

DIVISION OF AQUATIC RESOURCES

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

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BOARD OF LAND AND NATURAL RESOURCES

Dawn N.S. Chang  
Chairperson

CONTRACT SPECIFICATIONS AND PLANS

Job No: C00BO91B  
Anuenue Fisheries Research Center  
Annex Facility Improvements – Phase 1A (Building Improvements)  
Sand Island, Oahu, Hawaii

Architect:	Bowers + Kubota
Electrical Engineer:	Bowers + Kubota
Mechanical Engineer:	Okahara and Associates, Inc.
Structural Engineer:	Nagamine Okawa Engineers. Inc.


April 2026


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DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION  
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Job No: C00BO91B  
Anuenue Fisheries Research Center  
Annex Facility Improvements – Phase 1A (Building Improvements)  
Sand Island, Oahu, Hawaii

Approved:   
\_\_\_\_\_  
BRIAN J. NEILSON  
Administrator  
Division of Aquatic Resources

Approved:   
\_\_\_\_\_  
DINA U. LAU  
Acting Chief Engineer  
Engineering Division

April 2026

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PLANS (Bound Separately)

PROJECT SPECIFIC ASBESTOS AND LEAD PAINT SURVEY REPORT, DATED JULY 15, 2025 (Bound Separately)

DEPARTMENT OF LAND AND NATURAL RESOURCES INTERIM GENERAL CONDITIONS, DATED OCTOBER 1994 (Bound Separately)

NOTICE TO BIDDERS  
(Chapter 103D, HRS)

COMPETITIVE BIDS for Job No. C00BO91B, Anuenue Fisheries Research Center Annex Facility Improvements – Phase 1A (Building Improvements), Sand Island, Oahu 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](http://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. Electronic copies of the General Conditions are available on the State Procurement Office website.

The project is located at 1001 Sand Island Pkwy, Honolulu, HI 96819.

The project consists of repairs, alterations, and upgrades to the existing pre-engineered metal building at the Anuenue Annex Facility. Structural work includes repairs to the existing steel rigid frames, purlins, eave struts, girts at louvers and openings, and the corrugated metal roofing and siding. Structural members exhibiting minor surface corrosion will be cleaned and recoated, while members with significant section loss due to corrosion will be reinforced or removed and replaced as required. Portions of the existing toilet area will be selectively demolished to allow for an expansion utilizing new cold-formed steel framing. A new structural steel canopy will also be installed within the facility to provide protection for electrical equipment. Architectural work includes repairs and improvements to both the interior and exterior of the existing building. Interior work includes removal and replacement of flooring with new luxury vinyl tile and repainting of walls in Office 104 and Storage rooms 200 and 201. Installation of new casework in the Utility Closet 103. The scope of work also includes ADA compliance upgrades, consisting of the addition of two accessible showers and installation of required handrails at the existing metal stairs. Mechanical work includes modifications and upgrades to plumbing systems to support the new ADA-compliant showers and expanded restroom areas, as well as any required ventilation improvements associated with the renovated spaces. Electrical work includes modifications to support the relocated or protected electrical equipment, improvements associated with the new canopy protection, and electrical upgrades required to support the restroom expansion and ADA improvements, replacement of high bay lighting with LED fixture, and new receptacles, lighting, controls, and emergency lighting in renovated areas.

To be eligible to submit a bid, the Bidder must possess a valid State of Hawaii Contractor's license classification "B".

A voluntary pre-bid meeting will be held at the project site, located at 1001 Sand Island Pkwy, on May 8, 2026, at 10:00 am.

All interested parties are invited to attend a State-conducted site visit that will start immediately following the pre-bid conference mentioned above. It is highly recommended that all interested parties attend the site visit to become familiar with the existing field conditions. The site visit is anticipated to start around 10:15am and end around 10:45 am. Please note that the project is located within a secure facility, so there will be no other accommodation for a site visit.

Bidders are advised that anything discussed at the pre-bid conference does not change any part of this solicitation. Any questions or discussions at the pre-bid conference are not official and all questions shall be submitted through the HIePRO solicitation or emailed to the contract person listed in HIePRO. All changes and/or clarifications to this solicitation will be done in the form of an addendum.

The estimated cost of construction is \$800,000.00.

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

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

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## 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 \$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.

P R O P O S A L

FOR

DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION  
State of Hawaii

JOB NO. C00BO91B  
ANUENUE FISHERIES RESEARCH CENTER  
ANNEX FACILITY IMPROVEMENTS – PHASE 1A (BUILDING IMPROVEMENTS)  
SAND ISLAND, OAHU, HAWAII

\_\_\_\_\_, 20\_\_

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 provide repairs, alterations, and upgrades to the existing pre-engineered metal building at the Anuenue Annex Facility. Structural work includes repairs to the existing steel rigid frames, purlins, eave struts, girts at louvers and openings, and the corrugated metal roofing and siding. Structural members exhibiting minor surface corrosion will be cleaned and recoated, while members with significant section loss due to corrosion will be reinforced or removed and replaced as required. Portions of the existing toilet area will be selectively demolished to allow for an expansion utilizing new cold-formed steel framing. A new structural steel canopy will also be installed within the facility to provide protection for electrical equipment. Architectural work includes repairs and improvements to both the interior and exterior of the existing building. Interior work includes removal and replacement of flooring with new luxury vinyl tile and repainting of walls in Office 104 and Storage rooms 200 and 201. Installation of new casework in the Utility Closet 103. The scope of work also includes ADA compliance upgrades, consisting of the addition of two accessible showers and installation of required handrails at the existing metal stairs. Mechanical work includes modifications and upgrades to plumbing systems to support the new ADA-compliant showers and expanded restroom areas, as well as any required ventilation improvements associated with the renovated spaces. Electrical work includes modifications to support the relocated or protected electrical equipment, improvements associated with the new canopy protection, and electrical upgrades required to support the restroom expansion and ADA improvements, replacement of high bay lighting with LED fixture, and new receptacles, lighting, controls, and emergency lighting in renovated areas 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. C00BO91B  
 ANUENUE FISHERIES RESEARCH CENTER  
 ANNEX FACILITY IMPROVEMENTS – PHASE 1A (BUILDING IMPROVEMENTS)  
 SAND ISLAND, OAHU, HAWAII

on file in the office of the Engineering Division for the TOTAL BASE BID (Items 1 to 22) of:

Dollars (\$ \_\_\_\_\_)

and will fully complete all work under this contract within 260 consecutive calendar days from the date of written notice to proceed, including date of said order, said total sum being itemized on the following pages.

**PROPOSAL**

Item No.	Quantity	Unit	Description	Unit Price	Total
1.		LS	Demolition Work; to include demolition, hauling & disposal as required to construct new improvements.	LS	\$
2.	28	LF	Metal handrail, including but not limited to the following guardrail post, in place complete.	\$	\$
3.	100	SF	Plywood roof sheathing, in place complete.	\$	\$
4.	4,000	LBS	Structural steel canopy and associated structural materials, in place complete.	\$	\$
5.	600	SF	Cold-formed steel roof and wall framing, in place complete.	\$	\$
6.	20	CY	Cast-in-place concrete, including steel reinforcing, in place complete.	\$	\$
7.	100	SF	Wood Treatment, Rough Carpentry, Sheathing, in place complete.	\$	\$
8.	400	SF	Metal roof panels, Metal wall panels, Sheet metal flashing, Joint sealants, in place complete.	\$	\$
9.	50	SF	Hollow metal doors and frames, access doors, finish hardware, in place complete.	\$	\$
10.	14,100	SF	Gypsum drywall, Ceramic tiling, Luxury Vinyl tile flooring, Painting and finishing, in place complete.	\$	\$
11.	1	EA	Signage, Toilet accessories, in place complete.	\$	\$
12.	9	LF	Casework, in place complete.	\$	\$
13.		LS	Mechanical Work- Exhaust fan, registers, and other related work, in place complete.	LS	\$

14.		LS	Plumbing Work-fixtures, hose bibs, drains, cleanout, VTR, water heater, in place complete.	LS	\$ _____
15.		LS	Building electrical system, in place complete.	LS	\$ _____
16.		LS	Building interior lighting system, including controls and wiring complete.	LS	\$ _____
17.		LS	Electrical equipment and connections for HVAC equipment, in place complete.	LS	\$ _____
18.		LS	Lead Base Paint Control Measures.	LS	\$ _____
19.		LS	Air Monitoring and Testing.	LS	\$ _____
20.		LS	Project Sign, in place complete.	LS	\$ _____
21.	ALLOWANCE		Allowance, Field Office		\$10,000
<b>Subtotal Base Bid (Items 1-21)</b>					\$ _____
22.		LS	Mobilization and Demobilization (not to exceed 10% of the Subtotal Base Bid)	LS	\$ _____
<b>Total Base Bid (Items 1-22)</b>					\$ _____

RECYCLED PRODUCTS PREFERENCE

This project allows a 10% price preference for recycled products in accordance with HRS 103D-1005. Please indicate your selection of recycled or non-recycled product by indicating its cost FOB jobsite unloaded in the schedule below, including applicable General Excise & Use Taxes.

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

The bidder requesting a recycled product preference 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, 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 22) selected by the Board of Land and Natural Resources. Write the total of bid items 1 to 22 on page P-2.

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 one hundred eighty (180) 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 HIEPRO bid due date and time, 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:

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

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

It is also understood and agreed that if this Proposal is accepted and the undersigned should fail or neglect to contract as aforesaid, the 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 and providing the work of the required specialty contractor, 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.

<b>COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR</b>	<b>NATURE AND SCOPE OF WORK TO BE PERFORMED</b>

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.

Exact Legal Name of Company, Joint Venture or Partnership

Company is:

Sole Proprietor  Partnership  Corporation  Joint Venture  Other \_\_\_\_\_

Contractor's License No.: \_\_\_\_\_

Federal I.D. No.: \_\_\_\_\_

Hawaii General Excise Tax License I.D. No.: \_\_\_\_\_

Payment address (other than street address below): \_\_\_\_\_

City, State, Zip Code: \_\_\_\_\_

Business Address (street address): \_\_\_\_\_

City, State, Zip Code: \_\_\_\_\_

Respectfully submitted,

By \_\_\_\_\_

Authorized (Original) Signature (\*4)

Title: \_\_\_\_\_

Print Name: \_\_\_\_\_

Date: \_\_\_\_\_

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.hawaii.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 “one hundred eighty (180)” 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 one hundred eighty (180) 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 replacing the last paragraph with the following:

In the event the Notice to Proceed is not issued within three hundred and sixty-five (365) calendar days after the date of bid opening, the Contractor may submit a claim for increased labor and materials costs (but not overhead costs). The claim shall be for labor and material costs incurred after 365 days and the full duration of the contract time allowed for the

performance of the work (as specified on Page P-1 of the [Bid] PROPOSAL) have elapsed. Such claims shall be accompanied with the necessary documentation to justify the claim. No payments will be made for escalation costs that are not fully justified as determined by the State.

