment which requires correction more than 1 inch thickness shall be repaired in the following manner:

1. The surface of the affected areas shall be chipped, etched, or otherwise cleaned and roughened to provide a sound surface for bonding;

2. Concrete nails or other fasteners which can provide positive mechanical bonding of the patch shall be set into the surface at about 18 inches o.c. in all directions with a minimum of 2 rows;

3. Wire mesh reinforcement as approved by the Engineer shall be installed in those portions of the patch which exceed 2-inch thickness;

4. A bonding agent suitable for use in the repair location (epoxy required for exterior use) shall be applied over the entire surface to be patched;

5. Form work to the true lines called for shall be installed over the area requiring the patch; and

6. Concrete or grout with aggregate sized appropriately for the cavity and which will provide strength equivalent to that of the base surface shall be placed in the form, properly compacted and suitably cured.

E. Shrinkage Cracks in Walls and Slabs: Cracks shall be patched by veeing out the crack to a minimum depth of 1/4" and width of 1/4" and filled solid with epoxy based mortar. Refinish surfaces to match existing and to fully conceal patched cracks. Where required, cracks shall be patched by epoxy injection grout, as determined by the Engineer. Repair work shall be made at no additional cost to the State.

3.05 SURFACE FINISHES

A. Rough Concrete Finish - Rough finish surfaces shall be reasonably true to line and plane with no specific requirements for selected facing materials.

Tie holes, honeycomb and defects shall be patched in accordance with Paragraph 3.04 herein except that the patches for concealed surfaces need not be matched in color and texture with adjacent surfaces. Fins exceeding 1/4" in height shall be removed. Otherwise, surfaces shall be left with the texture imparted by the forms.

B. Plywood Finish - Finish of all exposed surfaces cast against forms constructed of plywood or lined with "Plyform" shall be true to line and plane.

1. Joint marks and fins shall be removed and surfaces left smooth, dense and free from prominent grain markings.

2. The surface shall be scrubbed or remove any laitance or loose particles and to expose any defects.

3. Tie holes, honeycombing, bug holes, and defects shall be repaired in accordance with Paragraph 3.04 herein.

4. The surface shall be thoroughly wetted. Then, as the concrete approaches surface dryness, a mortar consisting of 1 part Portland cement, 2 parts well-graded sand passing a No. 30 sieve, and enough water to provide the consistency of thick paint shall be vigorously and thoroughly rubbed over the area with clean burlap pads so as to fill all voids.

5. While the mortar is still plastic but partially set so that it cannot be easily pulled from the voids, the surface shall be rubbed again with a dry (no water) mortar mix of the same proportions as above. Burlap pads, stretched tightly around a board to prevent dishing the mortar in the voids, shall be used for this operation. There shall be no discernible voids when this operation is concluded.

6. Immediately following the rubbing treatment, the surface shall be continuously moist-cured for 72 hours.

3.06 LOCATION OF SURFACE FINISHES

A. Unless otherwise indicated on the plans, the location of formed surface finishes shall be as follows:

1. Plywood Finish - All exposed concrete surfaces.

B. Vehicle Slabs and Sidewalks

1. General: Concrete slabs shall receive a broom finish. Do not place dry cement directly upon the new concrete surface to absorb excess moisture.

2. Finishing: Place, consolidate and immediately strike off concrete to bring the top surface of the slab to proper contour, grade, and elevation. Immediately darby or bull float the surface with wooden tools so as to correct any unevenness. Complete striking-off and darbying before bleed water appears on the surface of the freshly-placed concrete. Permit the concrete to attain a set sufficient for floating and sufficient to support the weight of the finisher and equipment. If the bleed water has not disappeared by the time floating of the surface is to start, drag the excess water off using a rubber hose. Do not use dry cement to absorb bleed water.

3. Floated Finish: At the proper time, float the surface by hand with a wood or magnesium float, or power-driven float. Floating of any one area shall be the minimum necessary to produce an even finish, level within 1/4 inch in 10 feet.

4. Broomed Finish: Provide a floated finish as specified herein, and then broom with a flexible bristle broom. At time of brooming the troweled surface shall have hardened sufficiently to retain the scoring or ridges. Broom in a direction transverse to that of traffic or at right angles to the slope of the slab.

3.07 CONSTRUCTION JOINTS

A. Horizontal pour joints shall be located as indicated on the plans and shall be deeply roughened. When the joint is at the seat line for subsequently place pre-cast slabs, a strip of proper width shall be struck straight, true, and level and shall be given a smooth trowel finish. The remainder of the joint shall be roughened or cross-grooved to provide good bond with the subsequent placed concrete.

B. Vertical pour joints across the slab and/or beam shall be provided to divide the work into pours at construction joints as indicated on the plans, but in no case greater than 100 ft. apart. Vertical joints shall be located near the middle of the span of slabs and beams. The vertical joints shall have recessed-panel type shear key 12" square by 3" deep in beams and 3" x 1 ½" deep continuous in slabs. All vertical construction joints shall be coated with epoxy bonding compound prior to pouring new concrete.

3.08 CLEANUP: The Contractor shall clean up all concrete and cement materials, equipment and debris upon completion of any portion of the concrete work and upon completion of the entire concrete and related work.

3.09 MEASUREMENTS AND PAYMENT: Cast-in-place concrete will not be measured nor paid for directly, but shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made therefor.

END OF SECTION

DIVISION 4 - MASONRY

SECTION 04220 - CONCRETE MASONRY UNIT

SECTION 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section covers the requirements for furnishing and installing complete-in-place all concrete masonry unit and its appurtenances as indicated on the plans and specifications.

1.02 REFERENCES: The latest publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American Concrete Institute (ACI)

ACI 318 - Building Code Requirements for Reinforced Concrete

B. American Society for Testing and Materials (ASTM)

ASTM A 82 - Steel Wire, Plain, for Concrete Reinforcement

ASTM A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A 615 - Deformed and Plain Billet-Steel for Concrete Reinforcement

ASTM C 90 - Load-Bearing Concrete Masonry Unit

ASTM C 144 - Aggregate for Masonry Mortar

ASTM C 150 - Portland Cement

ASTM C 207 - Hydrated Lime for Masonry Purposes

ASTM C 404 - Aggregate for Masonry Grout

ASTM C 476 - Grout for Masonry

ASTM C 920 - Elastomeric Joint Sealants

ASTM C 1019 - Sampling and Testing Grout

ASTM D 448 - Sizes of Aggregates for Road and Bridge Construction

ASTM D 994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type)

ASTM D 1056 - Flexible Cellular Materials - Sponge or Expanded Rubber

ASTM D 2000 - Rubber Products in Automotive Applications

ASTM D 2287 - Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds

C. INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO)

ICBO UBC - Uniform Building Code

1.03 SUBMITTALS

A. Shop Drawings: Provide drawings showing all fabrication dimensions and locations for placing of the reinforcing steel and accessories.

B. Certifications: Submit certification from the masonry manufacturer that the masonry units comply with ICBO UBC Standard 21-4 and the curing requirements specified herein.

C. Sample Blocks: Submit stretcher units showing full range of color and texture and one of each special shape for approval to the Engineer upon request.

1.04 QUALITY ASSURANCE

A. Appearance: After work has started, do not change source of materials if appearance of finished work would be affected.

B. Testing: ACI 530.1, "Quality Assurance" except that the cost of the testing shall be paid by the Contractor.

1.05 STORAGE AND HANDLING

A. Masonry Units: Masonry units delivered to the jobsite shall conform to the moisture content requirements as specified under ICBO UBC Standard 21-4. Masonry units shall be stored off the ground and protected from inclement weather and physical damage. All units shall be handled with reasonable care to prevent marring or damaging of faces, edges and corners of units. In no case shall dumping of units from hand trucks or wheelbarrows be permitted.

B. 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.

C. Mortar and Grout Materials: Portland cement, masonry cement, mortar 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.

1.06 BRACING AND SCAFFOLDING

Provide all bracing and scaffolding necessary for masonry work. Design bracing to resist wind pressure as required by local code.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Hollow Concrete Masonry Units shall be load-bearing units and shall conform to the requirements of ICBO UBC Standard 21-4, Grade N-II. Units shall be 2-core type, 8 inch nominal height, 16-inch nominal length and widths as indicated on the plans. Exterior CMU walls shall be standard block. Interior walls shall be standard block. Units for jamb, corner sill, lintel and 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 the ASTM C 150, Type I or Type II.

C. Mortar Cement (Type M) shall conform to the requirements of ICBO UBC Standard 21-14, "Mortar Cement." Conformance to this standard shall be noted on the material package. ("Supermortar" by Hawaiian Cement, or approved equal).

D. Hydrated Lime shall conform to the ASTM C 207, Type S.

E. Aggregate for use in mortar shall conform to ASTM C 144.

F. Aggregate for use in grout shall conform to ASTM C 404, with grading in accordance with ASTM D 448, No. 10.

G. Water used in mixing mortar or grout shall be fresh, clean, and free from injurious amounts of oils, acids, alkalis, salts, organic materials or other substances that may be deleterious to either the mortar or reinforcement. Non-potable water shall not be used.

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 approval equal), or as otherwise indicated on the plans. Hot-dip galvanize after fabrication, ASTM A 153, B-2.

I. Reinforcing Steel shall be epoxy coated deformed bars conforming to ASTM A 615, grade as shown on plans. Epoxy coated steel bars shall conform to ASTM A775.

J. Rebar Wire Positioners shall be galvanized, No. 9 gauge wire, manufactured positioners per ASTM A 82 or other suitable devices. Hot-dip galvanize after fabrication, ASTM A 153, B-2.

K. Additives/Admixtures for mortar shall be "Easy Spread" by American Colloid Co., "MRF" by Gibco, Inc. or approved equal.

L. Prohibition of Gypsum: Gypsum shall not be used in any of the materials specified in this Section.

M. Epoxy Grout and Epoxy Bonding Compound shall be two component resins, polysulfide free, high modulus, high strength epoxy adhesive. Mix with quartz granules when grouting anchor bolts. Epoxy shall be "Sikudur Hi-Mod" as manufactured by Sika Chemical Co. or other approved equal.

2.02 PRECAST CONCRETE ITEMS

A. PCI MNL-116. Provide lifting devices for items weighing over 80 pounds.

B. Design: ACI 318 for flexural and shear strength. Concrete shall have a minimum 28-day compressive strength of 3,000 pounds per square inch using ½ inch to No. 4 nominal-size coarse aggregate. Reinforcement ASTM A 615, Grade 60. Limit lintel deflection due to dead plus live load to L/600 or 0.3 inches. Provide top and bottom bars for lintels over 36 inches in length. Provide 1-1/2 inch minimum cover, top and bottom.

C. Exposed Surfaces: Provide standard grade surface finish.

D. Sills: Cast sills with washes. Cast sills for windows and mullions in sections with head joints at mullions and 1/4 inch allowance for mortar joints. Provide rounded nosings on treads of exterior door sills. Roughen ends of sills, except for 3/4 inch wide margin at exposed surfaces, for bond. Reinforce sills with not less than two No. 4 bars.

E. Lintels: Maintain minimum clearance of 3/4 inch between reinforcement and

interior faces of units. Reinforce for full length and sufficient length beyond end of item to allow splicing or tying to building reinforcement. Provide splices per ACI SP 66.

F. Splash Blocks: Provide splash blocks approximately 16 inches long, 12 inches wide, and 4 inches deep, with 4 inch depression formed in top surface to drain away from building, reinforced as standard with manufacturer.

2.03 MOVEMENT JOINTS

A. Contraction Joint Material

1. Elastomeric Joint Sealant: ASTM C 920.

PART 3 - EXECUTION

3.01 MORTAR AND GROUT

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 and loose condition. Mixing shall be by a mechanical batch mixer for at least 3 minutes for mortar and 5 minutes for grout, but for not more than 10 minutes. Hand mixing shall be permitted only for small batches of 3 cubic feet or less.

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

1. Type M - Cement-lime Mortar:
1 part portland cement
1/4 part hydrated lime
3 to 3-3/4 parts mortar aggregate

2. Type M - Mortar Cement Mortar:
1 part mortar cement
2-1/4 to 3 parts mortar aggregate

Sufficient water shall be used to provide a workable consistency. Mortar shall be used and placed in final position within 1-1/2 hours after mixing.

3. Type M Mortar:
2 sacks portland cement
½ to 1 - 7 lb. bag Easy Spread
6 cubic feet mortar aggregate

4. Type M Mortar:
1 sack portland cement
3 ounces of MRF
2-1/4 to 2-3/4 cubic feet mortar aggregate

The above mixes 3 and 4 shall be prepared strictly in accordance with the manufacturer's instructions. Placement of the mortar shall be completed within 2-1/2 hours after mixing. No materials which start to set shape shall be retempered.

C. Grout (coarse) mixed on-site shall conform to ASTM C 476 and shall be freshly prepared and uniformly mixed in the following proportion:

1 part portland cement
0 to 1/10 part hydrated lime
Fine Aggregate: 2-1/4 to 3 times the sum of the volumes of the cementitious materials.
Course Aggregate: 1 to 2 times the sum of the volumes of the cementitious materials.

Grout designed by Ready-mix suppliers may be used upon approval of the Engineer.

Sufficient water shall be used to produce a consistency just fluid enough for pouring or pumping 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 2,500 psi 28-day compressive strength per ASTM C 1019, unless noted otherwise on drawings.

3.02 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 shall be accurately placed and secured against displacement by rebar wire positioners at top and bottom and at intervals not to exceed 200 diameters of the reinforcement (8 feet for #4 bars; 10 feet for #5 bars).

Dowels and splices shall be lapped as indicated but not less than 30 diameters or 15 inches, whichever is longer. At jambs at doors, windows, and other openings, and corners and ends of walls, including those abutting concrete, one #5 bar shall be installed in the end cell unless heavier reinforcement is otherwise called for on

the plans and that cell shall be filled with grout. Bars adjacent to all openings and at corners and ends of walls shall extend the full height or walls.

C. At intersections, corners and splices, horizontal reinforcing shall be place, bent and lapped as shown on the plans. End laps shall be at least 30 diameters.

3.03 ANCHORS

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

3.04 LAYING

A. General: All masonry units shall be clean and dry and 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 as 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 plans, this shall be on the inside face. Where one face of a wall is to be plastered or covered, the exposed face shall be the true flat plane. 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 be, as far as practicable, be placed as the work progresses. All walls and partitions shall be carried to underside of beams, slabs, or joists, as the case may be, and shall be connected at the top as shown on plans.

B. Allowable Tolerances

1. Variation from the Plumb

a. In the lines and surfaces of columns, walls and arises:

In 10 ft.	1/4 inch
In any story or 20 ft. max	3/8 inch
In 40 ft. or more	½ inch

b. For external corners, control joints and other conspicuous lines:

In any story or 20 ft.	1/4 inch
In 40 ft. or more	½ inch

2. Variation from the level or grades indicated on the plans:

For exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:

In any bay or 20 ft. max	1/4 inch
In 40 ft. or more	½ inch

3. Variation of the linear building lines from established position in plan and related portion of columns, walls partitions:

In any bay or 20 ft. max	½ inch
In 40 ft. or more	3/4 inch

4. Variation in cross-section dimensions of columns and thickness of walls:

Minus 1/4 inch; plus ½ inch

5. For window and door openings:

a. Maximum variations as specified in Paragraphs B.1 and B.2 for plumb and level of masonry work.

b. Maximum variation of 3/8 inch in each dimension from that specified or dimensioned.

c. Tolerance requirements for both dimensions and plump-and-level shall be met.

6. Checking and Setting: 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. An instrument at least 4 feet long shall be used for leveling or runs. A shorter level may be used for cross-leveling of units.

C. Masonry units shall not be wet before being used, and units which have gotten

wet shall be throughly dried before being used. 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 inch in thickness. Webs adjoining cells containing reinforcement shall also be bedded in mortar to prevent escape of grout. Vertical head joints shall be mortared 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 reset in fresh mortar.

F. Mortar joints shall be straight, clean and in a thickness of 3/8 inch + 1/8 inch. All exposed horizontal and vertical joints shall be tooled with a ½ inch to 5/8 inch round bar at least 14 inches 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 than gouging it out. Use a 3/8 inch 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 they are not exposed, 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 shall be full-bedded in mortar to prevent the leakage of grout.

H. All cells containing reinforcement shall be filled solidly with grout in lifts not exceeding 8 feet 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 inches below the top of the uppermost unit.

I. Care shall be taken to prevent mortar splotches. 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 PROTECTION AND CLEANING

A. While masonry walls are being built, they shall be protected when not being worked on to prevent rain from saturating the wall. Covering of suitable materials

such as canvas or plastic sheeting shall be placed atop the wall and shall extend at least two feet on either side of the wall. Covering shall be weighted down to prevent it from being lifted by the wind.

B. At the completion of the work, all holes or 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 throughly cleaned of mortar drippings, sand and splotches 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.

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

3.06 MEASUREMENT AND PAYMENT: Concrete Masonry Unit shall be considered incidental to the various items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

SECTION 05500 - GALVANIZED STEEL METAL FABRICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

This section shall include the furnishing and installing complete-in-place all galvanized steel metal fabrications and its appurtenances as indicated on the plans.

Provide all miscellaneous metal fabrication work, including but not limited to, the following:

1. Steel angles and plate.

2. Include all anchors, angles, bolts, expansion shields for items in this section only, and other accessories shown in details and/or required for the complete installation of all work.

1.02 QUALITY ASSURANCE

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordination installation.

1.03 SUBMITTALS

Shop Drawings: Submit complete shop drawings of all miscellaneous metal work to the Engineer for review before fabrication. Detail all members and connections not specifically shown but which are required to complete work.

PART 2 - MATERIALS

2.01 MATERIALS

A. Structural Steel, Shapes, Angles, and Plates:
Conforming to ASTM A 36 and galvanized. Hot-dip galvanize after fabrication.

B. Bolts, Nuts, and Washers: ASTM A 307, Grade A. Hot-dip galvanized all

hardware items in accordance with ASTM A 153.

C. Pipe: Standard weight, galvanized steel pipe conforming to ASTM A 53.

D. Expansion Shields: Fed. Spec. FF-S-325 and galvanized.

E. Nuts: ASTM A563, Grade A, hex style, hot-dip galvanized, or to match bolt.

F. Washers: ASTM F 844, hot-dip galvanized, or to match bolt.

G. Shop Paint:

1. Metal Prime Paint: Shop prime all welds after drounded smooth with rust inhibiting metal primer.

2. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in SECTION 09900 - PAINTING.

PART 3 - EXECUTION

3.01 FABRICATION

A. Workmanship:

1. Use materials of size and thickness shown, or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. From bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

3. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

4. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

B. Galvanizing: Provide a zinc coating for those items shown or specified to be galvanized, as follows:

1. ASTM A 153 for galvanizing iron and steel hardware.

2. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars, and strip 1/8" thick and heavier, and for galvanizing assembled steel products.

3. Provide minimum G90 coating designation.

C. Shop Painting:

1. Shop paint miscellaneous steel metal work and galvanized surfaces, unless otherwise specified.

2. Immediately after surface preparation, brush on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges, and exposed surfaces.

3.02 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

B. Cutting, Fitting and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.

3.03 ADJUST AND CLEAN

Touch-Up Painting: Immediately after erection, clean bolted connection and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush to provide a minimum dry film thickness of 2.0 mils.

3.04 MEASUREMENTS AND PAYMENT

The cost for galvanized steel metal fabrication shall be considered as being incidental to the total cost of construction of the product and will not be paid for as a separate item on the Proposal Schedule.

END OF SECTION

SECTION 07600 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section includes the furnishing and installing complete-in-place all flashing and sheet metal materials and its appurtenances as indicated on the plans and specifications.

1.02 DESCRIPTION OF WORK

A. Provide all labor, materials and equipment necessary to fabricate and install flashing, counterflashing, metal edging, gutters and downspouts, and other related work as shown on drawings and as specified herein.

1.03 SUBMITTALS

1. Manufacturer's Data: Submit manufacturer's product data on all manufactured items.

2. Shop Drawings: Submit shop drawings with reference made to detail numbers on the contract drawings to the Engineer for approval. Shop drawings shall show all fasteners and relationship to adjacent work. No fabrication will be permitted before approval is secured.

1.04 QUALITY ASSURANCE

A. All sheet metal fabrications shall conform to State and local codes, SMACNA (latest edition) and industry standards.

B. All roof penetrations shall be installed weathertight in such a manner to maintain integrity of the roofing.

1.05 STORAGE AND HANDLING

All materials shall be stored in such a manner as to afford adequate protection. Damaged materials shall not be used and shall be removed from the site.

1.06 GUARANTEE

The Contractor shall furnish to the Engineer a written guarantee on the sheet metal for a 2-year period after the Project Acceptance Date. The guarantee shall provide for the repair of all leaks as well as repair and replacement of damage to the building and/or its finishes at no cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Exposed Flashing, Counterflashing, Gutters, Downspouts, and Metal Edging: 24 gauge galvanized sheet metal, ASTM A 653/A 653/M, G90 hot-dip galvanized.

B. Solder: 50 percent virgin lead and 50 percent pure block tin, conforming to ASTM B 32.

C. Flux: Non-corrosive resin type.

D. Nails and Fasteners: Use the same metal or a metal compatible with the item. Use stainless steel fasteners to fasten dissimilar metals.

E. Asphaltic Roof Cement: ASTM D 4586, Type I for horizontal surface and Type II for vertical surfaces.

F. Stainless Steel Vent Screen: 8 mesh, minimum 0.017 diameter wire unless indicated otherwise.

G. Stainless Steel Clamp: As indicated for screwdriver adjustment.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

A. Surface to which sheet metal is to be applied shall be even, smooth, sound, thoroughly clean and dry, and free from defects that might affect the application. Report any unsatisfactory surfaces to the Engineer. In the absence of such a report, the Contractor shall be held responsible for the finished product.

B. All accessories or other items essential for the completeness of the sheet metal installation, though not specifically indicated on the drawings or specified, shall be provided. All such items unless otherwise indicated on the drawings or specified, shall be of the same kind of materials as the item to be applied. Nails, screws, rivets, and bolts shall be of the type best suited for the purpose intended and shall be of a composition that is compatible with the metal to which it will contact.