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 HIEPRO website.

**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. Proof of Insurance Coverage**

A Certificate of Insurance or other documentary evidence, to the satisfaction of the Engineer, that the Contractor has in place all insurance coverage required by the contract. The Certificate of Insurance shall contain wording which identifies the Project number and Project title for which the certificate of insurance is issued. Refer to the following for insurance requirements:

**1. Insurance Requirements**

- (a) **Obligation of Contractor** - Contractor shall not commence any work until it obtains, at its own expense, all required herein 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 laws of the State to issue such insurance in the State of Hawaii. Coverage by a “Non-Admitted” carrier is permissible provided the carrier has a AM Best’s Rating of “A-VII” or better.

- (b) 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.
- (c) Certificate(s) of Insurance acceptable to the Department shall be filed with the Engineer prior to commencement of the work. Certificates shall identify if the insurance company is a “captive” insurance company or a “Non-Admitted” carrier to the State of Hawaii. The Best’s Rating must be stated for the “Non-Admitted” carrier. Certificates shall contain a provision that coverages afforded under the policies will not be canceled or changed until at least thirty (30) 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.
- (d) 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.
- (e) All insurance described herein shall be primary and 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.
- (f) 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.
- (g) If the Contractor is self-insured, it shall furnish, upon the request and the satisfaction of the Engineer, any documentation to demonstrate the ability to self-insure itself. The Engineer, from time to time, can conduct an audit to determine the ability of the Contractor to be self-insured. Failure to comply with the Engineer’s request will be considered a material breach of the contract, and at the discretion of the Engineer, may be sufficient grounds to terminate the contract, suspend any work or withhold future payments.
- (h) It is the responsibility of the Contractor to notify the Department of any changes to its insurance policies or if the Contractor receives a notice of cancellation of any of its insurance policies. The Contractor will immediately provide written notice to the Department should the insurance policies evidenced on its Certificate of Insurance form be cancelled, limited in scope, or not renewed upon expiration.

**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 worker's compensation insurance for all persons whom they employ or may employ in carrying out the work under this contract. This insurance shall be in strict conformity with the requirements of the most current and applicable State of Hawaii Worker's Compensation Insurance laws in effect on the date of the execution of this contract and as modified during the duration of the contract.
- (b) **Commercial General Liability.** The Contractor shall obtain General Liability insurance with a limit of not less than \$1,000,000 per occurrence and \$2,000,000 aggregate. The insurance policy shall contain the following clauses: 1) "The State of Hawaii is added as an additional insured as respects to operations performed for the State of Hawaii."; and 2) "It is agreed that any insurance maintained by the State of Hawaii will apply in excess of, and not contributed with, insurance provided by this policy." The required limit of insurance may be provided by a single policy or with a combination of primary and excess policies."
- (c) **Comprehensive Automobile Liability.** The Contractor shall obtain Auto Liability insurance covering all owned, non-owned and hired autos with a combined single Limit of not less than \$1,000,000 per accident for bodily injury and property damage. The insurance policy shall contain the following clauses: 1) "The State of Hawaii is added as an additional insured as respects to operations performed for the State of Hawaii."; and 2) "It is agreed that any insurance maintained by the State of Hawaii will apply in excess of, and not contributed with, insurance provided by this policy." The required limit of insurance may be provided by a single policy or with a combination of primary and excess policies.

Furthermore, the Contractor's commercial general liability insurance and automobile liability insurance 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 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.

- (d) **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 insurance policy shall contain the following clauses: 1) "The State of Hawaii is added as an additional insured as respects to operations performed for the State of Hawaii."; and 2) "It is agreed that any insurance maintained by the State of Hawaii will apply in excess of, and not contributed with, insurance provided by this policy." The required limit of insurance may be provided by a single policy or with a combination of primary and excess policies.

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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## DIVISION 1 – GENERAL REQUIREMENTS

### SECTION 01019

#### GENERAL SPECIFICATIONS

##### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

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

##### 1.02 GENERAL

- A. Examination of Premises: The Contractor shall contact the Engineer and obtain permission before visiting the site.
- B. All lines and grades shall be established by a licensed surveyor, or licensed Civil Engineer, registered in the State of Hawaii. The Contractor shall submit evidence of current and valid registration.
- C. Notices: The Contractor shall notify the Engineer and give at least 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 for the user agency personnel and the public at all times.
- F. Lead Paint
  - 1. When the project includes paint to be disturbed that was applied prior to 1980, it shall be assumed to contain lead. The Contractor shall inform its employees, subcontractors, and all other persons engaged in the project that lead containing paints 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).

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: 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, items or parts as are required to properly complete the work.
3. Specifications and drawings are prepared in abbreviated form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", "an", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.

Q. Required Submittals

1. Required submittals as specified in the Technical Sections of these specifications include one or more of the following: Shop drawings; 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, by Specification Section, and submit this list to the Engineer within 15 days after notice to proceed.
3. As Built Drawings: When as built drawings are required for submittal, the following shall apply:
  - a. As built drawings, the intent of which is to record the actual in place construction so that any future renovations or tie ins can be anticipated accurately, shall be required.
  - b. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded in red on the as built drawings.
  - c. The following procedure shall be followed:
    - 1) Immediately after these changes are constructed in place, the Contractor shall record them on the field office plans.
    - 2) Within two weeks after final inspection of the project, the Contractor shall transfer the changes marked on the field office plans onto a clean copy of plans using a red pencil. Any deletions shall be so noted and redrawn as necessary. The Contractor shall stamp or mark the tracings "AS BUILT", and also sign and date each drawing so marked.

- 3) The Contractor shall submit the as built drawings to the Engineer for review and approval. After the Engineer approves the as-built drawings, the Contractor shall submit an electronic copy in Adobe PDF format on CD ROM.

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.

END OF SECTION

SECTION 01090

STANDARD REFERENCES

PART 1 - GENERAL

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

<u>Abbreviation</u>	<u>Company</u>
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. Washington, D.C. 20036

<u>Abbreviation</u>	<u>Company</u>
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, DC 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
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 345 East 47th Street New York, NY 10017

<u>Abbreviation</u>	<u>Company</u>
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, DC 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 America, 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
CSA	Canadian Standards Association 178 Rexdale Boulevard Rexdale, Ontario, M9W 1R3, Canada
DEMA	Diesel Engine Manufacturer's Association 122 East 42nd Street New York, NY 10017

<u>Abbreviation</u>	<u>Company</u>
DIS	Division of Industrial Safety California Department of Industrial Relations 2422 Arden Way Sacramento, CA 95825
EI	Edison Electric Institute 90 Park Avenue New York, NY 10016
EIA	Electronic Industries Association 2001 Eye Street N.W. Washington, DC 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, DC 20407
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

<u>Abbreviation</u>	<u>Company</u>
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
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

<u>Abbreviation</u>	<u>Company</u>
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, DC 20036
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, DC 20005
SBCC	Southern Building Code Congress 1116 Brown-Marx Building Birmingham, AL 35203

<u>Abbreviation</u>	<u>Company</u>
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
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.
- 3.02 Pursuant to Chapter 6E of the Hawaii Revised Statutes (HRS), in the event any artifacts, or human remains are uncovered during construction operations, the contractor shall immediately suspend work and notify the Honolulu Police Department, The Department of Planning and Permitting's Civil Engineering Branch (phone number 768-8084), along with the Engineering Division of the Department of Land and natural Resources.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Shop drawings shall be required for:

1. Division 1 - Project Sign
2. Any others as called for in the plans, specifications or by the Engineer.

B. Other required submittals shall include:

1. Piping Layout.
2. Manufacturer's Data.
3. Certificates of Warranty.
4. Any item listed in the "Submittal List".
5. Any others as called for in the plans, specifications, or by the Engineer.

1.02 BIDDER'S SPECIAL RESPONSIBILITY FOR COORDINATING CONTRACTUAL 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 a 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, it 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, piping layout, and/or catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment) required for the construction. Drawings shall be submitted in sufficient time to allow the Engineer not less than twenty 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 drawing.

- 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 of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, he shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.
  
- 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

SUBMITTAL LIST

Section No. - Title	Shop Drawings & Diagrams	Samples	Certificates (Prequalification/Quality Assurance, Material, Treatment, Applicator, etc.)	Product Data, Manufacturer' s Technical Literature, Sample Warranty and Brochures	SDS Sheets	Reports (Testing, Maintenance, Inspection, etc.)	O & M Manual	Equipment or Fixture Listing	Schedules (Project Installation)	Maintenance Service Contract	Field Posted As-Built Drawings	Others	Guaranty or Warranty	Manufacturer's Guaranty or Warranty (Greater than one year)
02410 – Demolition and removal of existing concrete and asphalt concrete pavement														
05120 – Structural Steel	■			■		■						■		
05400 – Cold-Formed Metal Framing	■		■	■		■								
07900 – Joint Sealants		■		■										■
08113 – Hollow Metal Doors and Frames	■		■	■		■	■		■			■	■	■
08700 - Finish Hardware				■		■	■						■	■
09250 - Gypsum Drywall				■										■
09300 – Porcelain Tiles		■		■									■	■
09990 – Painting and Finishing		■	■	■	■		■		■			■	■	■
10400 – Signage	■	■		■	■		■							
10800 – Toilet Accessories	■			■			■		■				■	■
15400 – Plumbing	■		■	■							■		■	

<b>15653 – Air Conditioning and Ventilation</b>	■		■	■			■	■		■	■		■	
<b>16011 – General Electrical Requirements</b>			■	■									■	
<b>16400 – Electrical Work</b>	■			■			■				■		■	

## SECTION 01311

### PROJECT MEETINGS

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.02 SECTION INCLUDES

- A. To enable orderly review of progress during construction and to provide for systematic discussions of problems, the Engineer will conduct project meetings throughout the construction period.
- B. In general, project meetings will be held virtually in accordance with a mutually acceptable schedule.
- C. The purpose of the project meetings is analysis of problems that might arise relative to execution of the work.

##### 1.03 RELATED SECTIONS

- A. The Contractor's relations with subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility as described in the General Conditions and are not part of the agenda of project meetings.

##### 1.04 QUALITY ASSURANCE

- A. Persons designated by the Contractor to attend and participate in project meetings shall have all required authority to commit the Contractor to solutions as agreed upon in the project meetings.

##### 1.05 SUBMITTALS

- A. Agenda Items: To the maximum extent possible, advise the Engineer, at least twenty-four (24) hours in advance of the project meeting, of all items to be added to the agenda.
- B. Minimum Agenda
  1. Review work progress since last meeting.
  2. Note field observations, problems, and decisions.
  3. Identify problems that may impede planned progress.
  4. Review off-site fabrication problems.
  5. Develop corrective measures and procedures to regain schedule.
  6. Coordinate projected progress with other prime contractors.
  7. Review submittal schedules, expedite as required to maintain schedule.

- C. Minutes: The Contractor shall compile minutes of each project meeting and shall distribute copies to the State and the Engineer. The Contractor shall make and distribute such other copies as he/she wishes. The Engineer and/or State may issue amendments to the minutes as necessary. Contractor shall issue same to other interested parties.

## PART 2 - PRODUCTS

(Not Applicable)

## PART 3 - EXECUTION

### 3.01 MEETING SCHEDULE

- A. Coordinate with the Engineer as required to establish a mutually acceptable schedule for project meetings.

### 3.02 MEETING LOCATION

- A. Project meetings will be held virtually in accordance with a mutually acceptable schedule. Provide adequate space and facility including table, chairs, and lighting for proper conduct of meeting.

### 3.03 ATTENDANCE

- A. Assign the same person or persons to represent the Contractor at project meetings throughout the construction period. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the work are involved.

END OF SECTION

## SECTION 01500

### TEMPORARY FACILITIES AND CONTROLS

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.02 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the temporary facilities and controls as shown on the drawings and specified herein, including, but not limited to, the following:
  - 1. Hoists, stairs, and ladders.
  - 2. Fire protection.
  - 3. Temporary utilities.
  - 4. Temporary site access.
  - 5. Water control.

##### 1.03 RELATED SECTIONS

- A. Barricades - Section 01530.
- B. Pollution Control - Section 01567.
- C. Project Sign - Section 01581.

#### PART 2 - PRODUCTS

##### 2.01 GENERAL

- A. Arrange for and provide temporary facilities and controls as specified herein and as required for the proper and expeditious prosecution of the work. Pay all costs, except as otherwise specified, until final acceptance of the work unless the State makes arrangement for the use of completed portions of the work after substantial completion.
- B. Make all temporary connections to utilities and services in locations acceptable to the local authorities having jurisdiction thereof; furnish all necessary labor and materials, and make all installations in a manner subject to the acceptance of such authorities; maintain such connections; remove the temporary installation and connections when no longer required; restore the services and sources of supply to proper operating condition.
- C. Unless otherwise noted, pay all costs for temporary electrical power, temporary water, and temporary heating; provide metering as necessary.
- D. A Staging Plan shall be submitted by the Contractor for approval by the State. The Staging Plan shall locate all temporary facilities and services, including parking for the

Contractor's employees, within the limits of the staging areas, and shall allot ground space to Subcontractors for storage of materials, and the erection of sheds and tool houses. Materials and equipment can only be stored in the staging area. No parking for Contractor's or Subcontractors' employees' vehicles will be allowed in undesignated parking areas. The staging area shall be maintained in good repair, free of mud and standing water, and passable at all times. All materials stored within the project site are the responsibility of the Contractor. At the completion of the work, the staging areas shall be restored to their original condition, gravel removed, topsoil replaced and graded and re-seeded.

- E. No signs or advertisements will be allowed to be displayed on the premises without the approval of the Architect.

## 2.02 MATERIAL HOIST

- A. Provide a material hoist as required for use by all trades. Provide all necessary guards, signals, safety devices, and so on, required for safe operations, and suitable runways from the hoists to each floor level and roof. The construction and operation of the material hoist shall comply with all applicable requirements of ANSI A10.5, the ACG Manual of Accident Prevention in Construction and to all applicable state and municipal codes. Prohibit the use of the material hoist for transporting personnel.

## 2.03 RODENT CONTROL

- A. Institute an effective program of rodent control for the entire site within the construction limits. Cooperate with local authorities and provide the regular services of an experienced exterminator who shall visit the site at least once a month for the entire construction period. Provide marked metal containers for all edible rubbish and enforce their use by all employees. Containers shall be emptied and the contents removed from the site as often as required to maintain an adequate rodent control program. If the program of rodent control used is not effective, take whatever steps are necessary to rid the project of rodents, and such action shall not be the basis of a claim for additional compensation or damages.

## 2.04 TEMPORARY CONSTRUCTION OPENINGS

- A. Provide openings in slabs, walls, and partitions where required for moving in large pieces of equipment of all types. Close and/or restore all openings and finish them after the equipment is in place. Structural modification, if required, shall be subject to review by the Architect.

## 2.05 FIRE PROTECTION

- A. Provide and maintain adequate fire protection, ready for instant use, distributed around the project.
- B. Make arrangement for periodical inspection by local fire protection authorities and insurance underwriter's inspections. Cooperate with said authorities and promptly carry out their recommendations.

C. Open fire will not be permitted within the building enclosure or on the project site.

#### 2.06 TEMPORARY LIGHT AND POWER

A. Make all arrangements with the local electric company for temporary electrical service to the construction site; provide all equipment necessary for temporary power and lighting; and pay all charges for this equipment, the installation thereof, and for current used. The electrical service shall be of 120v and 240v for single phase loads up to 30 amps for all construction tools and equipment without overloading the temporary facilities and shall be made available for power, lighting, and construction operations of all trades.

B. In addition to the electrical service, provide power distribution as required throughout structure. The terminations of power distribution shall be at convenient locations in the building. Terminations shall be provided for each voltage supply complete with circuit breakers, disconnect switches, and other electrical devices as required to protect the power supply system.

1. Provide double duplex outlets at not more than 200' o.c. both directions throughout this building.

C. A temporary lighting system shall be furnished, installed, and maintained as required to satisfy minimum requirements of safety and security. The temporary lighting system shall afford general illumination in all building areas and shall supply not less than 150 watt lamps on 30' centers both directions of floor area for illumination in the areas of the building where work is being performed.

D. All temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of the governing codes. All temporary wiring shall be maintained in a safe manner and used so as not to constitute a hazard to persons or property.

E. When the permanent electrical power and lighting systems are in operating condition, they may be used for temporary power and lighting for construction purposes, provided that the Contractor assumes full responsibility for the entire power and lighting system, and pays costs for power, operations, maintenance, and restoration of the system.

#### 2.07 TEMPORARY ACCESS TO SITE

A. Construct and maintain in good usable condition all required temporary access to site, and, when no longer required, remove all temporary construction and restore the site.

B. Where streets now in use are within or adjacent to the work, keep the passageways of such streets open to vehicular and pedestrian traffic to building fronting thereon. Maintain constant access for police, fire, and ambulance service.

C. Mud carried off the site and into public roads shall be removed immediately by the Contractor.

D. Access to the site for delivery of construction material or equipment shall be made only from locations designated by the Architect.

## 2.08 TEMPORARY STAIRS, LADDERS, RAMPS, SIDEWALK BRIDGING AND RUNWAYS

- A. Provide and maintain all equipment such as temporary stairs, ladders, ramps, runways, and chutes as required for the proper execution of the work.
- B. All such apparatus, equipment, and construction shall meet all requirements of the Labor Law and other state or local laws applicable thereto.
- C. As soon as permanent stairs are erected, provide temporary protective treads, handrails, and shaft protection.
- D. Covered Walkway: Erect a structurally adequate, protective, covered walkway for passage of persons along adjacent public street. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
  - 1. Construct covered walkways using scaffold or shoring framing.
  - 2. Provide wood plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well drained walkways, and similar provisions for protection and safe passage.
  - 3. Extend back wall beyond the structure to complete enclosure fence.
  - 4. Paint and maintain in a manner approved by State and Architect.
  - 5. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8" thick exterior plywood.
  - 6. Existing pedestrian walkways shall be maintained in a passable condition or provide for alternate/temporary accessible pedestrian access routes and facilities per the 2010 ADA standards for accessible design Chapter 2 ADDAG 201.3, and ADAAG 206.1.

## 2.09 TEMPORARY WATER SERVICE

- A. Provide at a point within 10 feet of the building (or buildings) all water necessary for construction purposes. Make all temporary connections to existing mains; provide temporary meter; and make arrangement to pay for the temporary water service including cost of installation, maintenance thereof, and water used.
- B. When the permanent water supply and distribution system has been installed, it may be used as a source of water for construction purposes, provided that the Contractor assumes full responsibility for the entire water distribution system, and pays costs for operation, maintenance, and restoration of the system including the cost of water used.
- C. At the completion of the construction work or at such time after the Contractor makes use of the permanent water installation, all temporary water service equipment and piping shall be removed, and all worn or damaged parts of the permanent system shall be replaced and equipment placed in first class condition equal to new.

## 2.10 WATER CONTROL

- A. From the commencement of the construction to the completion of the work, keep all parts of the site and the project free from accumulation of water, and supply, maintain, and operate all necessary pumping and bailing equipment.
- B. The Contractor shall take over responsibility for site drainage upon entering the premises and shall maintain such drainage until completion of the work so as not to adversely affect the adjacent areas.

#### 2.11 ENVIRONMENTAL CONTROLS

- A. The Contractor shall comply with all applicable Federal, State and local laws, regulations, ordinances, codes and standards concerning environment control. Particular attention shall be given, without limitations, to:
  - 1. Minimization of dust, containment of chemical vapors, control of engine exhaust gases, and control of smoke from temporary heaters.
  - 2. Reduction of water pollution by control of sanitary facilities, proper storage of fuels and other potential contaminants, and prevention of siltation from land erosion.
  - 3. Minimization of noise levels.
  - 4. Proper and legal disposal, off site unless otherwise provided, of waste and spoil resulting from construction activities.

### PART 3 - EXECUTION

#### 3.01 REMOVAL

- A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the work. Remove all such temporary facilities and controls as rapidly as progress of the work will permit or as directed by the Engineer.