C. Except as otherwise indicated on the drawings or specified, the workmanship of sheet metal work, method of forming joints, anchoring, cleating, provisions for expansion, etc., shall conform to the standards details and recommendations of the Sheet Metal and Air Conditioning Contractors National Association's

"Architectural Sheet Metal Manual", and shall be subject to the approval of the Engineer.

D. Seams: Straight and uniform in width and height with no sealants showing on the face.

1. Flat-lock Seams: Finish not less than 3/4-inch wide.

2. Lap Seams: Finish soldered seams not less than one-inch wide. Overlap seams not soldered, not less than 3-inches.

3. Loose-lock Expansion Seams: Not less than 3-inches wide, and shall provide minimum one-inch movement within the joint. Joint shall be completely filled with the specified sealant, applied at not less than 1/8-inch thick bed.

4. Flat Seams: Make seams in the direction of the flow.

E. All sheet metal work shall be watertight and wind-tight in compliance with the purpose intended for the items indicated on the drawings or specified herein.

F. Cleating: Cleats for sheet metal work shall be provided where required, spaced as indicated. Cleats shall be not less than 2-inches wide by 3-inches long of the same material and weight as the metal being installed.

G. Reglets: Type and size as indicated.

H. Protection from Contact of Dissimilar Materials: Surfaces in contact with dissimilar metal shall be painted with heavy-bodied bituminous paint, or shall be separated by means of moisture-proof building felts.

3.02 PROTECTION

Protect all sheet metal work until final acceptance of the building.

3.03 CLEANING

A. Clean all exposed sheet metal work at completion of installation. Grease and oil films, handling marks, contamination from steel wool, fittings and drilling debris shall be removed, and the work scrubbed clean. All exposed metal surfaces shall be free of dents, creases, waves, scratch marks, and solder or weld marks.

B. At completion of the work, clean up and remove all rubbish and debris from the premises which resulted from this work.

3.04 MEASUREMENT AND PAYMENT

Flashing and Sheet Metal shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

SECTION 07920 - SEALANTS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section covers the requirements for furnishing and installing complete-in-place all sealants and its appurtenances to complete the work as indicated on the plans and specifications.

Except as otherwise indicated, sealants shall be provided to establish and maintain airtight, sound tight, and weatherproof continuous seals on a permanent basis within recognized limitations of wear and aging for each application and type of sealant material. Provide at all exterior joint locations where weather penetration is possible and where a weather-tight installation is required.

1.02 REFERENCES: The latest publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. ASTM International (ASTM)

ASTM C 919 - Use of Sealants in Acoustical Applications

ASTM C 920 - Elastomeric Joint Sealants

ASTM C 1193 - Guide for Use of Joint Sealants

1.03 SUBMITTALS

A. Certificates of Compliance: Submit certificates from the manufacturers attesting that materials meet the specified requirements.

B. Manufacturers' Descriptive Data: Submit complete descriptive data for each type of material. Clearly mark data to indicate the type the Contractor intends to provide. Data shall state conformance to specified requirements. Data for sealant and calking shall include application instructions, shelf life, mixing instructions for multi-component sealants, and recommended cleaning solvents.

C. Colors: Submit one sample of each color for sealant and calking type to verify that products match the adjacent finish color. Where colors are not indicated, submit not less than 3 different samples of manufacturer's standard colors for selection.

1.04 DELIVERY AND STORAGE: Deliver materials to the job site in the manufacturers' external shipping containers, unopened, with brand names, date of manufacture, color,

and material designation clearly marked thereon. Containers of elastomeric sealant shall be labeled as to type, class, grade, and use. Carefully handle and store all materials to prevent inclusion of foreign materials.

1.05 WARRANTY: The Contractor shall execute to the Owner a 2-year written warranty after the Project Acceptance Date that the installation will be watertight and that any leaks which develop during that period which are not due to improper use or willful damage will be repaired at no cost to the Owner. The guaranty shall provide the following at no cost to the Owner:

A. Repair of sealants as necessary to seal leaks which are attributable to faulty materials and/or workmanship;

B. Repair or replacement of damage to the building and/or its finishes, equipment and/or furniture when occasioned by such leaks.

PART 2 - PRODUCTS

2.01 MATERIALS: Products shall conform to the reference documents listed for each use. Color of sealant and calking shall match adjacent surface color unless specified otherwise. For ASTM C 920 sealants, use a sealant that has been tested on the type(s) of substrate to which it will be applied.

A. Interior Sealants: ASTM C 920, Type S or M, Grade NS, Class 12.5, Use NT.

B. Exterior Sealants: For joints in vertical surfaces, provide ASTM C 920, Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide ASTM C 920, Type S or M, Grade P, Class 25, Use T.

C. Floor Joint Sealant: ASTM C 920, Type S or M, Grade P, Class 25, Use T. Color of sealant shall be as selected.

D. Acoustical Sealant: ASTM C 920, Type S or M, Grade NS, Class 12.5, Use NT.

E. Primer for Sealants: Provide non-staining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.

F. Bond Breakers: Provide type and consistency recommended by the sealant manufacturer for the particular application.

G. Backstops: Provide glass fiber roving or neoprene, butyl, polyurethane, or polyethylene foams free from oil or other staining elements as recommended by the sealant manufacturer. Backstop material shall be compatible with the sealant. Do not use oakum and other types of absorptive materials as backstops.

H. Cleaning Solvents: Provide types recommended by the sealant manufacturer.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION: Surfaces shall be clean, dry to the touch, and free from moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Where adequate grooves have not been provided, clean out grooves to a depth of 1/2 inch without damage to the adjoining work. No grinding shall be required on metal surfaces.

3.02 SEALANT PREPARATION: Do not modify the sealant by addition of liquids, solvents, or powders. Mix multi-component elastomeric sealants in accordance with manufacturer's printed instructions.

3.03 APPLICATION

A. Elastomeric Sealant Installation Standard: Comply with the requirements of ASTM C 1193 for the use of joint sealants as applicable to the materials, applications, and conditions required.

B. Backstops: Install backstops dry and free from tears or holes. Tightly pack the back or bottom of joint cavities with backstop materials to provide a joint of the depth as recommended by the sealant manufacturer.

C. Primer: Immediately prior to application of the sealant, clean out all loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete masonry units, wood, and other porous surfaces in accordance with compound manufacturer's instructions. Do not apply primer to exposed finish surfaces.

D. Bond Breaker: Provide bond breakers to the back or bottom of joint cavities, as recommended by the sealant manufacturer for each type of joint and sealant used to prevent sealant from adhering to these surfaces. Carefully apply the bond breaker to avoid contamination of adjoining surfaces or breaking bond with surfaces other than those covered by the bond breaker.

E. Sealants: Provide sealant compatible with the material to which it is applied. Do not use a compound that has exceeded its shelf life or has become too jellied to be discharged in a continuous flow from the gun. Apply the compound in accordance with the manufacturer's instructions with a gun having a nozzle that fits the joint width. Force sealant into joints to fill the joints solidly without pockets. Sealants shall be uniformly smooth and free from wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints, apply sealant and tool smooth as specified.

F. Sealants in Acoustical Application: Comply with the requirements of ASTM C 919 to reduce the sound transmission characteristics of interior walls, ceilings, and floors by proper application of sealants to joints, voids, and penetrations.

3.04 PROTECTION AND CLEANING

A. Protection: Protect areas adjacent to joints from compound smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

B. Cleaning: Immediately scrape off fresh compound that has been smeared on masonry and rub clean with a solvent as recommended by the compound manufacturer. Upon completion of compound application, remove all remaining smears and stains resulting there from and leave the work in a clean and neat condition.

3.05 MEASUREMENT AND PAYMENT: Sealants shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section covers the requirements for furnishing and installing complete-in-place all steel doors and frames and its appurtenances to complete the work as indicated on the plans and specifications.

1.02 REFERENCES: The latest publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American National Standards Institute, Inc. (ANSI)

ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing

ANSI A250.6 - Hardware on Standard Steel Doors (Reinforcement - Application)

ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames

B. ASTM International (ASTM)

ASTM A 653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

ASTM A 924 - General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

ASTM A 780 - Repair of Damaged Hot-Dip Galvanized Coating, Standard Practice for

ASTM C 578 - Preformed, Cellular Polystyrene Thermal Insulation

ASTM C 591 - Unfaced Preformed Rigid Cellular Polyurethane Thermal Insulation

ASTM C 612 - Mineral Fiber Block and Board Thermal Insulation

ASTM D 2863 - Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)

C. National Fire Protection Association (NFPA)

NFPA 80 - Fire Doors and Windows

NFPA 105 - The Installation of Smoke-Control Door Assemblies

NFPA 252 - Fire Tests of Door Assemblies

D. STEEL DOOR INSTITUTE (SDI)

SDI 105 - Recommended Erection Instructions for Steel Frames

SDI 111-C - Recommended Louver Details for Standard Steel Doors

SDI 113 - Apparent Thermal Performance for Steel Door and Frame Assemblies

E. Underwriters Laboratories (UL)

UL 10B - Fire Tests of Door Assemblies

UL BMD - Building Materials Directory

1.03 SUBMITTALS

A. Shop Drawings: Show elevations, construction details, metal gauges, hardware provisions, method of glazing, and installation details. Include a schedule showing door and frame locations.

B. Product Data: Manufacturer's descriptive literature for doors, frames and accessories. Include data and details on door construction, panel (internal) reinforcement, insulation, and door edge construction.

1.04 DELIVERY AND STORAGE

A. Deliver doors, frames, and accessories undamaged and with protective wrappings or packaging. Strap welded frames in pairs, with one frame inverted, or provide temporary steel spreaders securely fastened to the bottom of each frame. Store doors and frames on platforms under cover in clean, dry, ventilated, and accessible locations, with 1/4 inch air space between doors. Remove damp or wet packaging immediately and wipe all affected surfaces dry. Replace damaged materials with new.

PART 2 - PRODUCTS

2.01 STEEL DOORS

A. ANSI A250.8, except as specified otherwise. Doors shall be either hollow steel construction or composite construction. Prepare doors to receive hardware specified in Section 08700 - FINISH HARDWARE. Undercut doors where indicated. Exterior doors shall have top edge closed flush and sealed to prevent water intrusion. Doors shall be 1-3/4 inches thick, unless otherwise indicated.

B. Heavy Duty Doors: ANSI A250.8, Level 3, physical performance Level A, Model 1 or 2, with core construction Type a, d, or f for interior doors, and Type b, c, e, or f for exterior doors, of sizes and designs indicated. Where Type f cores are specified or scheduled, the space between the stiffeners shall be filled with mineral-fiber insulation as specified in paragraph "INSULATION CORES".

2.02 LOUVERS, ASTRAGALS, AND MOLDINGS

A. Louvers: SDI 111-C. Louvers for interior steel doors shall be inverted "Y" blade type. Form louvers of I6-gage steel for exterior doors and panels. Louvers for exterior doors shall have steel-framed insect and bird screens rigidly secured to louvers to permit ready removal. Provide as stainless steel wire cloth, 18 by 18 or 18 by 16 mesh, for insect screens, and stainless steel, 1/2 by 1/2 inch mesh hardware cloth, for bird screens. Louvers, before screening, shall have a minimum of 35 percent net-free opening.

B. Astragals: For pairs of exterior steel doors, provide overlapping steel astragals with the doors.

C. Moldings: Provide moldings around glass and louvers. Provide non-removable moldings on the outside of exterior doors.

2.03 INSULATION CORES

A. Insulated cores shall be type specified, shall provide maximum assembly U-value of 0.48 in accordance with SDI 113 and shall conform to:

1. Rigid Polyurethane Foam: ASTM C 591, Type 1 or 2, foamed-in-place or in board form, with an oxygen index of not less than 22 percent when tested in accordance with ASTM D 2863; or

2. Rigid Polystyrene Foam Board: ASTM C 578, Type I or II; or

3. Mineral Board: ASTM C 612, Type I.

2.04 STEEL FRAMES

A. ANSI A250.8, except as otherwise specified. Form frames to sizes and shapes indicated, with welded corners frames.

B. Welded Frames: Continuously weld frame faces at corner joints. Mechanically interlock or continuously weld stops and rabbets. Grind welds smooth.

C. Anchors: Provide anchors to secure the frame to adjoining construction. Provide steel anchors, zinc-coated or painted with rust-inhibitive paint, not lighter than 18 gage.

D. Floor Anchors: Provide floor anchors drilled for 3/8 inch anchor bolts at bottom of each jamb member.

2.05 FIRE DOORS AND FRAMES

A. NFPA 80 and this specification. The requirements of NFPA 80 shall take precedence over details indicated or specified.

B. Labels: Fire doors and frames shall bear the label of the Underwriters' Laboratories, Inc. (UL), Factory Mutual Engineering Corporation (FM), or Warnock Hersey International (WHI) attesting to the rating required. Testing shall be in accordance with NFPA 252 or UL 10B. Labels shall be metal with raised letters, and shall bear the name or file number of the door and frame manufacturer. Labels shall be permanently affixed at the factory to frames and to the hinge edge of the door. Door and frame labels shall not be painted.

2.06 HARDWARE PREPARATION

A. Reinforce, drill, and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of ANSI A 250.8 and ANSI A 250.6. Drill and tap for surface applied hardware at the project site. Build additional reinforcing for surface-applied hardware into the door at the factory. Locate hardware in accordance with the requirements of ANSI A250.8, as applicable. Punch door frames to receive a minimum of two rubber or vinyl door silencers on lock side of single doors and one silencer for each leaf in heads of double doors. Set lock strikes out to provide clearance for silencers.

2.07 FINISHES

A. Hot-Dip Zinc-Coated and Factory-Primed Finish: Fabricate doors and frames from hot dipped zinc coated steel, alloy type, that complies with ASTM A 924/A 924M and ASTM A 653/A 653M. The coating weight shall meet or exceed the minimum requirements for coating having 122 grams per square meter, total both

sides, i.e., ZF120. Repair damaged zinc-coated surfaces by the application of zinc dust paint conforming to ASTM A 780, Annex A2. Thoroughly clean and chemically treat to ensure maximum paint adhesion. Factory prime as specified in ANSI A250.8.

2.08 FABRICATION AND WORKMANSHIP

A. Finished doors and frames shall be strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp, and buckle. Molded members shall be clean cut, straight, and true, with joints coped or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door frame sections for use with the wall construction indicated. Corner joints shall be well formed and in true alignment. Conceal fastenings where practicable.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Frames: Set frames in accordance with SDI 105. Plumb, align, and brace securely until permanent anchors are set. Anchor bottoms of frames with expansion bolts or powder-actuated fasteners.

B. Doors: Hang doors in accordance with clearances specified in ANSI A250.8. After erection and glazing, clean and dust hardware.

C. Fire Doors and Frames: Install fire doors and frames, including hardware in accordance with NFPA 80.

3.02 PROTECTION

A. Protect doors and frames from damage. Repair damaged doors and frames prior to completion and acceptance of the project or replace with new, as directed. Wire brush rusted frames until all rust is removed, clean thoroughly, and apply an all-over coat of rust-inhibitive paint of the same type used for shop coat.

3.03 CLEANING

A. Upon completion, clean exposed surfaces of doors and frames thoroughly. Remove mastic smears and other unsightly marks. Touch-up finishes to restore damaged or soiled areas.

3.04 MEASURMENT AND PAYMENT: Steel Doors and Frames shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

SECTION 08331 – OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section covers the requirements for furnishing and installing complete-in-place all overhead coiling doors and frames and its appurtenances to complete the work as indicated on the plans and specifications.

1.02 REFERENCES: The latest publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American Society of Civil Engineers (ASCE)

ASCE 7 – (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

ASHRAE FUN IP – (2013; Addenda and Corrigendum 2013) Fundamentals Handbook, I-P Edition

C. ASME International (ASME)

ASME B29.400 – (2001; R 2013) Combination, "H" Type Mill Chains and Sprockets

D. ASTM International (ASTM)

ASTM A153 – (2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A27 – (2013) Standard Specification for Steel Castings, Carbon, for General Application

ASTM A307 – (2014) Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength

ASTM A36 – (2014) Standard Specification for Carbon Structural Steel

ASTM A48 – (2003; R 2012) Standard Specification for Gray Iron Castings

ASTM A53 – (2012) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A653 – (2015) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A780 – (2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

ASTM A924 – (2014) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

ASTM D2000 – (2012) Standard Classification System for Rubber Products in Automotive Applications

ASTM E330 – (2002; R 2010) Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

ASTM F568M – (2007) Standard Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners

1.03 SUBMITTALS

A. Shop Drawings: Submit drawings for doors showing types, sizes, locations, metal gauges, hardware provisions, installation details, and other details for construction.

B. Manufacturer's Installation Procedures: Submit manufacturer's currently recommended installation procedures for doors along with the shop drawings.

C. Manufacturer's Certificates of Conformance: Attest that the doors and accessories conform to all requirements of this specification and of the reference documents.

1.04 DELIVERY AND STORAGE

A. Protect doors and accessories from damage during delivery, storage, and handling. Clearly mark manufacturer's brand name. Store doors in dry locations with adequate ventilation, free from dust and water, and in such a manner as to permit access for inspection and handling. Handle doors carefully to prevent damage. Remove damaged items that cannot be restored to like-new condition and provide new items.

PART 2 - PRODUCTS

2.01 COILING STEEL DOORS

A. Coiling Steel Doors: Coiling steel doors shall be spring counterbalanced, overhead coiling type with interlocking slats, and shall be designed for use on exterior openings as indicated. Doors shall be operated by hand chain with gear or sprocket reduction. Doors shall be complete with guides, hood, anchoring, door hardware, fastenings, operating mechanisms, and accessories. Doors shall be surface-mounted type with guides at jambs set back a sufficient distance to provide a clear opening when door is in open position. Doors, hardware, and anchors shall be designed to withstand a wind pressure of 40 pounds per square foot of door area without damage and with a maximum deflection of 1/120 of the opening width. Exterior doors shall be mounted as indicated. Where service doors are indicated to be chain-operated, the door design and construction shall allow for future installation of electric-power operation. Use grease-sealed or self-lubricating bearings for rotating members.

B. Design Requirements:

1. Overhead Coiling Door Detail Shop Drawings: Provide installation drawings for overhead coiling door assemblies which show: elevations of each door type, shape and thickness of materials, finishes, details of joints and connections, details of guides and fittings, rough opening dimensions, location and description of hardware, anchorage locations, and counterbalancing mechanism and door operator details, bottom bars, guides, mounting brackets, overhead drum, and installation drawings.

C. Performance Requirements:

1. Wind Loading: Design and fabricate door assembly to withstand the wind loading pressure of at least 40 pounds per square foot with a maximum deflection of 1/120 of the opening width. Provide test data showing compliance with ASTM E330. Sound engineering principles may be used to interpolate or extrapolate test results to door sizes not specifically tested. Ensure complete assembly meets or exceeds the requirements of ASCE 7.

D. Operational Cycle Life: Design all portions of the door, hardware and operating mechanism that are subject to movement, wear, or stress fatigue to operate through a minimum number of 15,000 cycles. One complete cycle of door operation is defined as when the door is in the closed position, moves to the fully open position, and returns to the closed position.

2.02 COMPONENTS

A. Overhead Coiling Doors:

1. Curtain Materials and Construction: Provide curtain slats fabricated from Grade A steel sheets conforming to ASTM A653, with the additional requirement of a minimum yield point of 33,000 psi. Provide sheets, galvanized steel, G90 coating interior and exterior in accordance with ASTM A653 and ASTM A924. Form curtains from manufacturer's standard shapes of interlocking slats.

2. Fabricate doors from interlocking cold-rolled minimum 2-5/8" flat slats, designed to withstand the specified wind loading. Ensure the provided slats are continuous without splices for the width of the door.

3. Non-Insulated Curtains: Form Curtains from manufacturer's standard shapes of interlocking slats.

4. Curtain Bottom Bar: Install curtain bottom bars as pairs of angles from the manufacturer's standard steel, not less than 2.0 by 2.0 – inches by 0.188 – inch. Ensure steel extrusions conform to ASTM A36. Galvanize angles and fasteners in accordance with ASTM A653 and ASTM A924. Coat welds and abrasions with paint conform to ASTM A780.

5. Locks: Provide end and/or wind locks of Grade B cast steel conforming to ASTM A27, galvanized in accordance with ASTM A653, ASTM A153 and ASTM A924. Secure locks at every other curtain slat.

6. Weather Stripping: Ensure weather-stripping at the door-head and jamb is 1/8 – inch thick sheet of natural or neoprene rubber with air baffles. Secure weather stripping to the insides of hoods with galvanized-steel fasteners through continuous galvanized-steel pressure bars at least 5/8 – inch wide and 1/8 – inch thick.

   Ensure threshold weather-stripping is 1/8 – inch thick sheet natural or neoprene rubber secured to the bottom bars.

   Provide weather-stripping of natural or neoprene rubber conforming to ASTM D2000.

7. Locking Devices: Ensure slide bolt engages through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

Provide a locking device assembly which includes cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

Provide chain lock keeper suitable for a standard padlock.

8. Overhead Drum: Fabricate drums from nominal 0.028 – inch thick, hot-dip galvanized steel sheet with G90, zinc coating, complying with ASTM A653.

9. Slats: No. 4F Architectural Finish, 18 gauge, Grade 40 steel, ASTM A653 galvanized steel zinc coating, G90 coating for exterior and interior. Slats shall be interlocking type.

2.03 HARDWARE: Ensure all hardware conforms to ASTM A153, ASTM A307, ASTM F568M, and ASTM A27.

A. Guides:

1. Fabricate curtain jamb guides from the manufacturer's standard angles with a minimum thickness of 3/16" or channels for same material and finish as curtain slats unless otherwise indicated. Provide guides with sufficient depth and strength to retain curtain, and to withstand loading. Ensure curtain operates smoothly. Slot bolt holes for track adjustment.

2. Fabricate with structural steel angles. Provide windlock bars of same material when windlocks are required to meet specified wind load. Flare the top of inner and outer guide angles outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar.

B. Equipment Supports: Fabricate door-operating equipment supports from the manufacturer's standard steel shapes and plates not less than ¼" thick conforming to ASTM A36, galvanized in accordance with ASTM A653 and ASTM A924. Size the shapes and plates in accordance with the industry standards for the size, weight, and type of door installation.