END OF SECTION

SECTION 01505  
MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Description: 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.

Any and all additional mobilization or demobilization costs in excess of the maximum amounts specified in the Proposal shall be included in the appropriate unit prices bid in the Proposal. The Contractor shall not receive any compensation for mobilization and demobilization in addition to those specified in the Proposal.

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

END OF SECTION

## SECTION 01530

### BARRICADES

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Description. This work shall consist of furnishing, installing and maintaining 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

##### 2.01 MATERIALS

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

#### PART 3 - EXECUTION

##### 3.01 CONSTRUCTION REQUIREMENTS

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

Barricades shall be in good condition and approved by the Engineer for use within the project limits. Barricade application and installation shall be as shown on the plans and as directed by the Engineer in accordance with the guidelines provided in the latest edition of the FHWA publication, Manual on Uniform Traffic Control Devices for

Streets and Highways (MUTCD), and any amendments or revisions thereof as may be made from time to time.

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

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

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

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

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

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

Both vertical faces of each barricade rail shall be reflectorized as shown on the plans.

Wooden rails shall be reflectorized with one of the following:

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

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

The front and back faces of barricade rails shall have 6-inch wide alternative colored and white striped sloping downward toward the traveled way at an angle of 45

degrees with the vertical. The colored stripes shall be either orange or red in accordance with the following requirements:

1. Orange and white stripes shall be used in the following conditions:
    - a. Construction work.
    - b. Detours.
    - c. Maintenance work.
  2. Red and white stripes shall be used in the following conditions:
    - a. On roadways with no outlet (ie. 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 a permanent location shown on the plans or as directed.

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

END OF SECTION

## SECTION 01567

### POLLUTION CONTROL

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

###### A. Rubbish Disposal

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

###### B. Dust

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

###### C. Noise

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

2. All internal combustion engine-powered equipment shall have mufflers to minimize noise and shall be properly maintained to reduce noise to acceptable levels.
3. Pile driving operations shall be confined to the period between 9:00 a.m. and 5:30 p.m., Monday through Friday. Pile driving will not be permitted on weekends and legal State and Federal holidays.
4. Starting-up of construction equipment meeting allowable noise limits shall not be done prior to 6:45 a.m. without prior approval of the Engineer. Equipment exceeding allowable noise levels shall not be started-up prior to 7:00 a.m.

D. Erosion

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

E. Others

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

F. Suspension of Work

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

necessary to correct the situation and to deduct all costs incurred by the State in taking such action from monies due 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 GENERAL CONDITIONS and paid for in accordance with Subsection 8.4b - "Force - Account Work" therein. The count of elapsed working days to be charged against the contract in this situation shall be computed in accordance with Subsection 7.18 - "Contract Time" of the GENERAL CONDITIONS.

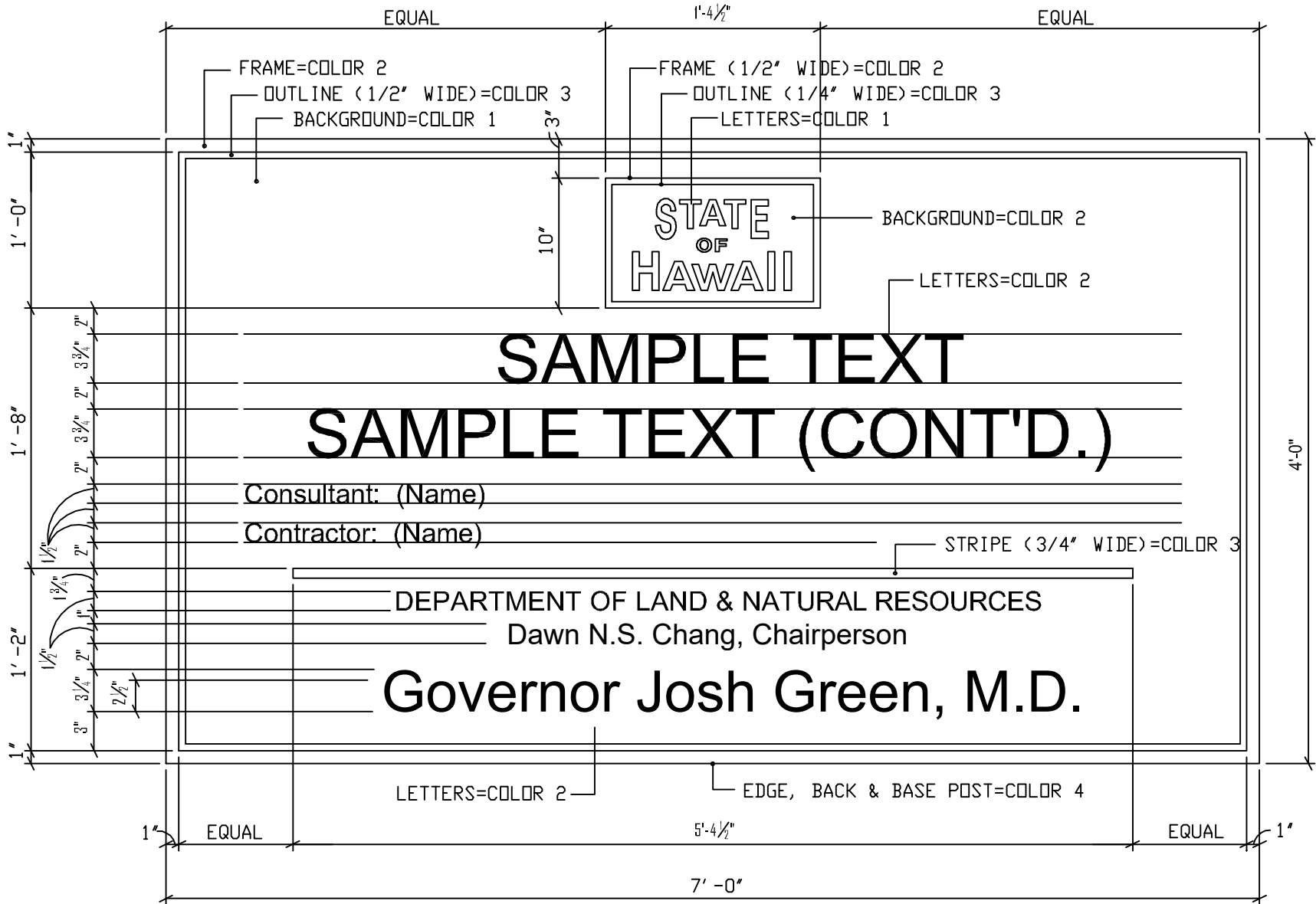
PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

Project Sign  
01581-3

Job No.



NOTE: Number of signs required 1

## 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 01581-3, 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

## SECTION 01600

### PRODUCT REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.02 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete product requirements as specified herein, including, but not limited to, the following:
  1. Product delivery, storage, and handling.
  2. Storage and protection.
  3. Identifying markings.
  4. Temporary use of equipment.
  5. General standards.

##### 1.03 RELATED SECTIONS

- A. Execution Requirements - Section 01700.

##### 1.04 TRANSPORTATION AND HANDLING

- A. Materials, products, and equipment shall be properly containerized, packaged, boxed, and protected to prevent damage during transportation and handling.
- B. More detailed requirements for transportation and handling are specified under the technical Sections.

##### 1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by State's construction forces. Coordinate location with State.

1.06 IDENTIFYING MARKINGS

- A. Name plates and other identifying markings shall not be affixed on exposed surfaces of manufactured items installed in finished spaces.

1.07 TEMPORARY USE OF EQUIPMENT

- A. No equipment intended for permanent installation shall be operated for temporary purposes without the written permission of the Engineer.
- B. The temporary or trial usage by the State of any mechanical device, machinery, apparatus, equipment or any work or materials supplied under this Contract before final completion and written acceptance by the Architect, shall not be construed as evidence of the acceptance of same by the State. The State shall have the privilege of such temporary and trial usage, for such reasonable length of time as and when the Engineer shall deem to be proper for making a complete and thorough test of same and no claim

for damage shall be made by the Contractor for the injury to or breaking of parts of such work which may be caused by weakness or inaccuracy of structural parts or by defective material or workmanship. If the Contractor so elects, he may at his own expense, place a competent person or persons to make such trial usage; such trial usage shall be under the supervision of the Contractor.

#### 1.08 GENERAL REQUIREMENTS

- A. In the event that it is necessary for the Contractor to store any materials offsite, he shall first obtain the approval of the Engineer. The Contractor shall be responsible for insurance and warehousing charges of any materials stored offsite. The Contractor shall also be responsible for the cost of delivery to the job site of any materials that have been stored offsite.
- B. Materials delivered to the job site shall be carefully stored and protected from damage. Damaged material shall not be used in the work. The Contractor shall provide, where directed temporary storage facilities as may be required for the storage of all materials which might be damaged by weather.
- C. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the representative manufacturers, unless otherwise specified.
- D. Equipment, plant, and appliances, such as hoists, centering, concrete lifts, construction elevators, cranes, rigging, towers, derricks, walks, ramps, chutes, scaffolding, implements, transportation, cartage and other things necessary and required for the adequate execution of the work and as required by law and applicable Union rules shall be provided and shall be maintained in good and safe mechanical working order, be responsible for their safe use, and remove them when no longer required. Applicable requirements of OSHA shall become and form a part of this document.
- E. During handling and installation of work at project site clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- F. To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period. Such exposures include (where applicable, but not by way of limitation) static loading, dynamic loading, internal

pressures, external pressures, high or low temperatures, thermal shock, high or low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling, bacteria, insect infestation, combustion, electrical current, high speed operation, improper lubrication, unusual wear, misuse, incompatible interface, destructive testing, misalignment, excessive weathering, unprotected storage, improper shipping/handling, theft and vandalism.

- G. Require installer of each major unit of work to inspect substrate to receive the work, and conditions under which the work will be performed, and to report (in writing to Contractor) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- H. Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation to whatever extent these are more explicit or more stringent than applicable requirements indicated in the Contract Documents.
- I. Inspect each item of materials or equipment immediately prior to installation and reject damaged and defective items.
- J. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerance if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Engineer for final decision.
- K. Recheck measurements and dimensions of the work as an integral step of starting each installation.
- L. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.
- M. Coordinate enclosure (closing-in) of work with required inspections and tests, so as to avoid necessity of uncovering work for that purpose.
- N. Mounting Heights: Except as otherwise indicated, mount individual units of work at industry-recognized standard mounting heights, for applications indicated. In CMU walls mount units at height closest to manufacturer's recommendation so as to minimize cutting of block coursings. Refer questionable mounting height choices to Engineer for final decision.

END OF SECTION

## SECTION 01700

### EXECUTION REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.02 SECTION INCLUDES

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
  1. Construction layout.
  2. Field engineering and surveying.
  3. General installation of products.
  4. Progress cleaning.
  5. Starting and adjusting.
  6. Protection of installed construction.
  7. Correction of the Work.

##### 1.03 RELATED SECTIONS

- A. Cutting and Patching - Section 01730.

##### 1.04 SUBMITTALS

- A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

##### 1.05 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor licensed in Hawaii who is experienced in providing land surveying services of the type indicated for the project.

## PART 2 - PRODUCTS

(Not Applicable)

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
  - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, water-service piping, and underground electrical services.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
    - a. Description of the Work.
    - b. List of detrimental conditions, including substrates.
    - c. List of unacceptable installation tolerances.
    - d. Recommended corrections.
  - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.02 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to the Engineer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

### 3.03 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify the Engineer promptly.
- B. General: Engage a Hawaii State Licensed land surveyor hired by the contractor to lay out the Work using accepted surveying practices.
  1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  3. Inform installers of lines and levels to which they must comply.

4. Check the location, level and plumb, of every major element as the Work progresses.
  5. Notify the Engineer when deviations from required lines and levels exceed allowable tolerances.
  6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by the Engineer.

#### 3.04 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of the Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to the Engineer before proceeding.
  2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

### 3.05 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
  1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by the Engineer.
  2. Allow for building movement, including thermal expansion and contraction.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
- 3.06 PROGRESS CLEANING
- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg. F.
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.07 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 014000, "Quality Requirements."

### 3.08 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

### 3.09 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 01730, "Cutting and Patching."
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

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 State's survey for Asbestos and Lead materials and is provided for the Contractor's information.
- B. Related Sections include the following:
  - 1. SECTION 13283 - DISTURBANCE LEAD-CONTAINING MATERIAL for requirements of all work which disturbs LEAD.
  - 2. SECTION 13288 - TESTING/AIR MONITORING for requirements of work specified.

##### 1.02 ASBESTOS

- A. The structure or structures to be renovated or modified under this contract were surveyed for the presence of asbestos containing materials (ACBM), using 11-501 requirements. 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 (or H.A.R. 11-502 when applicable) requirements within the Contract limits and only with approval of the Contracting Officer. If ACBM is found, notify the Contracting Officer 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 29 CFR 1926.1101.
- 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 Contracting Officer. 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 contain lead paint is present in the existing building(s) and at the job site. Conduct work in accordance with the requirements of Occupational Safety and Health Administration 29 CFR 1926.62 Lead.
- B. All paint shall be considered to contain lead and treated as such until proven/confirmed no lead is present.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 SURVEY (attached)

- A. The report(s) listed below shall be used for informational purposes as it relates to the project limits as indicated in the Contract Plans and Specifications. Information included in the reports which are not included within the project limits as indicated in the Contract Plans and Specifications shall not be included as part of the Contractor's work.
  - 1. Project Specific Asbestos and Lead Paint Survey Report, DLNR Anuenue Fisheries Research Center Annex Facility, 1001 Sand Island Parkway, Honolulu, Hawaii, Job No. C00B091B, 98 pages, dated July 15, 2025, prepared by EnvironMETeo Services, Inc.

END OF SECTION

## SECTION 01730

### CUTTING AND PATCHING

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.02 SECTION INCLUDES

- A. This Section includes procedural requirements for cutting and patching.

##### 1.03 RELATED SECTIONS

- A. Refer to Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
  - 1. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

##### 1.04 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

##### 1.05 SUBMITTALS

- A. Cutting and Patching: Submit a method describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
  - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
  - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
  - 3. Products: List products to be used and firms or entities that will perform the Work.
  - 4. Dates: Indicate when cutting and patching will be performed.
  - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.

6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Engineer's Approval: Obtain approval of cutting and patching before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

## 1.06 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
  1. Provide a list of additional elements that are structural elements and that require Architect's or Construction Manager's approval of a cutting and patching proposal.
- B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
  1. Primary operational systems and equipment.
  2. Air or smoke barriers.
  3. Fire-protection systems.
  4. Control systems.
  5. Communication systems.
  6. Electrical wiring systems.
  7. Operating systems of special construction in Division 13 Sections.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
  1. Water, moisture, or vapor barriers.
  2. Membranes and flashings.
  3. Exterior curtain-wall construction.
  4. Equipment supports.
  5. Piping, ductwork, vessels, and equipment.
  6. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

## 1.07 WARRANTY

- A. Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void warranties.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. In-Place Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing, adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
  - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

### 3.02 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. In-Place Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
  5. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION

## SECTION 01780

### OPERATION AND MAINTENANCE DATA

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.02 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the operation and maintenance data as specified herein.

##### 1.03 RELATED SECTIONS

- A. Submittal - Section 01300

##### 1.04 GENERAL

- A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.
  - 1. Subcontractors shall prepare operation and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.

##### 1.05 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by State's personnel.
- B. Format
  - 1. Size: 8-1/2" x 11".
  - 2. Paper: 20 pound minimum, white for typed pages.
  - 3. Text: Manufacturer's printed data, or neatly typewritten.
  - 4. Drawings
    - a. Provide reinforced punched binder tab, bind in with text.
    - b. Fold larger drawings to the size of the text pages.
  - 5. Provide fly-leaf for each separate product, or each piece of operating equipment.
    - a. Provide typed description of product, and major component parts of equipment.
    - b. Provide indexed tabs.
  - 6. Cover: Identify each volume with typed or printed title "OPERATION AND MAINTENANCE INSTRUCTIONS." List:

- a. Title of Project.
- b. Identity of separate structure as applicable.
- c. Identity of general subject matter covered in the manual.

C. Binders

1. Commercial quality three-ring binders with durable and cleanable plastic covers.
2. Maximum Ring Size: 1 inch.
3. When multiple binders are used, collate the data into related consistent groupings.

1.06 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of complete manual in final form.

B. Content, for architectural products, applied materials and finishes.

1. Manufacturer's data, giving full information on products.
  - a. Catalog number, size, composition.
  - b. Color and texture designations.
  - c. Information required for re-ordering special-manufactured products.
2. Instructions for care and maintenance.
  - a. Manufacturer's recommendation for types of cleaning agents and methods.
  - b. Cautions against cleaning agents and methods which are detrimental to the product.
  - c. Recommended schedule for cleaning and maintenance.

C. Content, for moisture-protection and weather-exposed products.

1. Manufacturer's data, giving full information on products.
  - a. Applicable standards.
  - b. Chemical composition.
  - c. Details of installation.
2. Instructions for inspection, maintenance, and repair.

1.07 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit three copies of complete manual in final form.

B. Content, for each unit of equipment and system, as appropriate.

1. Description of unit and component parts.
  - a. Function, normal operating characteristics, and limiting conditions.
  - b. Performance curves, engineering data and tests.
  - c. Complete nomenclature and commercial number of all replaceable parts.
2. Operating Procedures

- a. Start-up, break-in, routine, and normal operating instructions.
  - b. Regulation, control, stopping, shut-down, and emergency instructions.
  - c. Summer and winter operating instructions.
  - d. Special operating instructions.
3. Maintenance Procedures
- a. Routine operations.
  - b. Guide to "trouble-shooting."
  - c. Disassembly, repair, and reassembly.
  - d. Alignment, adjusting and checking.
4. Servicing and Lubrication Schedule: List of lubricants required.
5. Manufacturer's printed operation and maintenance instructions.
6. Description of sequence of operation by control manufacturer.
7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
- a. Predicted life of parts subject to wear.
  - b. Items recommended to be stocked as spare parts.
8. As-installed control diagrams by controls manufacturer.
9. Each contractor's coordination drawings.
- a. As-installed color-coded piping diagrams.
10. Charts of valve tag numbers, with the location and function of each valve.
11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
12. Other data as required under pertinent sections of specifications.
- C. Content, for each electric and electronic system, as appropriate:
- 1. Description of system and component parts.
    - a. Function, normal operating characteristics, and limiting condition.
    - b. Performance curves, engineering data and tests.
    - c. Complete nomenclature and commercial number of replaceable parts.
  - 2. Circuit directories of panel boards.
    - a. Electrical service.
    - b. Controls.
    - c. Communications.

3. As-installed color-coded wiring diagrams.
  4. Operating Procedures
    - a. Routine and normal operating instructions.
    - b. Sequences required.
    - c. Special operating instructions.
  5. Maintenance Procedures
    - a. Routine operations.
    - b. Guide to "trouble-shooting."
    - c. Disassembly, repair, and reassembly.
    - d. Adjustment and checking.
  6. Manufacturer's printed operation and maintenance instructions.
  7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
  8. Other data as required under pertinent sections of specifications.
- B. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.
- C. Additional Requirements for Operation and Maintenance Data: The respective sections of Specifications.

END OF SECTION

DIVISION 3 - CONCRETE

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

1.02 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans.

1.03 SUBMITTALS

- A. Submit in accordance with SECTION 01330 - SUBMITTAL PROCEDURES.
- B. Product Data:
  - 1. Reinforcing steel - Certified mill test results or laboratory test results. Indicate bar size, yield strength, ultimate tensile strength, elongation and bend test. Provide chemical composition for rebars that are to be welded.
- C. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mix water to be withheld for later addition at Project site.
- D. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- E. Welding Certificates: Copies of certificates for welding procedures and personnel.
- F. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with the requirements indicated, based on comprehensive testing of current materials.
- G. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Form materials and form-release agents.
2. Steel reinforcement and reinforcement accessories.
3. Curing materials.
4. Bonding agents.
5. Vapor retarders
6. Epoxy joint filler.
7. Joint-filler strips.
8. Repair materials.

#### 1.04 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- B. **Testing Agency Qualifications:** An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
  1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- C. **Source Limitations:** Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- D. **Welding:** Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- E. **ACI Publications:** Comply with the following, unless more stringent provisions are indicated and maintain a copy at the field office.
  1. ACI 301, "Specification for Structural Concrete."
  2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
  3. ACI 347R "Guide to Formwork for Concrete."