C. Hood:

1. Provide a hood with a minimum 24-gauge galvanized sheet metal, flanged at top for attachment to header and flanged at bottom to provide longitudinal stiffness. The hood encloses the curtain coil and counterbalance mechanism.

2. Provide a 24-gauge galvanized steel hood with reinforced top and bottom edges. Provide minimum ¼ - inch steel intermediate support brackets as required to prevent excessive sag.

D. Counterbalancing Mechanism: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted, around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed or self-lubricating bearings for rotating members.

E. Brackets:

1. Provide the manufacturer's standard mounting brackets with one located at each end of the counterbalance barrel conforming to ASTM A48. Provide brackets of either cast iron or cold-rolled steel.

2. Fabricate brackets from minimum 3/16 – inch steel plate. Permanently lubricate ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.

F. Counterbalance Barrels:

1. Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, welded or seamless carbon-steel pipe, conforming to ASTM A53. Ensure the barrel is of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats. Limit barrel deflection to not more than 0.03 inch per foot of span under full load.

2. Curtain to be coiled on a pipe of sufficient size to carry door load with deflection not to exceed 0.033 inches per foot of door span and to be correctly balanced by helical springs, oil tempered torsion type. Use cast iron barrel plugs to anchor springs to tension shaft and pipe.

G. Barrel: Provide steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot of width.

H. Spring Balance: Provide an oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door. Ensure that effort to operate manually operated units does not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.

I. Torsion Rod for Counter Balance: Fabricate rod from the manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

2.04 MANUAL DOOR OPERATORS

A. Manual Chain-Hoist Door Operators:

1. Provide door operators which consist of an endless steel hand chain, chain-pocket wheel and guard, and a geared reduction unit of at least a 3 to 1 ratio with a maximum lifting force of 25 lbs. Required pull for operation cannot exceed 35 pounds and chain keeper secured to guide.

2. Provide chain hoists with a self-locking mechanism allowing the curtain to be stopped at any point in its upward or downward travel and to remain in that position until moved to the fully open or closed position. Provide hand chains of cadmium-plated alloy steel conforming to ASME B29.400. Ensure yield point of the chain is at least three times the required hand-chain pull.

3. Provide chain sprocket wheels of cast iron conforming to ASTM A48.

B. Surface Finishing: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Noticeable variations in the same metal component are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install overhead coiling door assembly, anchors and inserts for guides, brackets, hardware, and other accessories in accordance with approved detail drawings and manufacturer's written instructions. Upon completion of installation, ensure doors are free from all distortion.

Install overhead coiling doors, hoods, and operators at the mounting locations as indicated for each door in the contract documents and as required by the manufacturer.

B. Field Painted Finish: Ensure field pained steel doors and frames are in accordance with Section 090900 PAINTING and manufacturer's written instructions. Protect weather stripping from paint. Ensure finishes are free of scratches or other blemishes.

3.02 ADJUSTING AND CLEANING

A. Acceptance Provisions: After installation, adjust hardware and moving parts. Lubricate bearings and sliding parts as recommended by manufacturer to provide smooth operating functions for ease movement, free of warping, twisting, or distortion of the door assembly.

1. Adjust seals to provide weather-tight fit around entire perimeter.

2. Engage a factory-authorized service representative to perform start-up service and checks according to manufacturer's written instructions.

3. Test the door opening and closing operation. Adjust controls and safeties. Replace damaged and malfunctioning controls and equipment. Reset door closing mechanism after successful test.

4. Test and make final adjustment of new doors at no addioitional cost to the State.

B. Maintenance and Adjustment: Not more than 90 calendar days after completion and acceptance of the project, examine, lubricate, test, and re-adjust doors as required for proper operation.

C. Cleaning: Clean doors in accordance with manufacturer's approved instructions.

3.03 CLOSEOUT ACTIVITIES

A. Warranty:

1. Furnish a written guarantee that the helical spring and counterbalance mechanism are free from defects in material and workmanship for not less than five (5) years after completion and acceptance of the project.

2. Warrant that upon notification by the State, any defects in material, workmanship, and door operation are immediately correct within the same time period covered by the guarantee, at no cost to the State.

B. Operation and Maintenance: Submit 6 copies of the Operation and Maintenance Manuals 30 calendar days prior to testing the Overhead Coiling Door Assemblies. Update and resubmit data for final approval no later than 30 calendar days prior to contract completion.

Submit Operation and Maintenance Manuals for Overhead Coiling Door Assemblies, including the following items:

1. Materials.

2. Devices.

3. Manual Door Operators.

4. Hood.

5. Counterbalancing Mechanism.

6. Painting.

7. Procedures.

8. Manufacturer's Brochures.

9. Parts Lists.

Provide operation and maintenance manuals which are consistent with manufacturer's standard brochures, schematics, printed instructions, operating procedures, and safety precautions. Provide test data that is legible and of good quality.

3.04 MEASUREMENT AND PAYMENT: Overhead Coiling Doors shall be considered incidental to the various items in the Proposal Schedule and no payment will be made therefore.

END OF SECTION

SECTION 08700 - FINISH HARDWARE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section covers the requirements for furnishing and installing complete-in-place all finish hardware and its appurtenances to complete the work as indicated on the plans and specifications.

1.02 DESCRIPTION OF WORK

A. Furnish and deliver to the building site, all finishing hardware required for all doors, etc., complete as indicated on the drawings and as specified herein.

B. It is the intent of these specifications to cover in general the class and character of all finish hardware required.

C. The hardware list specified hereinafter has been made for the convenience of the Contractor and covers in general the necessary hardware for doors, etc., but all other doors, etc., shown on the plan and not covered by the general characterization shall be fitted with appropriate hardware of the same standards as the hardware described throughout these specifications. Contractor shall furnish hardware schedule as hereinafter specified.

1.03 SUBMITTALS

Submit in accordance with Section 01330 - SUBMITTALS.

1. Schedule: Submit six (6) copies of the schedule of hardware in compliance with specifications and drawings. Schedule format shall be of vertical type as listed in D.H.I. document "Sequence and Format for the Hardware Schedule". List each opening and hardware to be applied. State material, finish, and manufacturer's number for each item. Required types are listed.

2. Manufacturer's Data: Submit manufacturer's descriptive literature along with schedule for information only.

1.04 WARRANTY

All finish hardware shall be supplied with a three (3) year warranty from the manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship, commencing from the Project Acceptance Date. The surety shall not be liable beyond two (2) years from the Project Acceptance Date.

1.05 DELIVERY

A. Examine the drawings, specifications, and details in order to check all items so they will be suitable and of perfect fit, and delivered where and when required.

B. All hardware shall be delivered at the site, packed in manufacturers original package with all trimmings, screws, etc. Each item shall be clearly marked with proper door or item number which corresponds with the hardware schedule so that installers can clearly identify the proper location of each item.

C. Upon delivery of the finishing hardware to the job site by the hardware supplier, the General Contractor shall have a responsible person check in the material at the place for storage. The hardware shall be protected from damage at all times, both prior to and after installation.

1.06 REPRESENTATIVE

Provide services of a competent hardware specialist who is familiar with installation and operation of all finishing hardware items furnished.

PART 2 - PRODUCTS

2.01 GENERAL CHARACTER

A. Furnish Hardware items shall be finish as listed.

B. Hardware shall be of the manufacture, type, weight, function and quality as shown by factory numbers or an approved equal.

C. Hardware as indicated in the Hardware Schedule, shall comply with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) Sections 4.13.8, 4.13.9, 4.13.10, & 4.13.11).

D. Locksets:

1. All mortise locksets and latchsets shall be the product of one manufacturer. All mortise locksets and latchsets shall be of heavy duty construction with wrought cases, minimum case thickness of 0.093.

   Adjustable to 1/8 inch in 2 inches with 2-3/4 inch backset. Latchbolts shall have a minimum projection of 5/8 inch. Locksets utilizing deadbolts shall be supplied with a minimum one-inch throw deadbolt.

2. Lockset strikes shall be furnished in accordance with the American Standard Association, Inc., Specifications A115.1, A115.2, and A115.3. Wrought strike boxes shall be provided for all strikes used on wood

frames.

3. Cylindrical lever locksets shall be able to fit a standard 2-1/8 inch bore without the use of thru bolts. Levers shall be solid material with no plastic filler plates.

E. Finish: Finish of hardware shall be as listed in the Hardware Sets.

2.02 KEYING

A. Keys: Provide four (4) keys per lock.

2.03 FASTENINGS

A. Furnish necessary screws, bolts, and other fastenings for proper application of hardware. Fastenings shall be of suitable size and type of securing hardware for heavy use. Fastenings must harmonize with the hardware as to material and finish.

B. Furnish necessary expansion shields, toggle bolts, machine or wood screws or other suitable approved anchoring devices where hardware is to be installed on concrete, masonry or other types of backing.

2.04 TEMPLATES

Templates as may be required to be furnished the Contractor within seven days after receipt of an order and approved hardware schedule.

2.05 TOOLS AND INSTRUCTIONS

All tools and maintenance or installation instruction packed with the locksets and closures shall be given to the Engineer when the project is completed.

PART 3 - EXECUTION

3.01 HARDWARE SUPPLIER'S INSPECTION

Before final inspection of the work under the contract and acceptance of the project by the Engineer, the supplier of hardware and other items specified in this Section shall visit the site and carefully inspect all parts for conformance to this specification, adequacy for intended use, proper functioning, appearance, finish and successful operation, assuming joining responsibility with the Contractor.

3.02 HARDWARE SETS

HARDWARE SET 1

Door D1		Flush Metal Door w/ Closure	RHR
HMF – F16-4-5-3/4-3070-RHR-ASA-PCL-P/D-MA-EXP BLTS			G60 GALV.
HMD – LS18-UL-4-3070-RHR-161			G60 GALV.
3	EA	HINGE FBB191 4.5 X 4.5 NRP	STANLEY
1	EA	DOOR CLOSER 4040XP REG W/62A ALUM	LCN
1	EA	LOCKSET ND96PD RHO 626 X 10-025 STK	SCHLAGE
1	EA	DOOR STOP 1224 626	TRIMCO

HARDWARE SET 2

Door D2

1	EA	12 Ft. High x 12 Ft. Wide Overhead Coiling Door, See Plans & Spec. Section 08331 - OVERHEAD COILING DOORS

HARDWARE SET 3

Door D3

1	EA	12 Ft. High x 10 Ft. Wide Overhead Coiling Door, See Plans & Spec. Section 08331 - OVERHEAD COILING DOORS & Plans

KEYING;

KEY ALL LOCKSETS TO EXISTING MASTER AND KEY TO ITS OWN CHANGE KEY. FURNISH 2 KEYS EACH LOCK.

3.03 MEASUREMENT AND PAYMENT: Finish Hardware shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section covers the requirements for furnishing and installing complete-in-place all painting and its appurtenances to complete the work as indicated on the plans and specifications.

1.02 REFERENCES: The latest publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. ASTM International (ASTM)

ASTM D 2092 - Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting

ASTM D 3273 - Resistance to Growth of Mold on the Surface of Interior Coating in and Environmental Chamber

ASTM D 3274 - Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation

ASTM D 4442 - Test Method for Direct Moisture Content Measurement of Wood and Wood Based Materials

B. Master Painters Institute (MPI)

MPI 4 - Interior/Exterior Latex Block Filler

MPI 5 - Exterior Alkyd Wood Primer

MPI 45 - Interior Primer Sealer

MPI 48 - Interior Alkyd, Gloss

MPI 50 - Interior Latex, Primer Sealer

MPI 52 - Interior Latex, Gloss Level 3

MPI 54 - Interior Latex, Semi-Gloss

MPI 57 - Interior Oil Modified Clear Urethane, Satin

MPI 72 - Polyurethane, Two Component, Pigmented, Gloss

MPI 79 - Marine Alkyd Metal Primer

MPI 80 - Vinyl Wash Primer

MPI 90 - Interior Wood Stain, Semi-Transparent

MPI 101 - Cold Curing Epoxy Primer

MPI 108 - High Build Epoxy Marine Primer

MPI 110 - Interior/Exterior High Performance Acrylic

MPI 119 - Exterior Latex, High Gloss (Acrylic)

MPI 139 - High Performance Latex, White and Tints - MPI Gloss Level 3

MPI 141 - High Performance Semi-gloss Latex, White and Tints - Gloss Level 5

MPI 146 - International Low Odor/VOC Interior Latex-Gloss Level 4 (a 'satin like' finish)

MPI 147 - International Low Odor/VOC Interior Latex-Gloss Level 6 (Gloss)

C. Painting and Decorating Contractors of America (PDCA)

PDCA - Architectural Specification Manual

D. Steel Structures Painting Council (SSPC)

SSPC PA 1 - Shop, Field, and Maintenance Painting

SSPC PA 3 - Safety in Paint Application

SSPC SP 1 - Solvent Cleaning

SSPC SP 3 - Power Tool Cleaning

SSPC SP 6 - Commercial Blast Cleaning

1.03 DEFINITIONS AND ABREVIATIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

B. DFT: Dry film thickness, the film thickness of the fully cured, dry paint or coating.

C. DSD: Degree of Surface Degradation, the MPI system of defining degree or surface degradation. Five levels are generically defined under the Assessment sections in the MPI Maintenance Repainting Manual.

D. EPP: Environmentally Preferred Products, a standard for determining environmental prefer-ability in support of Executive Order 13101.

E. EXT: MPI short term designation for an exterior coating system.

F. INT: MPI short term designation for an interior coating system.

G. Micron/microns: The metric measurement for 0.001 mm or one/one-thousandth of a millimeter.

H. Mil/mils: The English measurement for 0.001 inch or one/one-thousandth of an inch, equal to 25.4 microns or 0.0254 mm.

I. mm: The metric measurement for millimeter, 0.001 meter or one/one-thousandth of a meter.

J. MPI Gloss Levels: MPI system of defining gloss. Seven gloss levels (G1 to G7) Traditionally, Flat refers to G1/G2, Eggshell refers to G3, Semi-gloss refers to G5, and Gloss refers to G6. Gloss levels are defined by MPI as follows:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat	0 to 5	10 maximum
G2	Velvet	0 to 10	10 to 35
G3	Eggshell	10 to 25	10 to 35
G4	Satin	20 to 35	35 minimum
G5	Semi-Gloss	35 to 70	
G6	Gloss	70 to 85	
G7	High Gloss		

1.04 SUBMITTALS

A. Product Data

1. Materials List: Provide an inclusive list of required patching and coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material be manufacturer's

catalog number and general classification.

a. For products with premixed colors, provide manufacturer's standard color chips for selection by Engineer.

2. Manufacturer's Information: Provide data on all listed materials, including:

a. Thinning and mixing instructions
b. Application instructions and required mil film thicknesses.
c. Manufacturer's Material Safety Data Sheets.

B. Certifications: Provide a letter certifying paints and coatings are free of asbestos, lead, zinc-chromate, strontium chromate, cadmium, mercury, crystalline silica and other EPA regulated and hazardous materials. Provide a letter certifying the amounts of mildewcide added by both the paint manufacturer and paint supplier.

C. Schedule of Finishes: Provide finish schedule including paint spread rates required to achieve final dry film thickness indicated in the schedule.

D. Schedule of Operations: Provide a work schedule showing sequence of operation and installation dates.

E. Samples:

1. Submit color and finish samples, at manufacturers normal paint chip size illustrating range of colors and textures available for each surface finishing product scheduled.

2. After color and finish sample are returned, submit paint finish samples, 8.5"x11" in size illustrating selected colors and textures for each selection. Divide sample in horizontal strips showing prime and overlapping second and finish coats. Show coating tinting. Prepare transparent finish samples on same material as that on which coating will be applied. Identify each sample.

F. Manufacturer's Instructions: Indicate special surface preparation procedures, and substrate conditions requiring special attention. Refer to Section 3.01.

G. Samples for Initial Selection: For each type of finish-coat material indicated.

1. After color selection, Engineer will furnish color chips for surfaces to be coated.

2. Submit 3 samples on the following substrates for Engineer's review of color and texture only:

   a. Concrete: 4 inch square. Samples for each color and finish.

   b. Painted Wood: 8 inch square. Samples for each color and material on hardboard.

   c. Stained or Natural Wood: 4 by 8 inch. Samples of natural or stained wood finish on representative wood surfaces.

   d. Ferrous Metal: 3 inch square samples of flat metal and 6 inch long samples of solid metal for each color and finish.

H. Provide a Comprehensive Spray Plan when airless spraying is proposed.

I. Qualification Data: For Applicator.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

   1. Exception: Alkali resistant primers if compatible with the intermediate coat paint products.

C. Provide a Comprehensive Spray Plan when airless spraying is proposed to include:

   1. Documentation that the individual spray applicator(s) on the project have completed an approved "Spray Applicator Certification Program" conducted by the Painting Industry of Hawaii. The certification program shall include material and equipment selection, use and maintenance, hands-on application and safety training.

   2. Proposed overspray protection methods.

   3. Paint Manufacturer's spray application instructions and recommendations for products to be used.

4. Proposed schedule to shut-down and covering existing air-conditioning and ventilation equipment and existing air intake, return and diffuser grilles.

1.06 REGULATORY REQUIREMENTS

A. Comply with State OSHL (Occupational Safety and Health Law) and pollution control regulations of the State Department of Health, Owner and County of Honolulu, and the U.S. Environmental Protection Agency.

B. Safety methods used during coating application shall comply with the requirements of SSPC-PA Guide 3.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.

2. Product description (generic classification or binder type).

3. Manufacturer's brand name and lot number and date of manufacture.

4. Contents by volume, for pigment and vehicle constituents.

5. Thinning instructions.

6. Application instructions and coverage.

7. Color name and number.

8. VOC content.

B. Storage

1. Non-Flammable Materials: Store materials not in use in tightly covered containers in a well-ventilated area. Maintain storage containers in a clean condition, free of foreign materials and residue.

2. Flammable Materials

a. Store in such a manner as to prevent damage. No paint material,

empty cans, paint brushes and rollers may be stored in the building(s). Store these items in separate storage facilities away from the building(s). Contractor may furnish a separate job site storage structure, if the structure complies with the requirements of the local Fire Department. Keep the storage area clean. Lock any storage structures when not in use or when no visual supervision is possible.

b. All rejected materials shall be removed from the job site immediately.

1.08 PROJECT CONDITIONS

A. Do not apply materials when surfaces and ambient temperatures are outside the ranges required by the paint product manufacturer. Do not apply exterior coatings during rain or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

B. Protect public, pedestrians and tenants from injury. Provided, erect and maintain safety barricades around scaffolds, hoists and where constriction operations create hazardous conditions.

C. Completed Work: Provide necessary protection for wet paint surfaces.

D. Protective Covering and Enclosures: Provide and install clean sanitary drop cloth or plastic sheets to protect furniture, equipment, floor and other areas that are not scheduled for treatment. Remove any paint applied to surfaces not scheduled for treatment.

E. Fire Safety: Contractor and its employees shall not smoke in the vicinity of the paint storage area. Exercise precautions against fire at all times and remove waste rags, plastic (polyester sheets), empty cans, etc. from the site at the end of each day.

F. Where airless spraying is used, ensure that protective enclosures are erected to prevent the escape of overspray from the work area.

G. Safeguarding Property: Safeguard the work and also the property of the Owner and other individuals in the vicinity of Contractor's work. Make good on any damages and for losses to work or property caused by Contractor or its employee's negligence. Where damage property cannot be cleaned and restored to its original condition (i.e. prior to being damaged) replace it with a new product of equal quality. No prorating or use of "used" products will be permitted.

1. For painting and spray painting operation, assume that cars will not be temporarily relocated from parking areas during the painting operations.

2. Paint overspray shall not carry more than 5 lineal feet beyond the building eave line nor within 10 lineal feet of pedestrians or property and surfaces not scheduled to be painted. Immediately cease spray painting when overspray carries beyond these specified limits. Do not continue until protective barriers are erected to properly contain the overspray and damages caused by the overspray have been corrected.

3. The Contractor shall be assessed $300.00 for each incidence of property or personal damage caused by overspray until such time that a satisfactory settlement has been agreed upon by the damaged party and corrective action has been completed. All corrective action shall be settled within 24 hours from the time the damage is discovered. Should the Contractor fail to take corrective action in a timely and expeditious manner, the Engineer shall contact the Contractor's Insurance Company to seek resolution on the matter.

1.09 WARRANTY

A. Provide a two year guarantee that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship.

PART 2 - PRODUCTS

2.01 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Mildewcide: Except for metal primers all paint shall contain the maximum amount of mildewcide permitted per gallon of paint by the manufacturer without adversely affecting the color, texture, or durability of the coating. The mildewcide shall be incorporated into the paint by the manufacturer and shall attain a surface disfiguration rating of 8 or greater when tested in accordance with ASTM D 3273 and evaluated in accordance with ASTM D 3274. Mercurial mildewcide shall not be used in interior paint. Insecticide shall not be used in paint.

C. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by

manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names in the Color Schedule indicated to designate colors or materials is not intended to imply that products named area required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed products to be used.

2. Equivalency: Equivalent products to the specified products are listed in the Master Painter's Institute's "Architectural Painting Specification Manual".

3. Substitution: Requests for substitution of a product or product if a manufacturer is not on the "Approved Product List" will be evaluated for equivalency based on product test results per the test criteria of the Master Painter's Institute.

D. Colors: As indicated and selected by Engineer from manufacturer's full range.

E. EPA Regulated and Hazard Materials: Do not use paint or paint products containing lead, mercury, zinc chromates, strontium-chromate, cadmium or the EPA regulated or hazard materials.

F. Human Carcinogens: All paints shall not contain confirmed human carcinogens or suspected human carcinogens as determined by the American Conference of Governmental Industrial Hygienist.

2.02 MISCELLANEOUS MATERIALS

A. Provide patching and repair materials. Compatible with paint finishes and substrates. Use weather resistant materials for exterior surfaces and surfaces exposed to moisture.

B. Accessories

1. General: Provide other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2. Thinners: Thinning of paint shall be done using material recommended by the manufacturer. Mix proprietary products according to manufacturer's requirements. Do not use compound thinner, mineral oil, kerosene, refined linseed oil, or gasoline for thinning.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

a. Ensure that concrete and masonry surfaces are cured and dried pt meet paint manufacturer's recommendations.