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

## PART 2 - PRODUCTS

### 2.01 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Comply with ACI 347R. Provide new or good finish form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other ACI 347R approved panel materials.
  2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - a. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Form oils or waxes shall not be used for concrete surfaces intended to be painted.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.
  2. Furnish ties that, when removed, will leave holes not larger than 1-1/2 inches in diameter in concrete surface.
  3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

### 2.02 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed, unless otherwise noted on the drawings.

## 2.03 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place that will not puncture the vapor retarder. Use plastic straps or brightly colored tie wires to secure reinforcing. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports. Refer to paragraph 3.05 Steel Reinforcement for chair support spacing.

## 2.04 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II.
- B. Pozzolans
  - 1. Fly Ash: ASTM C 618, Class C or F.
- C. Blended Hydraulic Cement: ASTM C 595; Type IS - Portland blast-furnace slag cement, Type IP - Portland/pozzolan cement, or Type IL – Portland-limestone cement.
- D. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
  - 1. Class: Moderate weathering region, but not less than 3M.
  - 2. Aggregate Size: No. 67 (3/4 inch to No. 4).
- E. Size of Coarse Aggregate: Except when otherwise specified or permitted, maximum size of coarse aggregate shall not exceed three-fourths of the minimum clear spacing between reinforcing bars (or bundled bars), one-fifth of the narrowest dimension between the sides of forms, or one-third of the thickness of slabs or toppings.
- F. Water: Potable and complying with ASTM C 94 or non potable meeting ASTM C 94 Acceptance Criteria for Questionable Water Supply. Use only potable water for job site mixing.

## 2.05 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Corrosion Inhibiting Admixture: Cortec MCI-2005 or pre-reviewed equal.
- C. Air-Entraining Admixture: ASTM C 260.
- D. Water-Reducing Admixture: ASTM C 494, Type A.

- E. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
- F. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- G. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

## 2.06 VAPOR BARRIER

- A. Vapor Barrier: ASTM E 1745, Class B except as modified in Subparagraph 1. below, nylon or polyester-cord-reinforced three-ply high-density polyethylene sheet, or one ply extruded polyolefin sheet; 15 mil minimum thickness. Compliance to ASTM standards shall be confirmed by an independent testing agency.
  - 1. Permeance Rating: ASTM E 96, ASTM E 154 not exceeding 0.035 grains/ft<sup>2</sup>/hr

## 2.07 CURING MATERIALS AND EVAPORATION RETARDERS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Solvent-Borne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 22 percent solids.
- G. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

## 2.08 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

- D. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.
- E. Cementitious Coatings: Cement based polymer modified concrete finishing materials. Available Products subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. ProFinish by Bonded Materials.
  - 2. Polycoat by Tremcrete Systems Incorporated.
  - 3. Durus by Durus High Tech Cement.
  - 4. MBT RS-1150 by Master Builders Technologies.
- F. Sleeves:
  - 1. Schedule 40 pipe, galvanized per ASTM A53.
  - 2. Schedule 40 PVC Pipe.

## 2.09 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations. Products shall contain no added gypsum:
  - 1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch. Products shall contain no added gypsum.
  - 1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5500 psi (39 MPa) at 28 days when tested according to ASTM C 109/C 109M2.09 repair materials.

## 2.10 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
  1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. All structural concrete, UON:
  1. Compressive Strength (28 Days): 4,000 psi (W/C = 0.50 Max).
- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
  1. Fly Ash: 25 percent.
  2. Combined Fly Ash and Pozzolan: 25 percent.
  3. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent Portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
  4. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- D. Limit water-soluble, chloride-ion content in hardened concrete per ACI 318 Chapter 4 for corrosion protection of reinforcing steel.
- E. Admixtures: Use admixtures according to manufacturer's written instructions.
  1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  4. Use corrosion-inhibiting admixture in concrete mixes where indicated.

## 2.11 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.12 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and ASTM C 1116 and furnish batch ticket information. Batch ticket information shall include design mix reference, water that can be added at the jobsite, and admixtures. For transit mixing, complete not less than 70 revolutions of the drum at the manufacturer's rated mixing speed. Discharge concrete into its final position within 90 minutes after introduction of batch water to the cement. If a retarder admixture is used, the discharge time limit of 90 minutes may be increased by the time specified for retardation by the admixture manufacturer or the concrete supplier. Mix concrete a minimum of one minute at mixing speed immediately prior to discharge.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
  - 1. For mixer capacity of 1 cu. yd./0.76 cu. m. or less, continue mixing at least one and one-half minutes, but not more than five minutes after all ingredients are in mixer, before any part of batch is released.
  - 2. For mixer capacity larger than 1 cu. yd./0.76 cu. m., increase mixing time by 15 seconds for each additional 1 cu. yd./0.76 cu. m.
  - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of concrete placement in structure.
  - 4. Hand mixed concrete will not be allowed.

## PART 3 - EXECUTION

### 3.01 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Construct forms to prevent loss of concrete mortar.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal. Do not use rust-stained steel form-facing material.

- E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds. Maintain the integrity of the vapor retarder membrane.
- F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- G. Chamfer exterior corners and edges of permanently exposed concrete.
- H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

### 3.02 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor bolts, accurately located, to elevations required.
  - 2. Install inserts, hangers, metal ties, nailing strips, blocking, grounds and other fastening devices needed for attachment of other work.
- B. Locate electrical or mechanical conduits and fittings so that the strength of the concrete member is not impaired. "Conduits" include pipes, ducts, and electrical conduits. Unless required otherwise on the Drawings, conform to the following:
  - 1. Concrete Slabs on Grade: Do not embed conduits within the thickness of any concrete slab on grade. Place conduits in the subgrade below the concrete slabs. Conduits may pass vertically through slabs-on-grade perpendicular and shall be spaced a minimum of 10 times their outside diameter or as noted on structural drawings typical details. Avoid conduit crossings. Provide sleeve for conduits passing through slabs.
- C. Obtain Contracting Officer's approval to install conduit or pipe penetrations that may unduly impair the strength of the structural member (for example, multiple pipe penetrations near the face of a column).

### 3.03 REMOVING AND REUSING FORMS

- A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F (10 degrees C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained. The 24 hour period may be reduced to 12 hours in compliance with ACI 347R with prior approval from the Contracting Officer.
- B. Clean and repair surfaces of forms to be reused in the work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Contracting Officer.

### 3.04 VAPOR RETARDER

- A. Vapor Retarder: Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 “Standard Practice for Installation of Water Vapor Retarders” and manufacturer’s written instructions. The more stringent shall apply.
  - 1. Use the greatest widths and lengths practical to minimize lap joints. Seal lap joints and edges with tape or materials compatible with the vapor retarder. Remove and replace torn, punctured, or damaged vapor barrier materials, except when minor repairs or patches are allowed by manufacturer’s instructions.
  - 2. Do not cut or puncture vapor retarder. No penetrations of the vapor barrier allowed except for reinforcing steel and permanent utilities. Seal all penetrations including pipes and reinforcing. Repair damage and reseal vapor retarder before placing concrete.
  - 3. Do not leave the vapor retarder exposed to ultraviolet radiation for more than a few days prior to the concrete pour. Remove standing water from the vapor retarder prior top concrete pour.

### 3.05 STEEL REINFORCEMENT

- A. General: Comply with CRSI’s “Manual of Standard Practice” for placing reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, and other foreign materials.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Support slab reinforcing as follows:

<u>BAR SIZE</u>	<u>MAXIMUM DISTANCE BETWEEN SUPPORTS</u>
#3	2 feet
#4	3 feet
#5 and larger	4 feet

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

### 3.06 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed. Provide 72 hours advanced notification to Contracting Officer for each scheduled pour.
- B. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301. Up to two gallons of water per cubic yard of concrete may be added at the jobsite provided the approved design mix accommodates the additional water.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.
- C. Convey concrete from mixer to the place of final deposit rapidly by methods that prevent segregation or loss of ingredients and will insure the required quality of concrete. Use conveying equipment, conveyors, hoppers, baffles, chutes, pumps that are sized and designed to prevent cold joints from occurring and prevent segregation in discharged concrete. Clean conveying equipment before each placement.
- D. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- E. Deposit concrete in forms in horizontal layers with proper consolidation into previous layers and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
  - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
  - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
  - 3. Make construction joints only where located on drawings unless otherwise approved by Contracting Officer. Plan pours to continuously place concrete from one construction joint to another.

- F. Deposit and consolidate concrete in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  2. Maintain reinforcement in position on chairs during concrete placement.
  3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  4. Slope surfaces uniformly to drains where required.
  5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleed-water appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### 3.07 CONCRETE SLAB ON GRADE

- A. For interior areas, unless specified elsewhere, place concrete floor slabs directly over vapor retarder overlain atop gravel cushion-capillary barrier and reinforce slabs per plan.

### 3.08 FINISHING

- A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

- C. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighthen until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Finish and measure surface so gap at any point between concrete surface and an unlevelled freestanding 10-foot-long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:
    - a. 1/4 inch.

### 3.09 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Electrical Work: Use 3/4" maximum size of aggregates for duct encasement. Unless detailed otherwise, encase underground ducts or conduits as follows:
  - 1. Provide 3 inches minimum concrete cover around ducts or conduits. Use spacers to place and hold ducts. Provide 18 inches minimum earth cover over top of concrete encasement unless otherwise detailed.
  - 2. For future connections, provide a one foot section of ducts or conduits to extend beyond concrete encasement and terminate with a coupling or end cap.

### 3.10 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Evaporation Retarder Apply evaporation retarder to unformed concrete surfaces before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including columns, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the curing methods listed in paragraph 3.11.D.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods.

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
  - a. Water.
  - b. Continuous water-fog spray.
  - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape:
  - a. Moist cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
  - b. Moist cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
  - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.
3. Curing Compound: Apply uniformly in continuous operation by spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period:
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application where recommended by the manufacturer. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### 3.11 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas. Remove and replace concrete that cannot be repaired and patched to Contracting Officer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16(1.2-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Contracting Officer.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4-inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes 1-inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1-inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Contracting Officer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Contracting Officer's approval.

### 3.12 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall hire and pay for a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  1. Testing Frequency: Obtain one composite sample for each 100 cubic yards of fraction thereof of each concrete mix placed each day.
  2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
  3. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 degrees F (4.4 degrees C) and below and when 80 degrees F (27 degrees C) and above, and one test for each composite sample.
  4. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
    - a. Cast and field cure one set of four standard cylinder specimens for each composite sample.
  5. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
    - a. Test two field-cured specimens at 7 days and two at 28 days.
    - b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
- C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

- D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- E. Test results shall be reported in writing to Contracting Officer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Contracting Officer but will not be used as sole basis for approval or rejection of concrete.
- G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Contracting Officer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Contracting Officer.