2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Engineer about anticipated problems when using the materials specified over substrates primed by others.

3.02 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove dust, oil and grease before cleaning.

1. Scheduled cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as

specified.

1. Provide barrier coats over incompatible primers or remove and re-prime.

D. Surface Preparation Cementitious Materials: Prepare concrete, concrete unit masonry, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

1. Use abrasive blast-cleaning methods if recommended by paint manufacturer.

2. Determine alkalinity and moisture content of surfaces by performing appropriate tests. Submit test results to Engineer.

a. Prior to painting, concrete and masonry surfaces shall be allowed to cure and dry in accordance with the paint manufacture's instructions and recommendations.

b. Efflorescence and laitance shall be removed from the surface.

c. Prior to paint application, interior and exterior concrete and masonry (including grout joints) scheduled to receive paint shall be tested to determine the alkalinity level of the surface. Testing shall be performed in strict accordance with the test kit manufacturer's instructions. Submit test results to the Engineer.

d. Where the alkalinity level exceeds the pH level limit of the primer take one of the following three remedies at no additional cost to the Owner.

1) If new concrete or masonry, wait until alkaline level has dropped below the limit.

2) Substitute a primer that is able to resist the measured alkalinity and that is compatible with the paint finish. Alkyd based primers and top-coats or epoxy ester primers shall not be used. Submit the substitute primer to the Officer-in-Charge for review.

3) Neutralize the surface in accordance with the primer manufacturer's instructions to reduce the alkaline level. However, acid washing is not permitted where the surface

has been finished with a cementitious coating.

E. Surface Preparation Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

1. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.

2. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.

3. If transparent finish is required, back-prime with spar varnish.

4. Back-prime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.

5. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

F. Surface Preparation Ferrous Metals: Clean un-galvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.

1. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.

2. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

3. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat. Spot priming specified here shall be in addition to full prime painting scheduled in Part 3 below.

G. Surface Preparation Galvanized Surfaces: Clean galvanized surfaces with non-petroleum-based solvents so surface is free of oil and surface contaminants in accordance with SSPC SP 1. If the galvanized metal has been passivated or stabilized, the coating shall be completely removed by brushed-off abrasive blast.

New galvanized steel to be coated shall not be "passivated" or "stabilized". If the absence of hexavalent stain inhibitors is not documented, test as described in ASTM D 2092, Appendix X2, and remove by one of the methods described therein. Remove pretreatment from galvanized sheet metal fabricated from coil stock be mechanical methods.

H. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

3. Use only thinners approved by paint manufacturer and only within recommended limits.

I. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.03 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.

2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

3. Provide finish coats that are compatible with primers used.

4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

5. Paint surfaces behind movable equipment and furniture the same as

similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only unless otherwise noted.

6. Paint interior surfaces of ducts with a flat, non-specular black paint where visible through registers or grilles.

7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.

9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.

10. Sand lightly between each succeeding enamel or varnish coat.

11. Ensure primers are top coated within the times required by the paint manufacturers. Top coats not applied within the recoating window may be rejected.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, cervices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

3. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

4. Be aware the requirements for, and restrictions on, spray painting contained in PROJECT CONDITIONS Paragraph.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surfaces or item being painted.

2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

F. Mechanical items to be painted include, but are not limited to, the following:

1. Un-insulated metal piping.

2. Un-insulated plastic piping.

3. Pipe hangers and supports.

4. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.

5. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.

6. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

G. Electrical items to be painted include, but are not limited to, the following:

1. Panel boards.

2. Electrical equipment that is indicated to have a factory-primed finish for field painting.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats.

L. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.04 FIELD QUALITY CONTROL TESTING

A. Inspection and Approvals: Obtain written approval upon completion of each phase of work (phases or work are: surface preparation and spot prime, prime, first finish coat, second finish coat) before proceeding into the next phase of work. For any particular area of work that deviates from the submitted work schedule, notify the Engineer one day (24 hours minimum) in advance when completing any phase of work. Provide access to areas to be inspected.

1. Failure to obtain approval of any phase of work for a work area may result in redoing the operation at no cost to the Owner.

2. Right of Rejection: Non conforming work will be rejected by the Engineer. Remove rejected material from the job site immediately. Redo

rejected work at no cost to the Owner.

B. Thickness Testing: The Engineer will require all paints and their applied thickness tested determine compliance with the Contract Documents. The Owner will select a laboratory, and the cost of testing shall be borne by the Contractor.

1. Where the required paint thickness is deficient, provide additional coats to the affected surface(s) to meet the required paint thickness.

C. Moisture Testing: Measure moisture content of surfaces using and electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Gypsum Wallboard: 12 percent.

2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3. Interior Wood: 15 percent, measured in accordance with ASTM D 4442.

4. Exterior Wood: 15 percent, measured in accordance with ASTM D 4442.

D. Alkalinity Testing: Measure pH Level of surface to be painted. Notify Engineer if alkalinity level is below the maximum permitted by the paint or primer manufacturer.

1. Tests shall be paid by Contractor.

3.05 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.06 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Engineer.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to

protect their work.

1. After work of other trades in complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.07 SCHEDULE OF FINISHES

A. New Exterior and Interior Concrete Surfaces
   1. Latex Semi-Gloss Paint, EXT 3.1A-G5
      a. Primer: MPI 11, 1.5 mils DFT
      b. Intermediate Coat: MPI 11, 1.5 mils DFT
      c. Topcoat: MPI 11, 1.5 mils DFT

B. New Exterior and Interior Concrete Masonry Unit Surfaces
   1. Latex Semi-Gloss Paint, EXT 4.2A-G5
      a. Prime Coat: Alkali-resistance sealer: MPI 3, 1.5 mils DFT
      b. Block Filler: MPI 4, fill all voids and holes
      c. Intermediate Coat: MPI 11, 3.5 mils DFT
      d. Top Coat: MPI 11, 3.5 mils DFT

C. New Exterior and Interior Steel Surfaces
   1. Pigmented Polyurethane, EXT 5.1H
      a. Epoxy Primer: MPI 101, 3 mils DFT
      b. High Build Epoxy Intermediate Coat: MPI 108, 3 mils DFT
      c. Polyurethane Topcoat: MPI 72, 3 mils DFT

D. New Exterior and Interior Galvanized Steel Surfaces
   1. Pigmented Polyurethane, EXT 5.3D
      a. Pretreatment: MPI 80
      b. Epoxy Primer: MPI 101, 3 mils DFT
      c. High Build Epoxy Intermedia te Coat: MPI 108, 3 mils DFT
      d. Polyurethane Topcoat: MPI 72, 3 mils DFT
      d. Topcoat: MPI 139, 3.5 mils DFT
      c. High Build Epoxy Intermediate Coat: MPI 108, 3 mils DFT
      d. Polyurethane Topcoat: MPI 72, 3 mils DFT

3.08 SCHEDULE - COLORS

A. Colors shall be selected by the Engineer.

3.09 MEASUREMENT AND PAYMENT: Painting shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

END OF SECTION

SECTION 13120 - PRE-ENGINEERED METAL BUILDINGS

PART 1 - GENERAL

1.01 REFERENCES

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

A. Aluminum Association (AA)

AA 30	(1986) Aluminum Structures, Construction Manual Series Section 1

B. American Institute of Steel Construction (AISC)

AISC FCD	(1995a) AISC Quality Certification Program
AISC Pub No. S303	(2000) Code of Standard Practice for Steel Buildings and Bridges
AISC S329	(1985) Allowable Stress Design Specification for Structural Joints Using ASTM A 325 or A 490 Bolts
AISC S335	(1989) Structural Steel Buildings Allowable Stress Design and Plastic Design

C. American Society of Civil Engineers (ASCE)

ASCE 7	(2002) Minimum Design Loads for Buildings and Other Structures

D. American Welding Society (AWS)

AWS D1.1/D1.1M	(2006) Structural Welding Code - Steel

E. ASTM International (ASTM)

ASTM A 252	(1998, R 2002) Welded and Seamless Steel Pipe Piles
ASTM A 36/A 36M	(2005) Carbon Structural Steel

ASTM A 500	(2003a) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 501	(2001) Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A 529/A 529M	(2003) Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality
ASTM A 53/A 53M	(2004a) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 570/A 570M	(1998) Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
ASTM A 572/A 572M	(2004) High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 588/A 588M	(2005) High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick
ASTM A 606	(2004) Standard Specification for Steel Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM A 607	(1998) Steel, Sheet and Strip, High-Strength, Low-Alloy, Columbium or Vanadium, or Both, Hot-Rolled and Cold-Rolled
ASTM A 618	(2004) Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing
ASTM A 653/A 653M	(2004a) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 755/A 755M	(2004a) Steel Sheet, Metallic Coated by the Hot-Dip Process and Pre-Painted by the Coil-Coating Process for Exterior Exposed Building Products
ASTM A 792/A 792M	(2003) Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

ASTM A 992/A 992M	(2004a) Structural Steel Shapes
ASTM B 209	(2004) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 221	(2005) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 241/B 241M	(2002) Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube
ASTM B 308/B 308M	(2002) Aluminum-Alloy 6061-T6 Standard Structural Profiles
ASTM B 429	(2002) Aluminum-Alloy Extruded Structural Pipe and Tube
ASTM C 236	(1989; R 1993e1) Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box
ASTM C 518	(2004) Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C 991	(2003) Flexible Glass Fiber Insulation for Metal Buildings
ASTM D 1308	(2002e1) Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM D 1654	(1992; R 2000) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
ASTM D 2244	(2002e1) Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
ASTM D 2247	(2002) Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM D 2794	(1993; R 2004) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

ASTM D 3359	(2002) Measuring Adhesion by Tape Test
ASTM D 4214	(1998) Evaluating the Degree of Chalking of Exterior Paint Films
ASTM D 522	(1993a; R 2001) Mandrel Bend Test of Attached Organic Coatings
ASTM D 5894	(1996) Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
ASTM D 610	(2001) Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM D 714	(2002) Evaluating Degree of Blistering of Paints
ASTM D 828	(1997; R 2002) Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus
ASTM D 968	(1993; R 2001) Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM E 84	(2005) Surface Burning Characteristics of Building Materials
ASTM E 96	(2000e1) Water Vapor Transmission of Materials
ASTM G 23	(1996) Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Non-Metallic Materials

F. Crane Manufacturers Association of America (CMAA)

CMAA 70	(2004) EnviroTop Running and Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes, No. 70

G. Metal Building Manufacturers Association (MBMA)

MBMA MBSM	(2002) Metal Building Systems Manual

H. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

SMACNA Arch. Manual	(2003) Architectural Sheet Metal Manual

I. Steel Deck Institute (SDI)

SDI DDM02	(1987) Diaphragm Design Manual

J. Underwriters Laboratories (UL)

UL 580	(1994; Rev thru Feb 1998) Tests for Uplift Resistance of Roof Assemblies

1.02 SYSTEM DESCRIPTION

1. Design Requirements

1. Design Analysis

The design analysis shall be the design of a licensed Professional Structural Engineer licensed in the State of Hawaii, experienced in design of this work and shall include complete calculations for the building, its components, and the foundations. Foundations shown on the drawings are based on loads derived from a representative set of similar building types. The Contractor shall obtain the services of a licensed Professional Structural Engineer to verify that the foundations shown are adequate for the building supplied using the criteria in paragraph Foundations. Formulas and references shall be identified. Assumptions and conclusions shall be explained, and cross-referencing shall be clear. Wind forces on various parts of the structure, both positive and negative pressure, shall be calculated with the controlling pressure summarized. Lateral forces due to seismic loading shall be calculated and tabulated for the various parts and portions of the building. Computer programmed designs shall be accompanied by stress values and a letter of certification, signed by a licensed Professional Structural Engineer licensed in the State of Hawaii, stating the design criteria and procedures used and attesting to the adequacy and accuracy of the design. A narrative of the computer program delineating the basic methodology shall be included. Computer program output shall be annotated and supplemented with sketches to verify the input and output. Critical load conditions used in the final sizing of the members shall be emphasized. The design analysis shall include the name and office phone number of the designer, who shall function as a point of contact to answer questions during the detail drawing review.

2. Dimensions

Building dimensions shall be as standard with manufacturer, not less than those indicated, but exceeding the indicated dimensions only by the amount of the closest standard size thereto. Eave height shall be measured from the top of finished floor to intersection of insides of roof and sidewall sheets. The clear height between finished floor and bottom of roof steel shall be as indicated.

3. Framing

Provide buildings with vertical walls and gable roofs. Building shall be single-span structures with one of the following framing systems: column with rigid frame, or rigid frame type, similar to AISC S335, Type I construction. End walls shall be of beam and column design. Roof slope greater than that indicated may be furnished if the required materials are provided and appropriate drawings are submitted and approved. Design framed openings structurally.

4. Foundation Requirements

Design foundations for allowable soil bearing pressure and a minimum bottom of footing depth as indicated. Use a factor of safety of 1.5 for overturning, sliding and uplift, and a concrete compressive strength as specified in Section 03300 CAST-IN-PLACE CONCRETE. The foundation loads are supplied by the building manufacturer.

2. Performance Requirements

MBMA MBSM, for loading combinations and definitions with the exceptions of wind load and special collateral loads. Design for each material shall be as specified by the Design Authority as listed in MBMA MBSM.

1. Dead Loads

The dead load shall consist of the weight of all permanent construction such as roof, framing, covering members and all other materials of the building system.

2. Roof Live Loads

a. Uniform Loads: Uniform roof live loads, including maintenance traffic and construction loads, shall be determined and applied in accordance with ASCE 7.

b. Concentrated Loads: In addition to ASCE 7 roof live loads, a minimum design concentrated load of 300 pounds shall be used to simulate a construction load on roof panels. The concentrated load shall be applied at the panel mid-span and shall be resisted by a single metal roof panel, or a 24 inches wide corrugated metal panel, assumed to be acting as a beam. The un-deformed shape of the panel shall be used to determine the section properties.

3. Wind Loads

Compute and apply wind pressures, ASCE 7. Basic wind speed and multiplying factors are as indicated.

4. Seismic Loads

As required for ground motion acceleration as indicated.

5. Collateral Loads

Photovoltaic panels and equipments, electrical fixtures, and as indicated.

6. Deflection

a. Structural Members: The maximum deflection of main framing members shall not exceed $1/240^{th}$ of their respective spans. The maximum deflection due to live load in roof panels and purlins shall not exceed $1/180^{th}$ of their respective spans.

b. Roof Panels: UL 580, Class 90. The design analysis shall establish that the roof when deflected under dead plus live loads, will not result in a negative gradient. Maximum deflections shall be based on sheets continuous across two or more supports with sheets unfastened and fully free to deflect. In addition, the roof decking shall be designed for a 200-pound concentrated load at mid-span on a 12 inch wide section of deck.

c. Wall Panels: The maximum deflection due to wind on wall panels and girts shall be limited to $1/120^{th}$ of their respective spans except that when interior finishes are used the maximum allowable deflection shall be limited to $1/180^{th}$ of their respective spans.

d. Openings: Limit deflections of steel framing above and along the side of rolling door openings to a maximum of ½ the allowable movement in the telescoping top roller of the doors to ensure

proper operation. Frame all equipment opening over 12 by 12 inches.

e. Provisions for Gutters and Downspouts

Gutters and downspouts shall be designed according to the requirements of SMACNA Arch. Manual for storms which should be exceeded only once in 5 years and with adequate provisions for thermal expansion and contraction. Supports for gutters and downspouts shall be designed for the anticipated loads. Roof drainage system to withstand rainfall intensity of 6 inches per hour, with 5 minute duration.

f. Drift Provisions

Lateral deflections, or drift, at the roof level of a structure in relation to the floor or slab on grade, caused by deflection of horizontal force resisting elements, shall be less than 1/200 times eave height.

g. Grounding and Lightning Protection

Grounding and lightning protection shall be provided as specified in Section 13100 LIGHTNING PROTECTION SYSTEM.

1.03 SUBMITTALS

Government and Engineer approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

1. SD-02 Shop Drawings

Pre-Engineered Building; G
Template for Anchorage; G

Submit as necessary to erect the building and install components.

2. SD-03 Product Data

Pre-Engineered Metal Building Materials; G

Submit sufficient data indicating conformance to specified requirements on materials provided under this section.

Instruction Manuals; G
Erection; G
Qualifications; G

3. SD-04 Samples

Factory Color Finish; G
Accessories; G
Roofing and Siding; G
Fasteners; G
Insulation; G
Gaskets and Insulating Compounds; G
Sealant; G

4. SD-05 Design Data

Building; G
Foundation Loads; G
Anchor Bolts; G
Purlins and Girts; G
Bracing; G
Structural Calculation; G

5. SD-06 Tests Reports

Factory Color Finish; G
Insulation; G

6. SD-07 Certificates

Pre-Engineered Metal Building Materials; G

Submit certificates attesting that materials comply with this specification.

7. SD-10 Operation and Maintenance Data

Pre-Engineered Building, Data package 1; G

1.04 QUALITY ASSURANCE

1. Qualifications

Qualifications of the manufacturer, the manufacturer's Representative when one is used, and qualifications and experience of the building erector. A brief list of locations where buildings of similar design have been used shall be included with the detail drawings and shall also include information regarding date of completion, name and address of owner, and how the structure is used.

a. Manufacturer

The manufacturer shall have AISC FCD, category MB certification.

b. Installer

Erector shall have specialized experience in the erection of metal building systems for a period of at least 3 years.

c. Manufacturer's Representative

A representative designated by the building manufacturer, who is familiar with the design of the building supplied and experienced in the erection of metal buildings similar in size to the one required under this contract, shall be present at the job site during construction, from the start of the structural framing erection until completion of the installation of the exterior covering, to assure that the building is erected properly.

2. Regulatory Requirements

a. Drawings: Pre-Engineered Building

Submit complete design drawings for the pre-engineered building. Submit drawings for the foundations and anchorage.

b. Design Data Building

Submit design calculations for the entire pre-engineered building and foundations, prepared and stamped by a professional structural engineer licensed in the State of Hawaii. Also submit for components requested, and stamp with the seal of a professional structural engineer licensed in the State of Hawaii. Include sizes and location of anchor bolts.

3. Coordination Meeting

A coordination meeting shall be held within 45 days after contract award for mutual understanding of the metal building system contract requirements. This meeting shall take place at the building site and shall include representatives from the Contractor, the roofing/metal building system manufacturer, the roofing/metal building supplier, the erector, the designer, and the Engineer. All items required by paragraph SUBMITTALS shall be discussed, including applicable standard manufacturer shop drawings, and the approval process. The Contractor shall coordinate time and arrangements for the meeting.

4. Instructions

a. Instruction Manuals

Manufacturer's literature for individual building component systems.

b. Erection

Manufacturer's erection instruction and erection drawings describing the preparation requirements, assembly sequence, temporary bracing, shoring, and related information necessary for erection of the metal building including its structural framework and components.

5. Samples

a. Factory Color Finish

Submit one sample of each color indicated for verification that the color matches the colors indicated. Where colors are not indicated, submit manufacturer's standard color charts, but not less than four different samples of manufacturer's standard colors for selection by the Engineer and Owner.

b. Accessories

One sample of each type of flashing, trim, closure, cap and similar items. Size shall be sufficient to show construction and configuration.

c. Roofing and Siding

One piece of each type and finish (exterior and interior) to be used, 9 inches long, full width. The sample for factory color finished covering shall be accompanied by certified laboratory test reports showing that the sheets to be furnished are produced under a continuing quality control program and that a representative sample consisting of not less than 5

pieces has been tested and has met the quality standards specified for factory color finish.

d. Fasteners

Two samples of each type to be used, with statement regarding intended use. If so requested, random samples of bolts, nuts, and washers as delivered to the job site shall be taken in the presence of the Engineer and provided to the Engineer for testing to establish compliance with specified requirements.

e. Roof Insulation Blanket

One piece of each type to be used, and descriptive data covering installation.

f. Gaskets and Insulating Compounds

Two samples of each type to be used and descriptive data.

g. Sealant

One sample, approximately 1 pound, and descriptive data.

1.05 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle manufactured items so that materials remain dry and undamaged. Do not store in contact with materials that might cause staining.

1.06 WARRANTIES

1. Warranty

The Metal Building System, composed of framing and structural members, roofing and siding, gutters and downspouts, accessories, fasteners, trim, and miscellaneous building closure items shall be warranted as described below against material and workmanship deficiencies, system deterioration caused by exposure to the elements and service design loads, leaks and wind uplift damage. Any emergency temporary repairs conducted by the Owner shall not negate the warranties.

2. Prime Contractor's Weather-tightness Warranty

The Metal Building System shall be warranted by the Contractor on a no penal sum basis for a period of five years against materials and workmanship deficiencies; system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The Metal Building System covered under this warranty shall include but not limited to the following: framing and structural members, roofing and siding panels and seams, exterior gutters and downspouts, accessories, fasteners, trim, flashings and miscellaneous building closure items, connectors, components, and fasteners, and other system components and assemblies installed to provide a weather-tight system; and items specified in other sections of these specifications that become part of the metal building system. All material and workmanship deficiencies, system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks and wind uplift damage shall be repaired as approved by the Contracting Officer. See the attached Contractor's written warranty for issue resolution of warrantable defects. This warranty shall warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. The Contractor shall supplement this warranty with written warranties from the installer and/or system manufacturer, which shall be submitted along with Contractor's warranty. However, the Contractor is ultimately responsible for this warranty. The Contractor's written warranty shall be as outlined in attached **WARRANTY FOR METAL BUILDING SYSTEMS**, and start upon final acceptance of the facility. The Contractor shall provide a separate bond in an amount equal to the installed total metal building system cost in favor of the owner (Government) covering the Contractor's warranty responsibilities effective throughout the five year Contractor's warranty period for the entire metal building system as outlined above.

3. Manufacturer's Material and/or System Weather-tightness Warranties

The Contractor shall furnish, in writing, the following manufacturer's material warranties to the Contracting Officer which cover all Metal Building System components:

a. A manufacturer's 20 year material warranty warranting that the specified zinc-coated steel or aluminum-zinc alloy coated steel will not rupture, structurally fail, fracture, deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed securement system including fasteners and coil material.

b. A manufacturer's 20 year exterior material finish warranty on the factory colored finish warranting that the finish, under normal atmospheric

conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of eight, as determined by ASTM D 4214 test procedures; or change colors in excess of five CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to replacing the defective coated material.

PART 2 - PRODUCTS

2.01 WALL AND ROOF MATERIALS

MBMA MBSM except as specified otherwise herein. Design roof and wall panels, accessories, and flashings to be completely weather-tight and free of abrasions, loose fasteners, and deformations. Each piece or part of the assembly shall be clearly and legibly marked to correspond with the drawings.

a. Minimum Thickness

As required to conform to design requirements but not less than the following:

Items	Minimum Thickness (Uncoated)
Girders and Columns	3/16 inch
Purlins and Girts	14 Manufacturer's Standard gage (MFG STD)
Roof Panels	
Steel	22 MFG STD gage
Wall Panels	
Steel	22 MFG STD gage
Bracing	3/16 inch thick steel members
Column Base Plates	5/8 inch thick
Column Anchor Bolts	5/8 inch diameter
Gable and Eave Trim, Fascia Closure Strips, Rake Flashings, Copings, and Liner Panels	
Steel	22 MFG STD gage

Eave Gutters and Downspouts

Aluminum	0.032 inch

b. Panels

a. Fabricated of zinc-coated steel or aluminum/zinc-coated steel.

b. Preformed, Butlerib II Roof System panels, 22 gage, and panel configuration as shown on the plans.

c. If designed as diaphragm, roof decks shall be designed in accordance with SDI DDM02.

Depth of the panels shall be as indicated. Panels over 30 feet in length shall be designed for thermal expansion and contraction.

1. Zinc-Coated Steel Sheet

ASTM A 755/A 755M, Coating Class G-90 or ASTM A 653/A 653M, SQ, Grade 33, Coating Class G-90.

2. Aluminum/Zinc-Coated Steel Sheet

ASTM A 792/A 792M, AZ 55.

3. Aluminum Sheet

Alloy 3004 Alcald conforming to ASTM B 209.

2.02 FRAMING AND STRUCTURAL MEMBERS

1. Steel

ASTM A 36/A 36M, ASTM A 529/A 529M, ASTM A 572/A 572M, ASTM A 588/A 588M, or ASTM A 992/A 992M.

2. Aluminum

ASTM B 221 or ASTM B 308/B 308M.

3. Uncoated Steel

ASTM A 570/A 570M, ASTM A 606, or ASTM A 607.

4. Galvanized Steel

ASTM A 653/A 653M, G 90 coating designation, 0.045 inch minimum thickness.

5. Aluminum Sheet

Aluminum sheet shall conform to ASTM B 209, 0.032 inch minimum thickness. Aluminum structural shapes and tubes shall conform to ASTM B 221 or ASTM B 308/B 308M. Structural pipe shall conform to ASTM A 53/A 53M, ASTM A 252, ASTM A 500, ASTM A 501, ASTM A 618, ASTM B 221, ASTM B 241/B 241M, or ASTM B 429. Holes for structural connections shall be made in the shop.

6. Structural Tube

ASTM A 500 or ASTM B 221.

2.03 ACCESSORIES

1. Caps, Strips, and Plates

Form ridge caps, eave and edge strips, fascia strips, miscellaneous flashings, and miscellaneous sheet metal accessories from the same material and gage as the roof panels. Wall plates, base angles or base channels, and other miscellaneous framing members may be standard structural steel shapes, or may be formed from steel not lighter than 18 gage thick.

2. Closure Strips

Provide closure strips of closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride pre-molded to match configuration of the covering. Closure strips shall not absorb or retain water.

3. Sealant

Provide elastomeric type sealant containing no oil or asphalt. Exposed sealant shall cure to a rubberlike consistency. Concealed sealant may be the non-hardening type.

4. Gaskets and Insulating Compounds

Provide non-absorptive gaskets and insulating compounds suitable for insulating contact points of incompatible materials. Insulating compounds shall be non-running after drying.

5. Fasteners

Provide fasteners for steel wall and roof panels of stainless steel, type and size specified below or as otherwise approved for the applicable requirements. Fasteners for structural connections shall provide both tensile and shear strength of not less than 750 pounds per fastener. Fasteners for accessories shall be the manufacturer's standard. Exposed roof fasteners shall be gasketed or have gasketed washers on the exterior side of the covering to waterproof the fastener penetration. Washer material shall be compatible with the covering; have a minimum diameter of 3/8 inch for structural connections; and gasketed portion of fasteners or washers shall be neoprene or other equally durable elastomeric material approximately 1/8 inch thick. Exposed wall fasteners where required shall be color finished or provided with plastic color caps to match the covering. Non-penetrating fastener system using concealed clips shall be manufacturer's standard for the system provided.

a. Screws

Provide self-tapping screws not less than No. 14 diameter and not less than No. 12 diameter if self-drilling/self-tapping type.

b. End-Welded Studs

Provide automatic shouldered type studs with a shank diameter of not less than 3/16 inch and cap or nut for holding covering against the shoulder.

c. Explosive Actuated Fasteners

Fasteners for use with explosive actuated tools shall have a shank diameter of not less than 0.145 inch with a shank length of not less than ½ inch for fastening panels to steel and not less than one inch for fastening panels to concrete.

d. Blind Rivets

Provide aluminum rivets with 3/16 inch nominal diameter shank or stainless steel rivets with 1/8 inch nominal diameter shank. Rivets shall be threaded stem type if used for other than the fastening of trim. Provide hollow stem rivets with closed ends.

e. Bolts

Provide bolts not less than ¼ inch diameter, shouldered or plain shank as required, with proper nuts.

6. Gutters

Provide complete with mitered corners, end pieces, and special pieces that may be required. Expansion-type slip joints shall be provided at the center of the runs and at intervals of not more than 32 feet for aluminum. Provide water tight seal at all other joints. Provide hangers and fastenings from a metal compatible with the gutters. Space hangers not more than 36 inches apart.

7. Downspouts

Provide cross sectional area not less than the size of gutter indicated and complete including elbows and offsets. Provide downspouts in approximately 10 foot lengths; end joints shall telescope not less than ½ inch, and longitudinal joints shall be locked. Provide gutter outlets with stainless steel wire ball strainers of a standard type. Position downspouts not less than ½ inch away from walls and fasten to the walls at top, bottom, and at not to exceed 5 foot centers intermediately between with manufacturer's standard type leader straps, or concealed type fasteners. Form straps and fasteners from a metal compatible with the downspouts.

8. Insulation

Thermal resistance of insulation shall be not less than the R-value of 19. R-value shall be determined at a mean temperature of 75 degrees F in accordance with ASTM C 518. Insulation shall be a standard product with the insulation manufacturer, factory marked or identified with insulation manufacturer's name or trademark and R-value. Identification shall be on individual pieces or individual packages. Roof and wall insulation, including facings, shall have a flame spread not in excess of 75 and a smoke developed rating not in excess of 150 when tested in accordance with ASTM E 84. The stated R-value of the insulation shall be certified by an independent Registered Professional Engineer if tests are conducted in the insulation manufacturer's laboratory. Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED/RECOVERED MATERIALS.

1. Blanket Insulation

Blanket insulation shall conform to ASTM C 991 0.6 pound fiber-glass as standard with the metal building manufacturer having a factory-applied facing on one side and a permeance rating of 0.05 or less when tested in accordance with ASTM E 96. Insulation shall not be less than the R-value of 19.

a. Facing on insulation shall be vinyl-scrim foil. Vinyl-scrim foil shall have a tensile strength of not less than 40 pounds machine direction and 30 pounds cross machine direction when tested in accordance with ASTM D 828.

b. The insulation, including facings, shall have a flame spread rating of 75 or less and a smoke development factor of 150 or less when tested in accordance with ASTM E 84.

c. Wall insulation shall have guarded hot box values for "R" of 11 or more as measured in accordance with ASTM C 236 test method. Roof insulation shall have guarded hot box values for "R" of 19 or more as measured in accordance with ASTM C 236.

d. Provide insulation containing 20 percent or greater recovered material which has been diverted from solid waste, but not including material reused in a manufacturing process. Where two materials have the same price and performance, provide the one containing the higher recovered material content.

2. Insulation Retainers

Retainers shall be type, size and design necessary to adequately hold the insulation and to provide a neat appearance. Metallic retaining members shall be nonferrous or have a nonferrous coating. Nonmetallic retaining members, including adhesives used in conjunction with mechanical retainers or at insulation seams, shall have a fire resistance classification not less than that permitted for the insulation.

9. Canopies

Of same materials and finish as the building. Soffit materials where indicated shall be of material indicated.

10. Sealant

Sealant shall be an elastomeric type containing no oil or asphalt. Exposed sealant shall be colored to match the applicable building color.

11. Gaskets and Insulating Compounds

Gaskets and insulating compounds shall be non-absorptive and suitable for insulating contact points of incompatible materials. Insulating compounds shall be non-running after drying.

2.04 FINISH

1. Shop Painting

Ferrous metal work, except factory-finished work, zinc-coated work, aluminum-coated work, and work specified to be painted herein, shall be (1) cleaned of dirt, rust, scale, loose particles, grease, oil, and other deleterious substances; (2) phosphate treated; and (3) then be given one coat of an approved rust-inhibiting primer paint of the type standard with the metal building manufacturer.

2. Factory Color Finish

Provide exterior and interior exposed surfaces of metal roof and wall panels, gutters, downspouts, and metal accessories with a thermal-cured factory finish. Submit manufacturer's standard colors for color selection by the Engineer. Provide an exterior finish top coat of 70 percent resin fluoropolymer with Energy Star finish. Provide standard dry film thickness of 0.8 mil for exterior coating exclusive of primer. Provide exterior primer thickness 0.2 mil. Interior color finish shall consist of white polyester finish. Provide exterior color finish meeting the test requirements specified below. Tests shall have been performed on the same factory finish and thickness provided. For LEED credit, roofing finish shall have a minimum Solar Reflectance Index (SRI) value of 29 for slopes less than 2 in 12. For steeper slopes, minimum required SRI value is 78.

3. Testing of Factory Color Finishes

a. Salt Spray Test

A sample of the sheets shall withstand a cyclic corrosion test for a minimum of 2016 hours in accordance with ASTM D 5894, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of not less than 10, no blistering, as determined by ASTM D 714; 10, no rusting, as determined by ASTM D 610 and a rating of 6, over 1/16 to 1/8 inch failure at scribe, as determined by ASTM D 1654.

b. Accelerated Weathering Test

ASTM G 23, Method 2, Type D apparatus minimum 2000 hours or Type EH apparatus minimum 500 hours, no checking, blistering or loss of adhesion; color change less than 5 NBS units by ASTM D 2244 and chalking less than No. 8 rating by ASTM D 4214.

c. Flexibility

ASTM D 522, Method A, 1/8 inch diameter, 180 degree bend, no evidence of fracturing to the naked eye.

d. Adhesion

ASTM D 3359, Method B, for laboratory test and film thickness less than 5 mil and Method A for site tests. There shall be no film removed by tape applied to 11 parallel cuts spaced 1/8 inch apart plus 11 similar cuts at right angles.

e. Impact

ASTM D 2794, no loss of adhesion after direct and reverse impact equal to 1.5 times metal thickness in mils, expressed in inch-pounds.

f. Humidity Resistance

ASTM D 2247, 1,500 hours for steel and 2,000 hours for aluminum, no signs of blistering, cracking, creepage or corrosion on score panel.

g. Abrasion

ASTM D 968, Method A, falling sand shall not expose substrate when tested in quantities 7.9 - 10.6 gallons of sand per mil of thickness.

h. Formability Test

When subjected to testing in accordance with ASTM D 522 Method B, 1/8 inch diameter mandrel, the coating film shall show no evidence of cracking to the naked eye.

i. Pollution Resistance

Coating shall show no visual effects when covered spot tested in a 10 percent hydrochloric acid solution for 24 hours in accordance with ASTM D 1308.

PART 3 - EXECUTION

3.01 INSPECTION

Check concrete dimensions, anchor bolt size and placement, and slab elevation with the metal building manufacturer's templates and drawings before setting any steel.

3.02 ERECTION

Erect in accordance with the manufacturer's approved erection instructions and diagrams. Correct defects and errors in the fabrication of building components in a manner approved by the Engineer. If defects or errors in fabrication of components cannot be corrected, remove and provide non-defective components. When installing wall and roof systems, install closure strips, flashing, sealing material, and other accessories in accordance with building manufacturer's instructions to provide a weather-tight system, free of abrasions, loose fasteners, and deformations. After erection is complete, repair and coat abraded and damaged, primed or factory-finished surfaces to match adjacent surfaces.

1. Dissimilar Materials

Prevent direct contact between aluminum surfaces, and ferrous or other incompatible metals, by one of the following methods:

a. Paint the incompatible metal with a coating of manufacturer's standard heavy-bodied paint.

b. Paint the incompatible metal with a prime coat of corrosion inhibitive primer followed by one or two coats of aluminum metal-and-masonry paint, or other suitable protective coating, excluding products containing lead and chromium pigmentation.

c. Provide an approved non-absorptive gasket.

d. Apply an approved calking between the aluminum and the incompatible metal.

If drainage from incompatible metal passes over aluminum, paint the incompatible metal by method (a) or (b). Paint aluminum surfaces in contact with concrete or masonry materials by method (a). Paint green or wet wood, or wood treated with incompatible wood preservatives, by method (a) or use two coats of aluminum paint.

2. Rigid Frames, Bases, and Sill Members

Brace frames as necessary to ensure safety. Set accurately, using a non-shrink grout to obtain uniform bearing on the concrete and to maintain a level base line elevation. Separate leveling plates under column base plates shall not be used. Members shall be accurately spaced to assure proper fitting of panels. As erection progresses, the work shall be securely fastened to resist the dead load and wind and erection stresses. Supports for electric overhead traveling cranes shall be

positioned and aligned in accordance with CMAA 70. Clean surfaces to receive the mortar and thoroughly moisten immediately before placement of mortar. Water cure exposed surfaces of mortar with wet burlap for 7 days.

a. Field Welding

Steel, AWS D1.1/D1.1M. Aluminum, AA 30.

b. Field Bolting

AISC S329. Improper or mislocated bolt holes in structural members or other misfits caused by improper fabrication or erection, shall be repaired in accordance with AISC Pub No. S303. Concrete work is specified in Section 03300 CAST-IN-PLACE CONCRETE. Anchor bolts shall be accurately set by template while the concrete is in a plastic state.

3. Wall Construction

Apply panels full wall heights from base to eave with no horizontal joints except at the junctions of door frames, window frames, louver panels, and similar locations. Lay side laps away from the prevailing winds. Seal side and end laps with the joint sealing material recommended by the manufacturer. Flash or seal walls at the base, at the top, around windows, door frames, framed louvers, and other similar openings. Flashing will not be required where approved "self-flashing" panels are used. Minimum end laps for all types of panels shall be 2 ½ inches. Minimum side laps for all types of panels shall be one corrugation, one configuration, or an interlocking joint.

4. Roof Construction

Apply the roofing panels in the longest lengths obtainable with end laps occurring only at structural members. Lay side laps away from the prevailing wind, and seal side and end laps with joint sealing material. Flash and seal the roof at the ridge, at eaves and rakes, at projections through the roof, and elsewhere as necessary. Minimum side lap shall be one corrugation, configuration, or interlocking rib. End laps shall not be less than 6 inches and shall occur over purlins.

5. Installation of Gutters and Downspouts

Gutters and downspouts shall be rigidly attached to the building. Spacing of cleats for gutters shall be 16 inches maximum. Spacing of brackets and spacers for gutters shall be 36 inches maximum. Supports for downspouts shall be spaced according to manufacturer's recommendations.

6. Minimum Fastener Spacing

Space fasteners according to manufacturer's instructions, but not to exceed:

a. 8 inches o.c. at end laps of covering,

b. 12 inches o.c. at connection of covering to intermediate supports,

c. 12 inches o.c. side laps of roof coverings, 18 inches o.c. at side laps of wall.

7. Installation of Insulation

1. Roof Insulation

Install over purlins before roof coverings are applied. Hold insulation rigid until secured in place. Insulation facing shall be exposed on the interior side of the building. Fold and staple facing tabs of insulation on 6 inch centers, from exterior side of building to completely seal joints. If folding and stapling can only be accomplished from the inside, push the tabs neatly up between the edges of adjoining blankets, and cover side laps of insulation with metal strips formed for this purpose and paint to match the facing material. Install the strips spanning from purlin to purlin and in accordance with the metal building manufacturer's recommendations.

3.03 FIELD PAINTING

Immediately upon detection, abraded or corroded spots on shop-painted surfaces shall be wire brushed and touched up with the same color and material used for the shop coat. Section 09900 PAINTS AND COATINGS, for painting of shop-primed ferrous surfaces.

3.04 FIELD QUALITY CONTROL

At the discretion of the Engineer, sample panels may be taken at random from each delivery or from stockpiles on the site at any time during the construction period, and tests may be made to check the conformance of the materials to the requirements specified in paragraph entitled "Factory Color Finish". Failure of the sample sheets to pass the required tests shall be cause for rejection of all sheets represented by the samples and replacement of the entire shipment.

3.05 MEASUREMENT AND PAYMENT

Pre-Engineered Metal Buildings shall be considered incidental to the various contract items in the Proposal Schedule and no payment will be made thereof.

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
PRE-ENGINEERED METAL BUILDINGS

FACILITY
DESCRIPTION: _____

BUILDING
NUMBER: _____

CORPS OF ENGINEERS CONTRACT
NUMBER: _____

CONTRACTOR

CONTRACTOR: _____

ADDRESS: _____

POINT OF CONTACT: _____

TELEPHONE
NUMBER: _____

OWNER

OWNER: _____

ADDRESS: _____

POINT OF CONTACT: _____

TELEPHONE
NUMBER: _____

CONSTRUCTION AGENT

CONSTRUCTION
AGENT: _____

ADDRESS: _____

POINT OF CONTACT: _____

TELEPHONE
NUMBER: _____

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
PRE-ENGINEERED METAL BUILDINGS
(continued)

THE METAL BUILDING SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING IS WARRANTED BY _____ FOR A PERIOD OF FIVE (5) YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCIES, WIND DAMAGE AND STRUCTURAL FAILURE WITHIN PROJECT SPECIFIED DESIGN LOADS, AND LEAKAGE. THE METAL BUILDING SYSTEM COVERED UNDER THIS WARRANTY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING: FRAMING AND STRUCTURAL MEMBERS, ROOFING AND SIDING PANELS AND SEAMS, EXTERIOR GUTTERS AND DOWNSPOUTS, ACCESSORIES, TRIM, FLASHINGS AND MISCELLANEOUS BUILDING CLOSURE ITEMS, CONNECTORS, COMPONENTS, AND FASTENERS, AND OTHER SYSTEM COMPONENTS AND ASSEMBLIES INSTALLED TO PROVIDE A WEATHERTIGHT SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THESE SPECIFICATIONS THAT BECOME PART OF THE METAL BUILDING SYSTEM. ALL MATERIAL AND WORKMANSHIP DEFICIENCIES, SYSTEM DETERIORATION CAUSED BY EXPOSURE TO THE ELEMENTS AND/OR INADEQUATE RESISTANCE TO SPECIFIED SERVICE DESIGN LOADS, WATER LEAKS AND WIND UPLIFT DAMAGE SHALL BE REPAIRED AS APPROVED BY THE ENGINEER.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE AND LEAKAGE ASSOCIATED WITH THE METAL BUILDING SYSTEM COVERED UNDER THIS WARRANTY SHALL BE REPAIRED AS APPROVED BY THE ENGINEER. THE WARRANTY SHALL COVER THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON _____ AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

_____

(Company President) (Date)

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
PRE-ENGINEERED METAL BUILDINGS
(continued)

THE CONTRACTOR SHALL SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND/OR INSTALLER OF THE METAL BUILDING SYSTEM, WHICH SHALL BE SUBMITTED ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR WILL BE ULTIMATELY RESONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY.

EXCLUSIONS FROM COVERAGE

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).

2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL, INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.

3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.

4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.

5. FAILURE OF ANY PART OF THE BUILDING SYSTEM DUE TO ACTIONS BY THE OWNER WHICH INHIBIT FREE DRAINAGE FROM THE ROOF, AND GUTTERS AND DOWNSPOUTS; OR CONDITIONS WHICH CREATE PONDING WATER ON THE ROOF OR AGAINST THE BUILDING SIDING.

6. THIS WARRANTY APPLIES TO THE METAL BUILDING SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS WHICH IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.

7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES. REPORTS OF LEAKS AND BUILDING SYSTEM DEFICIENCIES SHALL BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE BY TELEPHONE OR IN WRITING FROM EITHER THE OWNER, OR CONTRACTING OFFICER. EMERGENCY REPAIRS, TO PREVENT FURTHER ROOF LEAKS, SHALL BE INITIATED IMMEDIATELY; A WRITTEN PLAN SHALL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS ROOF SYSTEM WITHIN SEVEN

CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT SHALL BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATLEY RESPOND TO THE WARRANTY PROVISIONS, AS STATED IN THE CONTRACT AND AS CONTAINED HEREIN, THE ENGINEER MAY HAVE THE METAL BUILDING SYSTEM REPLACED OR REPAIRED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR. IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS AND/OR REPLACEMENT DIRECTED BY THE OWNER OR ENGINEER EITHER BY REQUESTING A ENGINEER'S DECISION, UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED DEFECTS. UPON BEING INVOKED THE PARTIES SHALL, WITHIN 10 DAYS JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES SHALL CONFER WITHIN 10 DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE ENGINEER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE NAME REMAINS. THE REMAINING PERSON SHALL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED ETC., SHALL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT SHALL PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT. A FRAMED COPY OF THIS WARRANTY SHALL BE POSTED IN THE BUILDING OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

END OF SECTION

DIVISION 13 – SPECIAL CONSTRUCTION

SECTION 13283 – DISTURBANCE OF LEAD PAINT

PART 1 - GENERAL

1.01 GENERAL PROVISIONS: The General Instructions to Bidders, the General Conditions of Construction Contracts, and Special Provisions preceding these specification shall govern this section of the work.

1.02 DESCRIPTION OF WORK

A. Whenever paint containing lead (lead-containing paint and lead-based paint) is being disturbed, this section shall take precedence over others.