END OF SECTION

DIVISION 5 – METALS

SECTION 05120

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes work associated with structural hot-rolled steel framing.

1.02 REFERENCES

- A. 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 designation only.
1. American Institute of Steel Construction (AISC):
    - a. AISC 303 Code of Standard Practice for Steel Buildings and Bridges
    - b. AISC 317 Manual of Steel Construction Volume II Connections
    - c. AISC 325 Steel Construction Manual
    - d. AISC 326 Detailing for Steel Construction (2nd Edition)
    - e. AISC 341 Seismic Provisions for Structural Steel Buildings
    - f. AISC 348 Specification for Structural Joints Using ASTM A325 or A490 Bolts
    - g. AISC 360 Specification for Structural Steel Buildings
    - h. AISC 810 Steel Design Guide Series Erection Bracing of Low-Rise Structural Steel Buildings
  2. American Society for Testing and Materials (ASTM):
    - a. ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
    - b. ASTM A 153 Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
    - c. ASTM A 307 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
    - d. ASTM A 325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
    - e. ASTM A 36 Standard Specification for Carbon Structural Steel

- f. ASTM A 436 Standard Specification for Austenitic Gray Iron Castings
  - g. ASTM A 500 Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
  - h. ASTM A 563 Standard Specification for Carbons and Alloy Steel Nut
  - i. ASTM A 6 Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
  - j. ASTM A 780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings
  - k. ASTM A 992 Standard Specification for Structural Steel Shapes
  - l. ASTM C1107 Standard Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink)
  - m. ASTM C 827 Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures
  - n. ASTM E 165 Standard Practice for Liquid Penetrant Examination for General Industry
  - o. ASTM F 1554 Standard Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength
  - p. ASTM F 844 Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use
3. American Welding Society (AWS):
- a. AWS A2.4 Standard Symbols for Welding, Brazing, and Nondestructive Examination
  - b. AWS D1.1 Structural Welding Code – Steel
4. Society for Protective Coatings (SSPC):
- a. SSPC PA 1 Shop, Field, and Maintenance Painting of Steel
  - b. SSPC SP 3 Power Tool Cleaning
  - c. SSPC SP 6 Commercial Blast Cleaning

### 1.03 SUBMITTALS

#### A. Shop Drawings:

- 1. Erection Plan, including description of temporary supports.
- 2. Fabrication drawings including description of connections.

- B. Product Data: Submit Manufacturer's data including installation instructions for the following:
  - 1. Shop primer
  - 2. Welding electrodes and rods
  - 3. Non-Shrink Grout
  - 4. Bolts
- C. Test Reports:
  - 1. Class B Coating
  - 2. Bolts, Nuts, and Washers
  - 3. Supply the certified manufacturer's mill reports which clearly show the applicable ASTM mechanical and chemical requirements together with the actual test results for the supplied fasteners.
- D. Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
  - 1. Steel
  - 2. Bolts, Nuts, and Washers
  - 3. Galvanizing
  - 4. Welding Procedures and Qualifications

#### 1.04 QUALITY ASSURANCE

##### A. Shop Drawings

- 1. Erection Plan: Submit for record purposes. Indicate the sequence of erection, temporary shoring and bracing, and a detailed sequence of welding, including each welding procedure required.
- 2. Fabrication Drawing Requirements: Submit fabrication drawings for approval prior to fabrication. Prepare in accordance with AISC 326, AISC 325 and AISC 317. Fabrication drawings shall not be reproductions of contract drawings. Include complete information for the fabrication and erection of the structure's components, including the location, type, and size of bolts, welds, member sizes and lengths, connection details, blocks, copes, and cuts. Use AWS A2.4 standard welding symbols. Member substitutions of details shown on the contract drawings shall be clearly highlighted on the fabrication drawings. Explain the reasons for any deviations from the contract drawings

##### B. Certifications

1. Welding Procedures and Qualifications: Prior to welding, submit certification for each welder stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests. If the qualification date of the welding operator is more than one-year old, the welding operator's qualification certificate shall be accompanied by a current certificate by the welder attesting to the fact that he has been engaged in welding since the date of certification, with no break in welding service greater than 6 months. Conform to all requirements specified in AWS D1.1.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site at such intervals to insure uninterrupted progress of work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time not to delay work
- B. Storage: Store Materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration. Do not store materials on structure in a manner that might cause distortion or damage to members or support structure.

### PART 2 - PRODUCTS

#### 2.01 STEEL

- A. Structural Steel: ASTM A 36 for plates, angles and channels.
- B. Hollow Structural Steel Tubing (HSSx): ASTM A 500, Grade C.

#### 2.02 BOLTS, NUTS, AND WASHERS:

- A. Bolts: Shall conform to ASTM F 3125 (Grade F 1852), Type 1. The bolt heads and the nuts of the supplied fasteners must be marked with the manufacturer's identification mark, the strength grade and type specified by ASTM specifications. Bolts shall be manufactured notch between the bolt tip and threads. The bolt shall be designed to react to the opposing rotational torques applied by the installation wrench, with the bolt tip automatically shearing off when the proper tension is obtained.
- B. Nuts: ASTM A 563, Grade and Style for applicable ASTM bolt standard recommended.
- C. Washers: ASTM F 436 washers for ASTM A 325 bolts.
- D. Foundation Anchorage:
  1. Anchor Bolts: ASTM F1554 Gr 36.
  2. Anchor Nuts: ASTM A 563, Grade A, hex style.
  3. Anchor Washers: ASTM F 844.

#### 2.03 STRUCTURAL STEEL ACCESSORIES:

- A. Welding Electrodes and Rods: AWS D1.1.
- B. Non-Shrink Grout: ASTM C 1107, with no ASTM C 827 shrinkage. Grout shall be nonmetallic.
- C. Welded Shear Stud Connectors: ASTM A29, Type B. AWS D1.1

#### 2.04 GALVANIZING

- A. ASTM F2329 for threaded parts or ASTM A123 for structural steel members, unless specified otherwise galvanize after fabrication where practicable.
- B. Using zinc coating by thermal spraying (metalizing) can be used as an alternative to hot dip galvanizing if the galvanizing process by the hot-dip method would cause warping of the structural steel sections.

#### 2.05 FABRICATION:

- A. Fabrication shall be in accordance with the applicable provisions of AISC 325. Fabrication and assembly shall be done in the shop to the greatest extent possible. Compression joints depending on contact bearing shall have a surface roughness not in excess of 500 micro inch as determined by ASME B46.1, and ends shall be square within the tolerances for milled ends specified in ASTM A 6. Shop splices of members between field splices will be permitted only where indicated on the Contract Drawings. Splices not indicated require the approval of the Engineer.
- B. Markings: Prior to erection, members shall be identified by a painted erection mark. Connecting parts assembled in the shop for reaming holes in field connections shall be match marked with scratch and notch marks. Do not locate erection markings on areas to be welded. Do not locate match markings in areas that will decrease member strength or cause stress concentrations.
- C. Shop Primer: Shop prime structural steel, except as modified herein, in accordance with SSPC PA 1. Do not prime steel surfaces embedded in concrete, galvanized surfaces, surfaces to receive sprayed-on fireproofing, surfaces to receive epoxy coatings, surfaces designed as part of a composite steel concrete section, or surfaces within 0.5 inch of the toe of the welds prior to welding (except surfaces on which metal decking is to be welded). Prior to assembly, prime surfaces which will be concealed or inaccessible after assembly. Do not apply primer in foggy or rainy weather; when the ambient temperature is over 95 degrees F.
  - 1. Cleaning: SSPC SP 6, except steel exposed in spaces above ceilings, attic spaces, furred spaces, and chases that will be hidden to view in finished construction may be cleaned to SSPC SP 3 when recommended by the shop primer manufacturer. Maintain steel surfaces free from rust, dirt, oil, grease, and other contaminants through final assembly.
  - 2. Primer: Apply MPI-101 cold curing epoxy primer to a minimum dry film thickness of 3.0 mil in accordance with the coating manufacturer's recommendations. Repair damaged primed surfaces with an additional coat of primer.

- D. Surface Finishes: ASME B46.1 maximum surface roughness of 500 for holes, unless indicated otherwise.

## PART 3 - EXECUTION

### 3.01 FABRICATION

- A. Erection of structural steel shall be in accordance with applicable provisions of AISC 325 except as indicated in AISC Design Guide 10
- B. Provide full bearing under base plates and bearing plates using nonshrink grout. Place nonshrink grout in accordance with the manufacturer's instructions
- C. Except as modified in this section, connections not detailed shall be designed in accordance with AISC 360. Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Punch, subpunch and ream, or drill bolt holes perpendicular to the surface of the member. Holes shall not be cut or enlarged by burning. Bolts, nuts, and washers shall be clean of dirt and rust, and lubricated immediately prior to installation.

### 3.02 WELDING

- A. Welding must be in accordance with AWS D1.1. Grind exposed welds smooth. Provide AWS D1.1 qualified welders, welding operators, and tackers. The Contractor shall develop and submit the Welding Procedure Specifications (WPS) for all welding, including welding done using prequalified procedures. Prequalified procedures may be submitted for information only; however, procedures that are not prequalified shall be submitted for approval.
  - 1. Removal of Temporary Welds, Run-Off Plates, and Backing Strips: Remove only from finished areas as indicated.

### 3.03 SHOP PRIMER REPAIR

- A. Repair shop primer in accordance with the paint manufacturer's recommendation for surfaces damaged by handling, transporting, cutting, welding, or bolting.
  - 1. Field Priming: Field priming of steel exposed to the weather, or located in building areas without HVAC for control of relative humidity. After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat shall be cleaned and primed with paint of the same quality as that used for the shop coat.

### 3.04 GALVANIZING REPAIR:

- A. Galvanize after fabrication where practicable. Repair damage to galvanized coatings using ASTM A780 zinc rich paint for galvanizing damage by handling, transportation, cutting, welding, or bolting. Do not heat surface to which repair paint has been applied.