B. All paint shall be considered to contain lead until proven otherwise.

C. The preparation and treatment of existing lead-based and/or lead-containing material on various surfaces. Lead-based and/or lead-containing paint removal work shall be selective and only where existing paint is peeling, blistering, flaking, delaminating, in poor condition, not adhering to the existing substrate and/or going to be disturbed. In addition, Contractor shall coordinate work in this Section with contract drawings and documents to determine where painted surfaces, regardless of condition, are going to be disturbed and are required to be completely removed (deleading) to structural substrate to complete work required. This section is being implemented so that the planned work can be accomplished in a safe manner.

D. All preparation of paint with lead (lead-containing paint and lead-based paint) shall be identified in advance so that the preparation/treatment of surfaces will be one continuous operation.

E. Demolition of surfaces and components containing paint with lead (lead-containing paint and lead-based paint).

1.03 WORK SPECIFIED IN THIS SECTION: Furnish all labor, materials and equipment necessary to carry out the safe preparation and treatment of paint with lead in compliance with all applicable laws and regulations from all surfaces, including all incidental and pertinent operations to safely complete this project.

Furnish all labor, materials and equipment necessary to carry out the safe demolition of surfaces and components with paint with lead in compliance with all applicable laws and regulations from all surfaces, including all incidental and pertinent operations to safely complete this project.

All paint shall be considered to contain lead until proven otherwise.

1.04 COORDINATION WITH OTHER SECTIONS: It will be the Contractor's responsibility to repair and/or replace, to the Engineer's satisfaction, all items identified as damaged and/or missing in connection with this work that cannot be proven to have been in this condition prior to the commencement of

this project. It is the Contractor's responsibility to bring to the attention of the Engineer, any discrepancies in the plans and specifications prior to starting any work.

1.05 CONTRACTOR USE OF PREMISES

A. General: The Contractor shall cooperate fully with the Engineer, during the project execution to minimize conflicts.

B. Pollution Control: The Contractor shall not contaminate the air, water, soil or other items with hazardous materials such as cleaning solutions, lead paint debris and waste, etc. The Contractor shall immediately clean the contaminated area and dispose of the waste at his own expense if determined by the Engineer to be contaminated. The Engineer shall have the authority to immediately stop the work and order the Contractor to clean the contaminated site.

C. Use of the Site:

1. Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while at the project site.

2. Do not unreasonably encumber the site with materials or equipment. Confine stock-piling of materials and location of storage to the areas authorized by the Engineer.

1.06 COMMENCEMENT OF WORK

A. The Contractor shall not commence work unless the following requirements have been met. These requirements must be met each time work that calls for the disturbance paint with lead is to begin in a new work area.

B. Submittals: All pre-treatment submittals, notifications, posting and permits have been provided and are satisfactory to the Engineer.

C. Equipment: All equipment for preparation, clean-up and disposal are on hand.

1.07 SUBMITTALS: Submit in accordance with SECTION 01300 – SUBMITTALS and the following requirements. Submittals shall be submitted in the order listed herein. Failure to do so will result in automatic rejection of submittals.

A. General: All submittals shall be made to the Engineer no later than ten (10) consecutive calendar days from award date unless specified otherwise.

B. Detailed Paint with Lead Disturbance Schedule: The Contractor shall submit a project schedule indicating the actual start and completion dates for each phase of the work. The Contractor shall also provide detailed information concerning:

1. Name of Contractor's onsite Competent Person responsible for compliance with all Federal, State and Local regulations and plans and specifications.

2. Preparation of the work area.

3. Any personal protective equipment including respiratory protection and protective clothing acceptable by the Engineer.

4. Employees who will participate in the project, including delineation of experience, training, and assigned responsibilities during the project.

5. Decontamination procedures for the personnel, work area and equipment.

6. Work methods and procedures to be used during the removal of loose, peeling, flaking and/or blistering paint and during demolition of surfaces and components containing lead paint including methods to suppress dust emissions during the disturbance of paint with lead.

7. Required air monitoring procedures and sampling protocols when the likelihood of airborne exposure of lead-containing dust and fumes are probable.

8. Procedures for handling and transporting waste materials.

9. Procedures for final decontamination and clean-up.

10. A sequence of work and performance schedule in coordination with other trades.

11. Emergency procedures.

C. Samples: The Contractor shall submit samples for approval prior to ordering materials.

1. Eight (8) copies and samples for each manufacturer supplied items shall include manufacturer's name, trade name, catalog number, size, specification reference, applicable federal and military specification references, and all other information necessary to establish contract compliance.

2. Liquid sanders, encapsulants and any other materials brought on-site that are considered as hazardous materials under 29 CFR 1910.1200, shall include Materials Safety Data Sheets.

D. The Engineer with the Contractor may inspect the work area wherein all associated activities will occur and submit a statement signed by both, agreeing on building and fixture condition prior to the commencement of work.

E. Documentation for Instructions:

1. Submit to the Engineer that the Contractor's employees, including foreman, supervisors and any other company personnel or agents who may be exposed to airborne lead dust or who may be responsible for any aspects of lead paint removal activities certificates of training, in accordance with the Hawaii Department of Occupational Safety and Health's (HIOSH) lead standard (12-148).

2. Submit to the Engineer, a written respiratory protection program meeting the requirements of 29 CFR 1910.134 (b) (d) (e) and (f), documentation that all employees using respirators have received the training specified in this Section and documentation of respirator fit-testing for all Contractor employees and agents who must wear negative pressure respirators.

F. Documentation From Physician: The Contractor shall submit documentation from a physician that all employees or agents who may be exposed to airborne lead dust or fumes have been medically monitored to determine whether they are physically capable of working while wearing the respirator required without suffering adverse health effects. In addition, the Contractor shall document that his personnel have received medical monitoring as required in the HIOSH lead standard (12-148).

1. Before exposure to lead dust or fumes, the Contractor will provide workers with a comprehensive medical examination as required by Part 8, Section 12-148, June 1993 of the HIOSH standards; Federal Register/Volume 55, No. 189; and 29 CFR 1926.62 or whichever is stricter for the operation being performed. This examination will not be required if adequate records show the employees have been examined as required by the aforementioned regulations within the last year.

2. The Contractor shall provide information to the examining physician about unusual conditions in the work place environment that may impact on the employee's ability to perform work activities; a copy of 29 CFR 1910.1025; HIOSH Section 12-148; Federal Register/Volume 55, No. 189; a description of the affected employee's duties as they relate to the employee' s exposure; the employee's representative exposure level or anticipated exposure level; and description of any personal protective and respiratory equipment used or to be used; and information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

1.08 GENERAL REQUIREMENTS

A. The work specified herein shall include the preparation of work area, preparation and/or other special treatment procedures, demolition, and transportation and disposal procedures as required of lead-containing materials by persons trained, knowledgeable and qualified in the techniques of handling and disposing of lead-containing and lead-contaminated materials, and the subsequent cleaning of contaminated areas. This work shall be performed in compliance with all applicable federal, state and local regulations and be performed by workers who are capable of and willing to perform the work of this contract.

B. The Contractor shall submit documentation within 10 consecutive calendar days of award, that employees have had instructions on the dangers of lead exposure on respirator use and decontamination.

C. Applicable Standards and Guidelines: All work under this contract, and any other trade work conducted with the project, shall be performed in strict accordance with all applicable federal, state and local regulations, standards and codes governing lead paint preparation, removal, disposal, treatment, transportation and disposal of lead materials.

1. The most recent edition of any relevant regulation, standard, document code shall be in effect.

2. The Contractor shall have copies of all standards, regulations, codes and other applicable documents available at the work site in an area assigned to the Contractor throughout the execution of this project.

D. Specific Statutory and Regulatory Requirements:

1. The Department of Labor and Industrial Relations: State of Hawaii; Occupational Safety and Health Standards; Part 8, Section 12-148, June 1993 (HIOSH) Lead Exposure in Construction.

2. Office of Public and Indian Housing, Department of Housing and Urban Development: Lead Paint Guidelines, dated June 1995.

3. Title 29 Code of Federal Regulations Part 1926.62, Safety and Health Standards (Lead Exposure in Construction, May 1993).

4. Title 29 Code of Federal Regulations Part 1910.134, Respiratory Protection.

5. Title 40 Code of Federal Regulations Part 261, Identification and Listing of Hazardous Waste.

6. Title 40 Code of Federal Regulations Part 262, Standards Applicable to Generators of Hazardous Waste.

7. Title 40 Code of Federal Regulations Part 263, Regulations Hazardous Waste Transporters.

8. Federal Register/Vol. 54, No. 131; Tuesday, July 11, 1989. Department of Labor, Occupational Safety and Health Administration; 29 CFR Parts 1910, 1915, 1917 and 1918; Occupational Exposure to Lead; Statement of Reasons; Final Rule.

E. Alternative Procedures:

1. Requests for Alternative Procedures: Procedures described in this specification are to be used at all times. However, if specified procedures

cannot be used, a request must be made in writing to the Engineer providing details of the problem encountered and recommended alternatives.

2. Requirements for Alternative Procedures: Alternative procedures shall provide equivalent or greater protection than the procedures that they replace.

3. Approval of Alternative Procedures: Any alternative procedure must be in writing by the Engineer before implementation.

F. The Contractor shall comply with the above requirements and any applicable State and County regulations. Where conflict or any inconsistency among requirements, this specification exists, and acceptable work plan exists the more stringent requirements shall apply. Ignorance of the above requirements and any applicable State and County regulations resulting in additional cost to the Contractor shall not be paid by the County.

G. All regulations shall govern over these specifications, except that any more stringent specification (including acceptable work plan) or specification providing greater protection against lead exposure, injury, loss or liability shall control to the extent permitted by regulation. Any question regarding conflict or inconsistency between specifications and/or regulations should be directed to the Engineer.

H. The Contractor shall give, at a minimum, seven (7) working days notification to the Engineers' Designated Air Monitoring Inspector/Consultant prior to the start of any lead paint related work.

I. The Contractor shall not begin with any work without the Engineers' Designated Air Monitoring Inspector/Consultant present onsite.

1.09 DEFINITIONS

A. Abatement: Procedure to control lead dust release from paint with lead.

B. Removal: All herein specified procedures necessary to remove lead-containing and/or lead-based paint that is peeling, blistering, flaking, delaminating, in poor condition, not adhering to the existing substrate and/or going to be disturbed in an acceptable manner or the removal of all paint regardless of condition to structural substrate.

C. Action Level (AL): Employee exposure averaged over an 8-hour period, without regard to the use of respirators, to a particular airborne concentration. OSHA requirements become effective at this level. Lead: 30 micrograms/cubic meter.

D. Air Monitoring: The process of measuring the content of a specific, known, volume of air in a stated period of time. For this project, NIOSH 7082 method for lead monitoring.

E. Authorized Visitor: The Engineer, their representatives, air monitoring personnel, or representative of any regulatory or other agency having jurisdiction over the project.

F. Contaminated Area: An area where unwanted toxic or harmful substances have been introduced.

G. Fixed Object: A unit of equipment or furniture in the area which cannot be removed from the work area without dismantling.

H. HEPA Filter: A High Efficiency Particulate Absolute filter capable of trapping and retaining 99.97% of particulate greater than 0.3 micron in length.

I. HEPA Vacuum Equipment: Vacuuming equipment that utilizes a High Efficiency Particulate Absolute (HEPA) filter.

J. Holding Area: A secure area used for the storage of properly contained paint with lead material before removal from the project site to an approved disposal site.

K. Lead: Metallic lead, all inorganic lead compounds, and inorganic lead soaps. Excluded are all other organic lead compounds.

L. Lead-based Paint: Paint or other surface coatings that contain lead equal to or in excess of one milligram per square centimeter or 0.5 percent by weight.

M. Lead Paint: Lead-containing paint, lead-based paint and/or paint containing any amount of lead present.

N. Lead-containing Paint: Lead-containing paint, lead-based paint and/or paint containing any amount of lead.

O. Lead Control Area: An area where paint with lead paint removal, treatment and preparation operations are performed which is isolated by physical boundaries to prevent unauthorized entry of personnel and to prevent the spread of lead dust, paint chips or debris.

P. Permissible Exposure Limit (PEL): The employer shall ensure that no employee is exposed to concentrations greater than the PEL as determined from an 8-hour time weighted average. Lead: 50 micrograms/cubic meter.

Q. Personal Monitoring: Sampling of lead paint dust concentrations within the breathing zone of an employee to determine the 8-hour time weighted average. The samples shall be representative of the employee's work tasks.

R. Plasticizing: Procedures necessary to use polyethylene sheeting, adhesives and (or) taping.

1.10 ABBREVIATIONS

A. ANSI - American National Standards Institute, Inc.

B. CFR - Code of Federal Regulations

C. EPA - U.S. Environmental Protection Agency

D. HIOSH - Department of Occupational Safety and Health, Department of Labor and Industrial Relations, State of Hawaii

E. NIOSH - National Institute for Occupational Safety and Health

F. OSHA - Occupational Safety and health Administration

G. NESHAPS - National Emissions Standards for Hazardous Air Pollutants

H. LBP - Lead-Based Paint

PART 2 - PRODUCTS

2.01 MATERIALS

A. Plastic Sheeting: Minimum thickness is 6-mil polyethylene film.

B. 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 acceptable equal.

C. Adhesives: Adhesives shall be capable of sealing joints of adjacent sheets of polyethylene and for attachment of dissimilar materials and capable of adhering under both dry and wet conditions, including use of amended water. 3-M #76, #77, or acceptable equal.

D. Warning Labels and Signs: As required by HIOSH regulation 12-148 and CFR. 55 No. 189.

E. Protective Clothing: The Contractor shall have all the required sets of coveralls required for this project prior to the start of work. There will be no time extension for the unavailability of coveralls or related equipment.

F. Liquid Sanders: Product shall be specifically designed for the preparation of paint where dry sanding is not allowed or not appropriate. Liquid sanders are not to be used to remove paint.

G. Other Materials: Provide all other materials which may be required to prepare properly and complete this project.

2.02 TOOLS AND EQUIPMENT

A. General: Provide and fabricate suitable tools for the lead treatment/preparation procedures.

B. Other tools and equipment as necessary to accomplish the work.

2.03 PERSONNEL PROTECTION REQUIREMENTS

A. The Contractor acknowledges that he alone is responsible for the instruction and for enforcing personnel protection requirements, and that these specifications provide only a minimum acceptable standard. If other potentially hazardous materials are used, the Contractor shall comply with all applicable regulations that exist for that particular hazardous material and to ensure worker safety and health.

B. Respiratory Protection: The Contractor shall provide all respiratory protection to workers in accordance with the submitted written respiratory protection program, which includes all items in 29CFR1910.134(b)(I-II).

C. Protective Clothing:

1. Clothing: The Contractor shall provide clothing including head, hands, foot and full body protection consisting of material impenetrable by bulk material in sufficient quantities and adequate sized for all workers and Authorized Visitors. Disposable or reusable clothing are acceptable, however, disposable clothing shall be disposed of in accordance with all federal, state and local regulations.

2. Miscellaneous safety equipment: The Contractor shall provide hard hats (meeting the requirements of ANSI Standard Z89.1-1981), protective eyewear (meeting the requirements of ANSI Standard Z87.1-1979), and disposable gloves to all workers. Safety shoes (meeting the requirements of ANSI Standard Z41.1-1987) may be required for some activities.

3. Footwear: The Contractor shall require appropriate footwear for all workers.

PART 3 EXECUTION

3.01 POTENTIAL LEAD HAZARD

A. The disturbance or dislocation of lead-containing materials may cause lead-containing dust to be released into the atmosphere, thereby creating a potential health hazard to workmen, building occupants, and neighboring residences. Apprise all workers supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the hazard and of proper work procedures which must be followed.

B. Where in the performance of the work, workers, supervisory personnel, subcontractors or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified lead-containing materials, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to respirable airborne lead dust and ingestible lead-containing materials. Such measures shall include at the minimum, the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

3.02 LEAD-CONTAINING MATERIALS

A. Lead painted components known to be present due the age of the facility and based on lead paint testing conducted.

B. This Section applies to lead painted components that will be disturbed during surface preparation and treatment, demolition, and other activities and as described herein. It does not apply to painted components that do not contain lead, nor lead paint that will not be disturbed in any manner during the work to be performed under this contract. The Engineer shall have the authority to require special Engineer controls described under this Section of any lead painted components that are disturbed.

3.03 WORK AREA PREPARATION

A. Posting of Caution Signs: The Contractor shall post caution signs in accordance with OSHA/HIOSH at any location and approaches to a location where airborne concentrations of lead may exceed ambient background levels. The Contractor shall post signs at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of work place barriers.

B. Isolation Barriers: Isolation barriers shall be installed in accordance with the contractor's accepted work plan wherever it is necessary to protect the public, employees of the facility and non-working personnel from leaded dust. The isolation barriers shall provide sufficient protection from contaminating the exterior of the work area.

C. Inspect the Building Openings: At the beginning of each work day, the Contractor shall inspect and ensure that all doors, windows and other openings of affected building(s) and all surrounding buildings are closed or sealed.

3.04 LEAD PAINT TREATMENT/PREPARATION PROCEDURES

A. General:

1. Provide temporary utilities, security, safety, worker protection, clean-up and disposal of waste materials as described in this Section and elsewhere in these specifications.

2. Cleaning and isolating the work area: Clean the work area first using HEPA vacuum equipment and then wet cleaning methods as appropriate. Do not use methods that raise dust, such as dry sweeping or vacuuming equipment on wet surfaces.

3. Handling of lead-containing material: The Contractor shall not drop or throw to the floor, material removed from building structures or components. Material shall be removed as intact sections or components (whenever possible) and carefully lowered to the floor. For materials over

15 feet above the floor, the materials may be containerized at elevated levels, or gently lowered onto inclined chutes or scaffolding for subsequent collection and containerization.

4. Requirements for re-establishment of work area: Re-establishment of the work area shall only occur when clean-up procedures have been completed, all repairs necessitated by paint treatment activities have been performed and no visible lead paint debris is present. Any variation from this shall be at the Engineer's discretion.

5. Ground contamination of lead paint and other paint preparatory materials shall be cleaned before leaving the premises.

B. Paint Removal: Paint removal shall only be allowed in locations where paint is peeling, blistering, cracking and/or flaking, or where otherwise noted on the drawings.

C. Paint Stripping:

1. Work included under this sub-section includes the furnishing of all labor, materials and equipment required to remove lead paint by scraping and/or brushing after the paint has been softened by the application of a chemical stripping agent.

2. Chemical removers shall contain no methylene chloride products. Chemical removers shall be compatible with, and not harmful to the substrate to which they are applied. Chemical removers used for interior surfaces shall not raise or discolor the surface being abated.

3. Chemical stripping agent neutralizers may be used on exterior surfaces only. Neutralizers shall be compatible with and not harmful to the substrate that they are applied to. Neutralizers shall be compatible with the stripping agent that has been applied to the surface substrate.

4. Chemical stripping agents and neutralizers shall be applied in accordance with the recommendations of the manufacturer. Care must be taken to adhere to all MSDS, health/safety code and other specification section requirements. Stripping agents shall not be allowed to penetrate wood or other fibrous substrates.

5. Apply paint strippers in accordance with the manufacturer's printed instructions by trowel to a minimum thickness of 1/8 inch. Cover past with fibrous rubbing gently to remove air and pierce remaining air bubbles with knife. Leave on for period of not less than 24 hours or longer according to test patch findings.

6. Neutralize area: Rinse off the residue with water into a collection-filtration system and neutralize the area in accordance with the manufacturer's recommendations.

7. Protective clothing: All workers shall be protected by rubber or polyethylene full body coverage suits, boots, gloves, face shield and protective head gear. Avoid contact with eyes and skin.

8. Ground contamination of lead paint and other paint preparatory materials shall be cleaned before leaving the premises.

D. Abrasive Removers Machine Sander:

1. Work included under this sub-section includes the furnishing of all labor, materials, and equipment required to remove lead paint by machine sanding using a high efficiency dust particulate accumulator (HEPA) vacuum system, as called out in these specifications.

2. Sanders shall be of the dual action, rotary action, orbital or straight line system type, capable of being fitted with a (HEPA) dust pick-up system.

3. Air compressors utilized to operate this equipment shall be designed to continuously provide 90 to 110 psi or a recommended by the manufacturer.

4. Wet sanding shall be conducted by hand or pneumatic driven sanders. Electric powered sanders shall not be used for wet sanding.

5. Dry sanding shall only be done on flat surfaces which allow the HEPA dust collection system come into tight contact with the surface being sanded. Surfaces to be sanded shall be wide enough to allow maximum efficiency of the HEPA dust collection system.

6. All lead paint shall be removed down to the bare substrate surface. In cases that some pigment may remain embedded in wood grain and similar porous substrate, care shall be taken to avoid damage to the substrate with the sanding machine. If the pigment cannot be removed without damaging the substrate, the Contractor shall notify the Engineer for further instructions.

7. Ground contamination of lead paint and other paint preparatory materials shall be cleaned before leaving the premises.

E. Paint Preparation:

1. Work included under this Sub-Section includes the furnishing of all labor, materials and equipment required to prepare lead painted components by non-abrasive or wet abrasive techniques.

2. Application:

a. Protective clothing shall be worn at all times during the work. Tyvek suits or coveralls shall be worn with protective shoes and gloves.

b. Plastic drop cloths shall cover the floor and other areas not being repainted.

c. Remove from surface to be repainted all foreign matter such as tape and gum.

d. Where existing finish remains clean, tight and firm, prepare surface by using a commercial paint preparation solution (liquid sandpaper) or wet sandpaper to remove the glossy coat.

e. Completely wipe or wash all surfaces with mineral spirits, T.S.P. (tri-sodium phosphate), or other appropriate solution as required to remove any accumulated film of wax, oil, grease, smoke, dust, dirt, chalky or other foreign matter which would impair bond of, or bleed through new finish.

f. Immediately, spot prime with specified primer, areas where bare metal is exposed.

g. Dispose of waste, gloves, suits, plastic, and disposable equipment in accordance with 40 CFR 261 and specifications herein.

3. Ground contamination of lead paint and other paint preparatory materials shall be cleaned before leaving the premises.

3.05 LEAD PAINT - DEMOLITION PROCEDURES

A. Provide temporary utilities, security, safety, worker protection, clean-up and disposal of waste materials as described in this Section and elsewhere in these specifications.

B. Isolating the work area: The Contractor shall isolate work area, with barricades and signs to prevent un-authorized persons from entering into the work area.

The Contractor shall post signs at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of work place barriers.

C. The Contractor shall at all times suppress dust emissions while disturbing any material containing lead paint. No visible emissions will be permitted.

D. Requirements for re-establishment of work area: Re-establishment of the work area shall only occur when clean-up procedures have been completed, all repairs necessitated by paint treatment activities have been performed and no visible lead paint debris is present, and all work has been documented to the satisfaction of the Engineer and/or it's representative. Any variation from this shall be at the Engineer's discretion.

E. Ground contamination of lead paint and other paint preparatory materials shall be cleaned before leaving the premises.

3.06 STORAGE AND DISPOSAL REQUIREMENTS

A. Storage Requirements: The Contractor shall store Non-Hazardous and Hazardous Waste Material within the Contractor's trailer or secured storage area.

1. Bagged waste material: If bagged waste material is to be stored, the Contractor shall use dumpsters for this purpose. The dumpsters shall have doors and tops that can be closed and locked to prevent vandalism, wind dispersion of lead dust, or other disturbance of the bagged debris. The Contractor shall not store unbagged lead-containing waste, liquid waste or non-lead-containing waste in these dumpsters. The Contractor also shall ensure that the bags in the dumpsters are not damaged. The Contractor shall post warning signs on the dumpsters as specified in OSHA requirement 29 CFR 1926.62.

2. Drummed waste material: If waste material is to be stored in drums, the Contractor shall use a secured storage area for this purpose. This storage area shall have doors that can be closed and locked to prevent vandalism. The Contractor shall only store waste material contained in drums or dumpsters in the secured area. The Contractor shall ensure that the drums in this secured storage area are not damaged. The Contractor shall post warning signs outside the secured storage area as specified in the OSHA requirement 29 CFR 1926.62.

B. Waste Disposal and Landfill Requirements:

1. Representative samples of demolition debris and paint chip debris for lead leachability (TCLP) testing shall be collected and paid for by the Contractor. If results are below the EPA limit, the materials shall be disposed of at a landfill approved for such purposes. The Contractor shall submit to the Engineer, documentation that the lead-containing waste material removed from the work area has been accepted by the landfill owner.

2. If waste characterization result of the demolition debris and paint chip debris are above the EPA limits, the materials shall be disposed of at an approved facility for receiving hazardous materials. The Contractor shall be responsible for all disposal costs including all transportation fees. The Contractor shall submit to the Engineer, documentation that the lead-containing waste material removed from the work area has been accepted by the hazardous materials approved landfill owner.

C. Disposal of Non-Hazardous Lead-Containing Waste:

1. Notifying landfill operator: If required by the landfill or its agents, the Contractor shall advise the landfill operator with sufficient time prior to transportation of the quantity of material to be delivered.

2. Unloading: Upon reaching the landfill, the Contractor's trucks are to approach the dump location as close as possible for unloading the Lead-Containing Waste Material.

a. The Contractor shall inspect containers as they are unloaded at the disposal site. Material in damaged containers shall be repacked in empty containers, as necessary.

b. The Contractor shall carefully place waste Containers on the ground at the disposal site, not push or throw the containers out of the trucks.

3. Clean-up procedures:

a. If containers are broken or damaged, the Contractor shall leave the containers in the truck and clean the entire truck and its contents using HEPA vacuums and wet cleaning methods, until no visible residue is observed.

b. Following the removal of all contaminated waste, the Contractor shall decontaminate the truck cargo area using HEPA Vacuums and/or wet cleaning methods until no visible residue is observed. Polyethylene sheeting shall be removed and discarded as Lead-Contaminated Waste Material, along with contaminated cleaning materials and protective clothing, in containers at the disposal site.

3.07 TESTING /AIR MONITORING

A. General Contractor and Lead Paint Contractor Responsibilities:

1. The Contractor shall provide the personal monitoring and necessary records for all of the Contractor's employees as required by OSHA (29 CFR 1926.62), Hawaii State Law HIOSH (12-148) and all other applicable law.

2. The General Contractor shall include in their bid $730.00 for each daily (up to 8-hour) work shift for payment to the Engineers' selected Designated Air Monitoring Inspector/ Consultant.

3. Daily area air monitoring and clearance testing shall be paid by the General Contractor. Any air monitoring and testing which becomes necessary in order to follow up on work by the Contractor that has been rejected as not conforming to the requirements shall be the responsibility of the General Contractor.

B. Daily Testing/Air Monitoring Inspector:

1. The Inspector (Engineer's Air Monitoring Consultant) shall be on site at all times and will ensure that the applicable specifications are being followed using the methods and requirements of the applicable scope of work.

2. The Inspector (Engineer's Air Monitoring Consultant) and the Engineer shall have the authority of providing control during the project.

3.08 MEASUREMENT AND PAYMENT

Disturbance of Lead Paint specified above and in the plans shall include all equipment, labor, material, and testing necessary to complete the work in place and shall be paid for under the Lump Sum for "Removal of Lead Paint" in the Proposal Schedule.

END OF SECTION

SECTION 13288 - TESTING / AIR MONITORING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS: The General Instructions to Bidders, the General Conditions of Construction Contracts, and Special Provisions preceding these specification shall govern this section of the work.

1.02 SUMMARY: Testing and air monitoring (non-HIOSH) shall be supplied by the Engineer for the purpose of:

A. Verifying compliance with the specifications listed in Section 13283;

B. Insuring that the State's legally required documentation is collected;

C. Providing engineering control during the project.

D. The Contractor shall give, at a minimum, seven (7) working days notification to the Engineer's Air Monitoring Consultant prior to the start of any lead paint related work.

1.03 COORDINATION WITH OTHER SECTIONS: The testing/air monitoring requirements included in the scope of work for any testing/air monitoring consultants or inspectors, and all applicable Federal, State, and local regulations shall be coordinated with this section.

PART 2 - PRODUCTS

Not applicable to this section.

PART 3 - EXECUTION

3.01 ABATEMENT CONTRACTOR RESPONSIBILITIES

A. The Contractor shall be responsible for providing the personal monitoring and maintaining necessary records for all of the Contractor's employees as required by Hawaii State Law and all other applicable law.

B. The Contractor shall obtain the legally required reports for air monitoring as part of the contract.

C. Monitoring information developed by the Inspector's activities while under the contract with the State shall be for the use of the State. The information will be available and offered to the Contractor when developed, but not thereafter, and shall not waive the Contractor's obligations stated elsewhere in this section.

D. Air monitoring and testing which becomes necessary in order to follow up on work by the Contractor which is rejected as not conforming to the requirements shall be the responsibility of the State. However, the full cost of such additional

monitoring and testing shall be borne by the Contractor, and shall be deducted from the final contract payment.

E. Personal air monitoring that is part of the Inspector's scope of work shall be accommodated by the Contractor and shall not be assumed to be the monitoring required of the Contractor by law or regulation.

3.02 GENERAL CONTRACTOR RESPONSIBILITIES

A. The General Contractor shall include in their bid proposal cost $730.00 for each daily (up to 8-hour) work shift for payment to the Engineers' selected Designated Air Monitoring Inspector/Consultant. See Section 13283 - Disturbance of Lead Paint, paragraph 3.07A for requirements.

3.03 TESTING/AIR MONITORING INSPECTOR

A. The Inspector (Engineer's Air Monitoring Consultant) will insure that the applicable specifications are being followed using the methods and requirements of the applicable scope of work.

B. The Inspector (Engineer's Air Monitoring Consultant) shall have the authority to exercise engineering control during the project.

3.04 MEASUREMENT AND PAYMENT

Testing/Air Monitoring specified above and in the plans shall be conducted by the Inspector (Engineer's Air Monitoring Consultant) as specified above and in the plans shall be paid for under Lump Sum for "Removal of Lead Paint" in the Proposal Schedule.

END OF SECTION

SECTION 16011 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

This specification covers the requirements for furnishing and installing all electrical work.

1.02 WORK INCLUDED

A. The Contractor under this Division shall provide all labor, materials, equipment, supervision and services required for the construction of the electrical systems. The finished installations shall be complete, operable and shall include all work specified herein and shown on the Drawings.

B. The work shall include complete testing of all equipment and wiring at the completion of the work and making any minor connection changes or adjustments necessary for the proper functioning of the system and equipment. All systems shall be properly adjusted and in working order at the time of final acceptance.

C. All painting and other finishing work shall conform to the applicable requirements of the specifications as prescribed in appropriate sections.

D. It is the intent of these Specifications and other Contract Documents to require an installation complete in every detail. Consequently, the Contractor will be responsible for minor details or for any special construction which may be found necessary to properly furnish, install, adjust, test, and place in successful and continuous operation, the entire electrical system, and the cost of same shall be included in the contract price.

1.03 DESCRIPTION OF WORK

Work specified in this Division shall include, but not be limited to the following:

1. Complete disconnecting, removal and disposal of existing electrical panel, outlets, wiring, lighting fixtures, and feeders in existing Covered Parking Building.

2. Complete new electric panel outlets, wiring, lighting fixtures, wiring devices and feeder in new Covered Parking Building.

3. Complete new solar photovoltaic system, including photovoltaic panels, inverters, disconnect switches, circuit breakers and wiring.

4. Complete testing.

5. Complete as-built drawings.

1.04 REFERENCES

Comply with the applicable requirements of the following standards unless otherwise indicated:

1. Comply with local ordinances; National Electrical Code; applicable regulations of the National Board of Fire Underwriters; specifications of ANSI, NEMA, and UL and regulations of the County of Kauai and the State of Hawaii.

2. In the event of conflict between pertinent codes and regulations, and the requirements of the referenced standards, or those indicated in Specifications and on drawings, the provision of the more stringent shall govern.

1.05 RELATED WORK

DIVISION 1 - GENERAL REQUIREMENTS.
SECTION 16100 - ELECTRICAL WORK.
SECTION 17000 - PHOTOVOLTAIC SYSTEM.

1.06 PERMITS AND INSPECTION

A. Electrical permit required by local ordinances shall be obtained and paid for by the Electrical Contractor.

B. After completion of the work, the Engineer shall be furnished a certificate of final inspection and approval from the electrical code inspection department, Department of Public Works, and the County of Kauai.

1.07 COORDINATION

A. Refer to all project Drawings and to all Sections of the project Specifications. Coordinate and fit all work accordingly so that all electrical outlets and equipment will be properly located and readily accessible. The Drawings indicate the relation of wiring and connections and must not be scaled for exact locations.

Verify all construction dimensions at the project and make changes necessary to conform to the piers as constructed. Work improperly installed due to lack of construction verification shall be corrected at the Contractor's expense.

B. Work shall be scheduled to avoid delays, interferences, and unnecessary work. If any conflicts occur necessitating departures from the Drawings and Specifications, details of departures and reasons therefore shall be submitted immediately for consideration by the Engineer.

1.08 SUBMITTALS

Submit shop drawings and catalog cuts of the equipment and products identified in each Division 16 technical section for approval in accordance with SUBMITTALS section of these specifications. Each submittal shall be prepared with a summary sheet attached to each copy identifying all items included in the submittal. Incomplete submittals and those without summary sheets will be returned without review.

1.09 DELIVERY, HANDLING AND STORAGE

A. Deliver all materials of this Division in manufacturer's original unopened packages or containers with label intact and legible.

B. Use means necessary to protect the materials of this section before, during and after installation; to protect the installed work and materials of all other trades; and to protect the original structure, work and materials of the State of Hawaii.

C. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the State of Hawaii.

1.10 WARRANTY

A. Installation shall be complete in every detail as specified and ready for use. Any items supplied by Contractor developing defects of design, construction, or quality within one (1) year of final acceptance by Engineer shall be replaced by such new materials, apparatus or parts to make such defective portion of the complete system conform to the true intent and meaning of the Drawings and Specifications at no additional cost to the State of Hawaii.

B. The warranty shall be countersigned by the General Contractor.

1.11 SITE CONDITIONS

The Contractor shall visit the project site before any work has started to determine the site conditions and the extent of the removal and new work required.

1.12 CONTINUITY OF SERVICES, PHASING

A. Execute work using such methods, techniques, connections and tie-ins which will cause least interference with, and interruptions of, existing utilities and services. Schedule all arrangement for work which will cause interferences or interruptions, in advance with the Engineer, all other affected trades and authorities having jurisdiction.

B. Examine site and become familiar with existing conditions affecting work.

C. Examine all Drawings and Specifications, including civil, structural and mechanical, and become familiar with the types and systems of construction to be used. Determine how such types and systems will affect the installation of electrical work.

D. Investigate, determine and verify locations of any utilities in or near project area.

PART 2 - PRODUCTS

2.01 MATERIALS AND WORKMANSHIP

A. All materials shall conform to the latest issue of all applicable standards as established by NEMA, NFPA, ANSI, IEEE, ASTM and Underwriters' Laboratories, and shall bear the manufacturer's name, trade name and when available, the Underwriters' Label.

B. Within twenty (20) days after the contract has been awarded, or as otherwise directed, forward to the Engineer a complete list of all materials and equipment proposed for installation. The intent to use the exact makes specified does not eliminate the responsibility of submitting such a list. List shall include sufficient information to permit ready and complete identification. After the work is completed, Contractor shall provide drawings showing the as-built conditions.

C. All work not installed and completed in accordance with the latest rules and regulations of the NEC, OSHA, NESC, and all local ordinances shall be removed and reinstalled correctly at the Contractor's expense.

PART 3 – EXECUTION

3.01 GENERAL

A. Install all electrical materials and equipment in accordance contract drawings, manufacturer's recommendations and as approved by the Engineer.

B. Cut, break, drill and patch as required to install electrical system. Repair any surface damaged or marred by notching, drilling or any other process necessary for installation of electrical work. Patch any damaged surfaces to match the adjacent surface.

C. The Electrical Contractor shall coordinate his work with other trades to avoid conflicts with civil, structural, mechanical, and architectural elements of this project.

3.02 JOB CONDITIONS

A. These specifications are accompanied by construction drawings including plans showing locations of all wiring, outlets, devices, and other electrical equipment. The locations are approximate and before installing, study adjacent structural and architectural details and make installation in most logical manner. Any device and/or wiring may be relocated within 10'-0" before installation at direction of Engineer without additional cost to the State of Hawaii.

B. Before installing, verify all dimensions, sizes, and electrical rating of equipment.

C. Verify that electrical system may be installed in strict accordance with the existing construction, the Drawings and Specifications and the manufacturer's recommendations.

D. In the event of discrepancy, immediately notify the Engineer. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.03 DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS

A. Submit written certification that electrical systems are complete and operational. Submit certification with Contractor's request for final review.

B. At the time of final review of electrical work, demonstrate the operation of electrical systems. Provide labor, apparatus and equipment for systems' demonstration. The various tests shall be under the direction and supervision of the Engineer.

C. The Contractor shall perform start-up and all tests as required to obtain final field acceptance from the State of Hawaii. All tests shall be conducted in the presence of the Engineer or his representative.

D. The Contractor shall be responsible for all tests. Testing shall be performed by and under the immediate supervision of the Contractor.

E. A visual inspection of all electrical equipment, to check for foreign material, tightness of wiring and connection, proper grounding, matching nameplate charts with specification, etc., shall be made prior to actual testing.

3.04 PRELIMINARY TEST

After obtaining permission from the Engineer and before commencing work on any existing electrical system, the Contractor shall perform an operational test on the existing systems to determine if it is in perfect operating condition and free from physical damage. Any malfunctions or physical damage shall be noted and reported in writing, in order that the adjustments and repairs can be made by the State of Hawaii. All reported malfunctions and physical damage shall constitute the as-in condition of the system and the Contractor shall not be responsible for their repairs, adjustment or replacement. Thereafter, work on those systems, in connection with this project, may be performed. Upon completion of the project, any malfunctions of or physical damage to those systems not identified in a preliminary test report shall be the responsibility of the Contractor to repair, adjust and make operative at no additional cost to the State of Hawaii.

3.05 "AS-BUILT" DRAWINGS

Field set and TWO (2) sets of "As-Built" plans indicating all deviations from the construction drawings shall be provided FIVE (5) Working Days prior to the scheduled final inspection. Approved "As-Built" plans shall be submitted TEN (10) working days after final inspection on TWO (2) sets of prints.

END OF SECTION

SECTION 16100 - ELECTRICAL WORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. This specification covers the requirements for furnishing and installing all electrical work.

B. SECTION 16011 - GENERAL ELECTRICAL REQUIREMENTS applies to this section with additions and modifications specified herein.

1.02 APPLICABLE PUBLICATIONS

The publications cited within this specification form a part of this specification to the extent referenced. Unless otherwise indicated, most recent edition of the publication with current revisions and amendments will be enforced.

1.03 SUBMITTALS

Submit shop drawings and catalog cuts of the following equipment for approval in accordance with SUBMITTALS section. Each submittal shall be prepared with a summary sheet attached to each copy identifying all items included in the submittal. Incomplete submittals and those without summary sheets will be returned without review.

1. Raceways, conductors, and mounting hardware.
2. Lighting fixtures, lamps and ballasts.
3. Junction boxes.
4. Wiring devices.
5. Electric panelboard.
6. Disconnect switches.
7. Circuit breakers.
8. Any built-to-order equipment.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Asbestos Prohibition: No asbestos-containing material shall be used in this section. The Contractor shall ensure that all materials incorporated in the project are asbestos-free.

B. Materials and equipment shall be new and equipment satisfying the requirements of NEC Articles 90.7 and 110.3 shall be listed or labeled by a nationally recognized electrical testing laboratory.

C. Brand names and catalog numbers indicate standards of design and quality required. In case of obsolescence, supersedure, or error in catalog number, the associated description and intent implied by the application shall govern.

2.02 WIRING MATERIAL

A. Conduits: Electrical metallic tubing (EMT) and rigid steel conduit (GRS) shall be 3/4" minimum diameter. Metallic tubing and conduits shall be steel; tubing shall be zinc-coated and conduits shall be hot-dip galvanized.

B. Exterior Underground Raceways: Plastic conduit, polyvinyl chloride, Schedule 40, provide with green equipment grounding conductor.

C. Flexible Conduit: Zinc-coated inside and outside; liquid-tight with factory fitting for, 3/4" minimum diameter.

D. Outlet and Small Junction Boxes: Concealed boxes shall be pressed, zinc-coated steel, 4" sq. minimum nominal size, minimum depth 1-1/2", with raised cover ring for devices set flush in drywall. Exposed boxes shall be smooth cast metal, prime painted and enamel finished with hubs for conduit connection with covers.

E. Junction Boxes: Junction boxes, unless otherwise specified, shall be NEMA 1 for interior locations and NEMA 4X stainless steel for exterior locations. NEMA 1 fabricate from galvanized steel, prime painted and enamel finish according to NEMA specifications. Manufacturer and install according to NEC Article 370.

F. Wires and Cables: Conductors shall be copper, No. 12 AWG minimum; No. 10 and smaller, solid and round; No. 8 and larger, 7 or 19 strands, concentric. All conductors shall be Type THWN or XHHW. Fixture wires shall conform to NEC requirements.

2.03 LIGHTING SYSTEM

A. Lighting system shall be complete with all necessary mounting hardware and accessories, lamps ballasts, modifications and accessories to provide a complete system in accordance with NEC Article No. 410 and the intent of the contract.

B. Fixtures manufactured from sheet steel shall be die formed, embossed for strength, welded for permanent rigidity, corrosion protected by process bonding phosphate material to metal, finished after fabrication with baked white enamel having minimum of 88 percent reflectivity in all light reflecting surfaces and of baked white enamel for all other surfaces. All unpainted parts and hardware shall be dip zinc plated. When subjected to 300 hours salt spray testing, the fixture shall not show corrosion deterioration. Light-tight construction and sealing gaskets of resilient neoprene seals at openings shall be provided. Ballast and lamp compartments shall be isolated from each other. Provide separate wiring channel for through wiring.

C. Fixtures manufactured from aluminum shall be cast or extruded. Corrosion protection shall be provided by anodizing process. Color of finish shall be dark bronze unless otherwise specified in fixture description.

D. Plastic lens of fluorescent fixtures shall be virgin acrylic, type K12, .125" minimum thickness.

E. Fluorescent Solid-State Ballasts: Provide energy saving, Class "P", sound rating "A", solid-state fluorescent ballast of the full light output type. Ballasts shall be able to withstand voltage transients in accordance with IEEE C62.41, Category A, for normal and common modes. Minimum power factor shall not be less than 0.90. Ballasts shall operate at input frequency of 60 hertz. The ballast shall operate the lamps at a frequency of not less than 20,000 hertz. Ballast current total harmonic content shall be less than 10 percent. Ballasts shall be compatible for use with energy-saving lamps. Maximum ballast factor of 0.78. Ballast shall be programmed rapid start type. Sylvania Quicktronic System 32 QTPXx32T8/PSX-SC; General Electric Ultrastart, Multi-Voltage programmed Start GE X32 MVPS-L; Advance Optanium Multi-Voltage IOPXS32-LW-SC, or approved equal.

F. Fluorescent Lamps: Cool white phosphor coated, 4100°K, 48" nominal length rapid start, 3100 lumens initial output, F32T8/841/XPS/ECO. Lamps shall be rated for 36,000 hours life.

G. LED fixtures shall be composed of an LED light engine and an LED driver. Light engines shall consist of multiple LED modules mounted on an aluminum heat sink. Rated life of light engine shall be 50,000 hours minimum at 70% lumen maintenance. LED drivers shall be solid state electronic type with current rating appropriate for fixture. Units shall be UL listed, temperature rated for the ambient anticipated by the fixture manufacturer and rated for system voltage.

2.04 WIRING DEVICES

A. Duplex Receptacle, GFI Type: Ivory phenolic molded body, NEMA 5-20R, 20A, 125V, 2-pole, 3-wire, grounded, side wired, U-shaped grounding slot, parallel double wipe phosphor bronze spring tensioned contacts, automatic grounding clip, solid-state ground fault sensing and test circuit designed to trip open when ground current exceed 5.0 milliamperes, resettable, and with rating engraved on body. Install in outlet box with appropriate device or cover plate. Manufacture and install according to NEC Article Nos. 200 and 410. Hubbell No. GFR-5362-SGI.

B. Weatherproof Receptacle: Provide GFI type receptacle in cast metal box with gasketed, cast metal weatherproof cover plate. Cover plates shall be listed for "wet locations" while in use.

C. Light switch shall be non-mercury, number of poles required, quiet operating, rated for 20A, 120-277 volts, one piece heavy-duty ivory nylon toggle handle which makes continuous contact with spring contact arms, two piece heavy-duty body bolted to bridge strap, large binding head screws for terminating conductors silver cadmium oxide contacts, high conductivity and fatigue resistant contact arms, spring loaded cam mechanism, back and side wiring, with ground terminal, heavy-duty bridge strap, premium specification grade, U.L. labeled, and rated for 10,000 cycles of operation. Manufacture and install according to NEC Article Nos. 100 and 380. Device shall be installed in outlet box complete with device plate. Hubbell No. HBL 1221-I series.

D. Device Plates: Provide U.L. listed, one-piece device plates for all outlets and fittings to suit the devices installed. Plates on unfinished walls and on fittings shall be of zinc-coated sheet steel or cast metal having round or beveled edges. Plates on finished walls shall be smooth nylon. Screws shall be machine type with countersunk heads to match the plate. The use of sectional type device plates will not be permitted. Plates installed on weatherproof designated devices shall be gasketed and U.L. listed for "wet locations" with cast aluminum plate and hinged cover/covers.

Equal devices by Arrow Hart, Bryant, Leviton, Pass & Seymour, or General Electric are approved.

2.05 MOTOR OR EQUIPMENT CONNECTION

A. Power connection to motor or equipment from nearest box, disconnect or controller with watertight flexible conduit and locknut type or threaded connector.

2.06 ELECTRICAL APPARATUS

A. Equipment Disconnect and Fused Switches: Heavy duty, fusible or non-fusible safety switch. Horsepower rated when used as motor disconnect. Contacts shall be lever operated, spring loaded and enclosed in NEMA 1 enclosures for interior locations in ceiling spaces and NEMA 4X, stainless steel enclosures for all other locations. When for use with fuses of current limiting type, clips shall be rejection type. Manufacture and install according to NEC Articles 240, 380 and 430. Provide three (3) spare fuses of each ampere rating. Siemens, Cutler-Hammer, Square-D and General Electric.

B. Panelboards:

1. General: Furnish and install circuit breaker lighting and appliance panelboards where shown on the drawings and as indicated in the panelboards schedule.

   Panelboards shall comply with the following industry standard:

   a. NEMA Standard PB-1

   b. UL Standards; Cabinets and Boxes-UL 50; Panelboards -UL 67

   c. National Electrical Code

   Panelboards shall be labeled as suitable for use as service equipment in accordance with Article 384 of the National Electrical Code.

2. Box: The panel box shall not be less than 20 inches wide and fabricated from galvanized or galvannealed steel. Box shall have adjustment screws to provide easy alignment. Removable end walls to be blank. Panelboard box is to have separate UL label and minimum wire bending and gutter requirements to meet the NEC and UL standards. Wiring gutters shall be completely free of any part of trim clamp to prevent damaging wire insulation.

3. Interior: All interiors shall be completely factory assembled. The design of the interior shall permit replacement of circuit breakers without disturbing adjacent units and without machine drilling or tapping. All circuit breaker connections shall be in a hole tapped by the manufacturer. Main bus shall be all copper. Branch bus shall be copper only. Sizing of

conductor shall be in accordance with UL 67. Bus bars shall be supported by a VO rated, UL recognized, Polymeric material. Bus sequence shall start at the top left phase bus of the interior for both top and bottom fed panels. Panels shall be rated as shown on plans. Interior shall be convertible from main lug to main breaker with the addition of an appropriate field-installable kit. Interior shall be changeable from top to bottom feed and vice-versa, while maintaining readability of dead-front labeling.

Dead-front shall be provided with a flange for easy attachment of trim. Incoming cable lugs shall be grouped at one end to separate them from the load side cables. Main lugs shall be lay-in construction to facilitate connections. Neutral bussing shall have a lug for each outgoing branch requiring a neutral connection. For easy wiring and shortest cable run possible, load size neutral connection lugs to be split with each side taking 50% of load neutral connections. The interior shall be provided with wing nuts for securing to box without tools.

4. Trim: The panel trim shall be surface or flush as indicated on the drawings. It shall be fabricated from cold-rolled steel, painted with an ANSI-61 light gray finish and equipped with concealed hinges, flush lock and a holder for circuit directory card. Trim shall have two separate supports designed to engage the box flange to stabilize and secure the trim during installation. Trim screws to be located behind the lockable door for tamper resistance.

5. Description: The panelboard shall be for use with the system indicated on panelboard schedule.

   The panelboard enclosures shall be NEMA Type 4X construction for top or bottom cable entrance and suitable for surface mounting unless otherwise noted on panelboard schedules.

   Short circuit rating shall be 10,000 amperes symmetrical based on the smallest rating on any circuit breaker installed in the panelboard.

   Provide main lug only or main circuit breaker panelboards as shown on panelboard schedules. Also provide branch and sub-feed circuit breakers of the quantity, trip rating and number of poles as shown on schedules.

   Molded case circuit breakers shall be thermal-magnetic, quick-make,

quick-break, trip free. Multi-pole breakers shall be common trip. If current limiting circuit breaker mains are indicated on schedules, provide breakers with inverse time delay, instantaneous circuit protection and limit let-through I^2t to a value less than I^2t of one-half cycle wave of the symmetrical prospective current without any fusible elements. All breakers shall be equipped with antiturn solderless, pressure type connectors. All provisions shall be located at the bottom of the panelboard and be fully bussed complete with all necessary mounting hardware less the breaker.

Provide sub-feed lugs, feed though lugs, handle blocking devices, padlocking devices, shunt trips and ground bus bars as shown on schedules.

6. Manufacturer: General Electric A Series (AQF 1422MB), Siemens, Square D, or Cutler Hammer equals.

2.07 HARDWARE SUPPORTS, BACKING, ETC.

A. Provide all hardware, supports, backing and other accessories necessary to install electrical equipment. Wood materials shall be plastic lumber or composite wood - polymer material, iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be stainless steel or bronze. Provide Type 316 stainless steel materials where indicated.

B. Bolt, nuts, washers, and screws used for outside shall be high quality stainless steel or brass.

C. Channel shall be heavy duty, fiberglass, glass reinforced polyester or vinyl ester resin, 1-5/8" x 1-5/8" x ¼", or 1-5/8" x 1-5/8" x 12 gauge stainless steel UNISTRUT and B-Line.

D. Concrete: Ready mix type with 3000 PSI compressive strengths. Concrete material and aggregates shall conform to latest ASTM Specifications. Concrete aggregates for ductlines shall be 3/4" maximum in size.

E. Backfill Material Type A: Black or beach sand, earth or earth and gravel mixture. If earth and gravel mixture, rock size shall be one inch or smaller and shall not contain more than 50% rock particles by volume. This fill shall be used over concrete encased ducts.

PART 3 - EXECUTION

3.01 RACEWAYS

A. Use PVC, EMT and rigid steel conduits with approved coupling and connectors. All cuts square, using saw. Ream the ends. Bends made with approved tools. Reject flattened or crushed conduit. No running thread. Bushing and two locknuts at connection to boxes and enclosures.

B. Seal against water during construction. Risers must be closed, except when pulling conductors.

C. Exposed conduit runs shall be parallel and/or perpendicular to structural elements.

D. Provide nylon pull string of 200-pound minimum tensile strength in all empty conduits in excess of 15 feet in length.

E. Use PVC underground. Use rigid steel conduits in locations exposed to weather. Use EMT in interior locations.

3.02 BOXES

Plumb and securely fasten. Remove all debris from interior.

3.03 CONDUCTORS

A. Lubricants: Non-wax type, chemically neutral to insulation.

B. Clean all raceways, boxes, and enclosures before pulling wires and cables. Form neatly in enclosures for minimum of crossovers.

3.04 MISCELLANEOUS DETAILS

A. Provide necessary foundations, supports, backing, etc., for all raceways, junction boxes, light pole, pier power pedestal and equipment. Attach to wood and steel by screws or bolts. Attach to concrete by expansion anchors. Powder charge driven studs and anchors shall not be used.

B. Clean all surfaces of enclosures and equipment.

C. Close all unused knockout holes.

3.05 PAINTING

A. Wipe clean of dirt, oil, grease, etc., all new electrical equipment and raceways with rag and solvent, prime and finish to match surrounding finish. Do not paint over nameplate.

B. All new surface-mounted boxes and exposed raceways shall be painted to match the color of adjacent surfaces.

3.06 TESTING

A. Upon completion of this portion of work, and prior to its acceptance by the State of Hawaii, make all required tests and secure all required approval from agencies having jurisdiction. Any deficiencies found shall be rectified and work affected by such deficiencies shall be completely retested at Contractor's expense. Written notification of all proposed tests shall be provided to the Engineer a minimum of 14 days prior to the date of the test.

B. Perform an operational test after completion of the installation in the presence of the Engineer, to assure proper operation of all items of work. Remove all grounds and shorts.

END OF SECTION

SECTION 17000 - PHOTOVOLTAIC SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

This section specifies photovoltaic panels, inverters, racking and remote monitoring system for a complete and operable KW DC STC roof mounted photovoltaic system and Net Energy Metering (NEM) application/agreement and associated drawings and product data sheets to Kauai Island Utility Cooperative (KIUC) for a Net Energy Metering interconnection with the Kauai Island Utility Cooperative (KIUC) distribution system.

1.02 REFERENCES

This section contains references to the following documents. They are a part of this section. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ANSI/IEEE C62.41	Guide for Surge Voltages in Low-voltage AC Power Circuits
FCC Part 15 A&B	FCC Rules
IEEE 1547.1-2003	Standard for Interconnecting Distributed Resources with Electric Power Systems
IEEE 519	Recommended Practices and Requirements for Harmonic Control in Electric Power Systems
IEEE 929	Recommended Practice for Utility Interface of Photovoltaic (PV) Systems
NFPA 7G-2008	National Electric Code (NEC)
IBC 2006	International Building Code (IBC)
UL-1741-2005	The Standard for Static Inverters and Charge Controllers for use in Photovoltaic Power Systems
ANSI/UL 1998	Standard for Software in Programmable Components

1.03 REGULATORY

A. All work and material executed under this Section shall be in accordance with the National Electrical Code, 2008 edition.

B. All products shall comply with applicable State and Federal government efficacy laws.

C. Products shall be listed and classified by Underwriters Laboratories, Inc or Nationally Recognized Testing Laboratory as suitable for the purpose specified and indicated.

D. The Contractor will be required to apply for any permits related to the PV installation.

1.04 GUARANTEE

A. All work and material executed under this Section shall be guaranteed to be free from defects of materials and workmanship for one (1) year from date of final acceptance of the project as a whole. The panels and inverters shall be warranted as specified in PART 2 - PRODUCTS.

1.05 REPAIR AND REPLACEMENT

A. All work of repair and replacement required, including other work damaged by this work's defects, shall be performed without cost to the State of Hawaii.

1.06 DRAWINGS

A. Specifications are accompanied by drawings of buildings, site, plans, and diagrammatic electrical plans showing locations of PV panels, inverters, disconnects, panelboards and other electrical equipment. Locations are approximate. Before installing, study adjacent construction details and make installation in most logical manner. Any device or equipment may be relocated within 10'-0" before installation at direction of the Engineer without additional charge to the State of Hawaii.

B. Before installing, verify all dimensions and sizes of equipment at job site. Circuit and conduit routing is typical and may be altered in any logical manner; however, all changes shall be approved by the Engineer and shown on field posted "as-built" reproducible drawings.

1.07 SUBMITTALS

A. Submit in accordance with SECTION 01330 - SUBMITTAL PROCEDURES. Provide shop drawings, catalog cut sheets and warranty for approval for the following items:

1. PV panels.

2. Inverter(s).

3. Combiner Boxes.

4. Roof mounted racking system, including point load calculations.

5. Anemometer, temperature probe, and pyranometer.

6. Monitoring system and monitoring service.

7. NEM agreement and associated drawings.

8. Maintenance contract services to be provided and associated manufacturer's recommendations.

9. Permit(s) as required.

B. Shop drawings and catalog cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Approval of shop drawings and catalog cuts shall not release Contractor from complying with intent of specifications and drawings. Any deviations from approved shop drawings shall have prior approval by the Engineer.

1.08 SPARE PARTS

A. Per SECTION 01770 - CLOSEOUT PROCEDURES, provide the following:

1. A quantity equal to two (2) of the PV panels installed.

2. Spare parts as recommended by the inverter manufacturer.

PART 2 - PRODUCTS

2.01 GENERAL

Conductors between photovoltaic panels and to the DC inputs of the inverter are to be determined by the PhotoVoltaic Subcontractor. Depending upon routing by Contractor,

the conductors shall be sized by the Contractor in accordance with the NEC to limit voltage drop to 2 percent.

2.02 COLOR CODING

Utilize different color conductors for each string circuit.

2.03 PHOTOVOLTAIC PANEL CONDUCTORS

A. Conductors shall be provided with the following characteristics:

1. Voltage: 600 volts.

2. Conductor: Copper, 600 volt, No. 10 AWG minimum. Conductors No. 8 and smaller, solid and round.

3. Insulation: USE-2 and THWN or XHHW-2 in conduit, 90 degree C dry, 75 degree C wet.

4. Jacket: Nylon.

5. Flame Resistance: UL 83.

6. Manufacturer: Alpha, Carol, Northern Wire and Cable, General Cable; or equal.

2.04 SPLICING AND TERMINATING MATERIALS

600 Volt Conductor and Cable Connectors: Connectors shall be tool applied compression type of correct size and UL listed for the specific application. Connectors shall be tin-plated high conductivity copper.

In-line splices are not allowed. Splices shall be compression type, made with a compression tool die approved for the purpose, as made by Thomas and Betts Corp., or equal. Splice shall be covered with a heat-shrinkable sleeve or boot.

2.05 PHOTOVOLTAIC PANELS

A. Photovoltaic panels shall be monocrystalline type, listed on the California Energy Commission List of Eligible Photovoltaic Panels (www.gosolarcalifornia.ca.gov) and having the following characteristics:

1. Max Power Voltage: 30 +/-5 V

2. Max Power Current: 7.66 +/- 1 A

3. Wattage: 245 W

4. Tolerance: +/- 3%

5. Open Circuit Voltage: 37 +/- .5 V

6. Short Circuit Current: 8.18 +/-.5 A

7. Bypass Diodes: 3

8. Module Efficiency: 14.1%; Cell Efficiency: 16.2%

9. Temperature Coefficient: -0.43%

10. Isc Temperature Coefficient: 0.08%

11. Voc Temperature Coefficient: -0.36%

12. Nominal Operating Cell Temperature: 45 +/- 2

13. Degradation: 0.7% per year

14. Loading: Up to 5400 Pascals

15. Tempered glass shield.

16. Connectors: Plug & Play type

17. Warranty: 5 years manufacturing; 90% at ten (10) years and 80% at 25 years for power production.

18. UL listed.

2.06 GRID-TIED INVERTER

A. Grid-tied solar shall be listed on the California Energy Commission List of Eligible Inverters (www.gosolarcalifornia.ca.gov) and having the following characteristics:

B. Nominal AC Output Voltage: 240 volts, single phase.

C. Maximum Continuous Output Power: 48 kW. Other wattage ratings may be acceptable if the same quantity of panels as indicated on the drawings can be accommodated and string sizes meet manufacturer's recommendations.

D. Maximum Efficiency: 96% minimum

E. CEC Efficiency: 95.5%

F. Consumption in Standby Mode: < 15 watt

G. Frequency adjustment, frequency clearing times, frequency trip limit accuracy and voltage adjustment per KIUC requirements and UL 1741 and IEEE 1547.

H. DC Disconnect and Combiner: Provide an integrated DC disconnect and fused combiner to accommodate the indicated number of strings.

I. Internal Ground Fault Detector/Interrupter

J. Islanding Protection

K. DC reverse polarity protection and over temperature protection.

L. Enclosure: Provide a weatherproof NEMA 3R type enclosure. Sensitive electronics shall be housed in a NEMA 4X enclosure.

M. Cooling: Via forced air fan.

N. Ambient Temperature Range: -13 degree F to 122 degree F

O. Warranty: Provide 15 year extended warranty.

P. UL listed.

2.07 ROOF MOUNTED RACKING SYSTEM

A. The roof mounted racking system shall have the following characteristics:

1. Wind rating: 115 mph per 2006 IBC.

2. Construction: 6063-T6 aluminum construction with clear anodized finish. Upper rail shall consist of a structural hollow. Provide roof standoffs and flashing as indicated on the drawings.

3. Fasteners: L-foot, L-foot bolt, flange nut, top mounting clamps and top mounting grounding clips and lugs shall be 18-8A2 stainless steel.

4. Lag sets and bolts: Stainless steel 18-8 alloy with high corrosion resistance.

5. Standoff: Standoff shall be provided to allow for the use of flashings. Standoff shall be constructed of 6105-T5 aluminum.

6. Accommodate PV module framewalls between 1 inch and 2-1/2 inch in height in landscape or portrait orientation.

7. Warranty: 10 year product warranty, 5 year finish warranty.

2.08 REMOTE MONITORING SYSTEM

A. The photovoltaic monitoring system shall be comprised of the following components in a NEMA 4 enclosure:

1. Anemometer: External wind sensor, 0.8 to 40m/s, -13 degree F to 140 degree F.

2. Temperature Probes: Module temperature sensor attachable, precision to +/- 0.5 degree C. Ambient temperature sensor, precision to +/- 0.5 degree C.

3. Pyranometer: ASI solar module, amorphous accuracy +/- 8%, range 0 to 1500 W/m2.

4. Datalogger at inverter, compatible with installed inverter, with Bluetooth communications protocol to central web connection interface box to existing internet router for computer access to web monitoring service.

5. The data monitoring system shall be capable of interfacing with the facilities existing computer system, such that a computer at the site ran be utilized to view system output, daily profile indicating power utilized from the Kauai Island Utility Cooperative (KIUC) system and power utilized from the PV system. Historical profiles, and total annual PV system production and year to date production totals.

6. Subscription: 20 year subscription to a monitoring service.

2.09 NET ENERGY METERING (NEM) APPLICATION

A. The Contractor shall immediately submit to KIUC a NEM application agreement for this project. The submittal shall include:

1. Location Plan.

2. PV, Inverter, and AC Disconnect Layout Plan.

3. Three Line diagram of Photovoltaic System.

4. All equipment information requested in KIUC NEM application/agreement and associated cut sheets.

5. Information for existing circuit breaker information as required per KIUC NEM application/agreement.

6. Contractor shall schedule the installation of the photovoltaic system and final testing and inspections by the Authority having jurisdiction and KIUC to be complete within the limitations of KIUC's requirements to maintain the reserved spot on the distribution system. Should the installation exceed this time period, Liquidated Damages shall apply.

2.10 PHOTOVOLTAIC SYSTEM MAINTENANCE CONTRACT

A. The Contractor shall include a five (5) year maintenance contract for the installed system. The maintenance contract shall include:

1. Monthly inspection tasks as recommended by the inverter and photovoltaic panel manufacturer.

2. Semi-annual inspection, cleaning, tightening and adjustment tasks as recommended by the inverter and photovoltaic manufacturer.

3. Annual inspection, cleaning, tightening and adjustment tasks as recommended by the inverter, photovoltaic and data monitoring system manufacturer.

4. Inspection reports shall be provided to the facility manager after each visit.

PART 3 - EXECUTION

3.01 GENERAL

Each power and control communications conductor shall be identified at each terminal to which it is connected.

Pulling wire and cable into conduit or trays shall be completed without damaging or putting undue stress on the cable insulation. Soapstone, talc or UL listed pulling compounds are acceptable lubricants for pulling wire and cable. Grease is not acceptable. Raceway construction shall be complete, cleaned, and protected from the weather before cable is placed.

Whenever a cable leaves a raceway, a cable support shall be provided.

When flat bus bar connections are made with unplated bar, the Contractor shall scratch-brush the contact areas. Bolts shall be torqued to the bus manufacturer's recommendations.

3.02 600 VOLT CONDUCTOR AND CABLE

Conductors in panels and electrical equipment, No. 6 AWG and smaller, shall be bundled and laced at intervals not greater than 6 inches, spread into trees and connected to their respective terminals. Lacing shall be made up with plastic cable ties. Lacing is not necessary in plastic panel wiring duct. Conductors crossing hinges shall be bundled into groups not exceeding 12 and shall be so arranged that they will be protected from chafing when the hinged member is moved.

Slack shall be provided in junction and pull boxes. Slack shall be sufficient to allow cables or conductors to be routed along the walls of the box. Amount of slack shall be equal to largest dimension of the box. Where plastic panel wiring duct is provided for wire runs, lacing is not required.

Raceway fill limitations shall be as defined by NEC and the following:

Lugs and connectors shall be installed with a compression tool.

Conductor and cable markers shall be provided at splice points, at both ends of each building's feeder line, and all intermediate locations where cables are accessible and visible.

All conduit roof penetrations shall be flashed and sealed.

3.03 PV PANELS

Clean thoroughly before activating.

3.04 INVERTER

Inverter shall be installed per Manufacturer's recommendations. When floor or wall mounting use appropriate bolts or screws to be fastened to.

Program the inverter per the Manufacturer's directions and per KIUC requirements for under and over frequency and voltage conditions.

The inverters need to be modular in design so that its components can safely be manually carried up a flight of stairs from the fourth floor to the Penthouse Lobby.

3.05 ROOF MOUNTED RACKING SYSTEM

Flashing and roof standoffs shall be provided at all attachment points to the roof.

The racking system attachment points shall occur on the concrete roof structure as needed.

Provide point load calculations for racking system prior to procuring. From as-built drawings determine building height and roof angle. Use wind exposure C, wind speed of 115 mph and importance factor of 1.15.

3.06 TESTING

General: The Contractor shall test conductors and cable.

The Contractor shall test the panels per the Manufacturer's directions.

The Contractor shall test the inverter per Manufacturer's directions.

The Contractor shall test the monitoring system per Manufacturer's direction and verify that the output of the photovoltaic system is in conformance with data from the anemometer, temperature probe, and pyranometer.

END OF SECTION