### 3.05 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.
- B. Contractor to perform field tests, and provide labor, equipment, and incidentals required for testing. The Engineer shall be notified in writing of defective welds, bolts, nuts, and washers within 7 working days of the date of weld inspection.
- C. Shop Welds:
  - 1. Visual Inspection: AWS D1.1. Furnish the services of AWS-certified welding inspectors for fabrication and erection inspection and testing and verification inspections. Welding inspectors shall visually inspect and mark welds, including fillet weld end returns.
  - 2. The Contractor shall hire and pay for Special Inspection services.
- D. Field Welds:
  - 1. Nondestructive Testing: AWS D1.1. 50 percent of all welds shall be dye penetrant tested in accordance with methods established in ASTM E 165. Test locations shall be as selected by the Engineer. Allowable defects shall conform to AWS Specification D1.1. In addition to dye penetrant testing, 50 percent of all full penetration weld joints shall be subjected to ultrasonic examination. If more than 20 percent of welds made by a welder contain defects identified by dye penetrant testing, then all welds made by that welder shall be tested by ultrasonic testing, as approved by the Engineer. When all welds made by an individual welder are required to be tested, magnetic particle testing shall be used only in areas inaccessible to ultrasonic testing. Retest defective areas after repair.

END OF SECTION

## SECTION 05400

### COLD-FORMED METAL FRAMING

#### PART 1 – GENERAL

##### 1.01 SUMMARY

- A. Provide cold-formed steel for interior wall framing shown in structural drawings, including galvanizing, anchors, clips, and fasteners.

##### 1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  1. ASTM A 1003 Standard Specification for Steel Sheet, Carbon, Metallic and Nonmetallic Coated for Cold Formed Framing Members
  2. ASTM A 36 Standard Specification for Carbon Structural Steel
  3. ASTM A 780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings
  4. ASTM C 1513 Standard Specification for Steel Tapping Screws for Cold Formed Steel Framing Connections
  5. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Materials
  6. ASTM E 1190 Standard Test Methods for Strength of Power Actuated Fasteners Installed in Structural Members
  7. ASTM E 329 Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
- B. American Welding Society (AWS):
  1. AWS D1.1 Structural Welding Code – Steel
  2. AWS D1.3 Structural Welding Code – Sheet Steel

##### 1.03 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing as shown on structural drawings.
  1. Framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature

change of 120 degree F.

2. Framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure.
- B. Cold-Formed Steel Framing, General: According to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
1. Headers: According to AISI's "Standard for Cold-Formed Steel Framing- Header Design."

#### 1.04 SUBMITTALS

- A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- C. Shop Drawings: Provide shop drawings prepared by cold-formed metal framing manufacturer. Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- D. Welding Certificates.
- E. Qualification Data: For Testing agency.
- F. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
1. Steel sheet.
  2. Mechanical fasteners.
  3. Miscellaneous structural clips and accessories.
  4. Powder actuated fasteners.
- G. Research/Evaluation Reports: For cold-formed metal framing.

#### 1.05 QUALITY ASSURANCE

- A. Engineering Responsibility: Preparation of Shop Drawings and other structural data by a qualified professional Engineer.
- B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated.
- C. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-

house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, ductility, and metallic-coating thickness.

- D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- E. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction. Products used in the assembly shall carry a classification label from a testing laboratory acceptable to authority having jurisdiction.
- F. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and it's "Standard for Cold-Formed Steel Framing - General Provisions."
  - 1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling per requirements of AISI's "Code of Standard Practice."

### PART 2 – PRODUCTS

#### 2.01 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide cold-formed metal framing products specified in other Part 2 articles by one of the following manufacturers:
  - 1. Allied Studco.
  - 2. AllSteel Products, Inc.
  - 3. California Expanded Metal Products Company.
  - 4. Clark Western.
  - 5. Consolidated Fabricators Corp.; Building Products Division.
  - 6. Craco Metals Manufacturing, LLC.
  - 7. Custom Stud, Inc.

8. Design Shapes in Steel.
9. Dietrich Metal Framing; a Worthington Industries Company.
10. Formetal Co. Inc. (The).
11. MarinoWare; a division of Ware Industries.
12. MBA Building Supplies Inc.
13. Olmar Supply; dba Denmark Steel
14. Quail Run Building Materials, Inc.
15. SCAFCO Corporation.
16. Southeastern Stud & Components, Inc.
17. Steel Construction Systems.
18. Steeler, Inc.
19. United Metal Products, Inc.
20. Or approved equal in good standing of Steel Stud Manufacturer's Association (SSMA).

## 2.02 MATERIALS

- A. Steel Sheet: ASTM A 1003, Metallic coated, of grade and coating weight as follows:
  1. Grade: As required by structural performance.
  2. Coating: G90 or approved equal.

## 2.03 LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  1. Minimum Base-Metal Thickness: 16 Ga.
  2. Flange Width: 2 inches.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
  1. Minimum Base-Metal Thickness: 16 Ga.
  2. Flange Width: 2 inches.

C. Headers and Jambs - Heavy-Duty Stud: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:

1. Basis-of-Design Product: Combination track and stud built up members.
2. Minimum Base-Metal Thickness: 0.0428 inch (10 Ga).
3. Web and Flange Widths, Type HDS: See track and stud.

#### 2.04 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003, Structural Grade, Type H or Type L, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Hole reinforcing plates.
7. Backer plates.

#### 2.05 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123.

B. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
2. Hot-dipped galvanized per ASTM A123 or ASTM A153.

C. Welding Electrodes: Comply with AWS standards.

D. All connectors shall be hot dip galvanized after fabrication. Where noted on drawings, screws shall be hot dip galvanized.

- E. Powder Actuated Fasteners: Heavy-duty, smooth shank, and galvanized. Shank diameter and allowable load capacity as indicated on the drawings. Allowable load capacities shall be in accordance with ICC-ES AC70 and determined by testing per ASTM E 1190.

## 2.06 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- C. Sealer Gaskets: Closed-cell neoprene foam, ¼ inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

## 2.07 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
  - 1. Fabricate framing assemblies using jigs or templates.
  - 2. Cut framing members by sawing or shearing; do not torch cut.
  - 3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
  - 4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  - 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

## PART 3 – EXECUTION

### 3.01 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of slab at stud locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
- B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of slab at stud locations.

### 3.03 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
  - 1. Cut framing members by sawing or shearing; do not torch cut.
  - 2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to structural drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- H. Fasten hole reinforcing plate per reviewed engineering design over web penetrations that exceed size of manufacturer's standard punched openings.
- I. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

### 3.04 LOAD-BEARING WALL INSTALLATION

- A. Install continuous top and bottom tracks sized to match studs unless approved design is more stringent. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
  - 1. Anchor Spacing: As shown on Structural Drawings.
- B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
  - 1. Stud Spacing: As indicated on structural drawings.
- C. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
- D. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
  - 1. Frame wall openings with not less than a double stud at each jamb of frame or as indicated on Structural Drawings. Fasten jamb members together to uniformly distribute loads.
  - 2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- E. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work

requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- F. Install horizontal bridging in stud system as indicated on Structural Drawings. Fasten at each stud intersection.
1. Bridging: Steel channel, welded or mechanically fastened to webs of punched studs with a minimum of 2 screws into each flange of the clip angle for framing members up to 6 inches deep.
  2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
  3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions, or approved equal.
- G. If required by design, install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
- H. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.05 FIELD QUALITY CONTROL

- A. Testing: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Contracting Officer.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.06 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that cold-formed metal framing is without damage or deterioration at time of project acceptance.

END OF SECTION

DIVISION 6 – WOOD AND PLASTICS

SECTION 06070

WOOD TREATMENT

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The General Conditions, the Special Provisions, and all other applicable documents preceding these specifications shall govern all work specified hereinafter in all DIVISIONS AND SECTIONS.

1.02 SUMMARY

- A. Plant preservative and insecticide treatment of lumber and other wood products specified in other sections of this Specification by pressure and dip methods.
- B. Field treatment of field cut or drilled lumber.
- C. Related Work Described Elsewhere:
  - 1. Section 06100 – ROUGH CARPENTRY for miscellaneous framing and blocking.

1.03 REFERENCES

- A. American Wood-Preservers' Association
  - 1. AWWA C2-00: Lumber, Timber, Bridge Ties and Mine Ties-Preservative Treatment by Pressure Processes.
  - 2. AWWA C9-00: Plywood-Preservative Treatment by Pressure Processes.
  - 3. AWWA C31-00: Lumber Used out of Contact with the Ground and Continuously Protected from Liquid Water-Treatment by Pressure Processes.
  - 4. AWWA M4-01: Care of Preservative-Treated Wood Products.
  - 5. AWWA C20-99: Structural Lumber- Fire Retardant Treatment by Pressure Process.
  - 6. AWWA N1-01: All millwork, Preservative Treatment by Non-Pressure Process.
  - 7. AWWA N2-00: Composite Wood Products, Preservative Treatment by Non-Pressure Process.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Product Data: Provide data on all treatment products, including field application instructions if applicable.

1. Provide manufacturer's Material Safety Data Sheets on all products, and hazardous materials.
  2. Provide ICBO approvals for treatment solutions used.
- C. Preserver Certifications:
1. Provide a Certificate of Treatment showing compliance with these specifications for the following:
    - a. Kiln drying
    - b. Method of treatment performed, including dip treatment.
- D. Contractor's Certification: Provide a certification letter stating that all wood used on this job including cuts and penetration were treated and coated with preservatives in compliance with requirements of this contract.
- E. Guarantee: Guarantee form for written guarantee.

#### 1.05 REGULATORY REQUIREMENTS

- A. Comply with State OSHL (Occupancy Safety and Health Law) and pollution controls regulations of the State Department of Health and EPA.
- B. Comply with Act 045, Session Laws of Hawaii 2018 which was signed into law by the Hawaii State Governor on June 13, 2018. On January 1, 2023, the law banned all use and sale of chlorpyrifos in the State of Hawaii, and permitting of its use ceased at that time.

#### 1.06 QUALITY ASSURANCE

- A. Comply with the American Wood-Preservers' Association standards as described in the applicable building or residential code. Preservatives shall be EPA registered.
- B. Do not use preservatives containing arsenic or other EPA banned chemicals.
- C. Do not use Perma-Clear 65 or other zinc naphthanate and permethrin products.
- D. Source Limitations for Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer.

#### 1.07 DELIVERY STORAGE AND HANDLING

- A. Protect AWWA C31 inorganic boron treated wood from contact with the ground, rain or other sources of liquid water until permanent installation of covering construction.

#### 1.08 GUARANTEE

- A. Provide a two-year guaranty to replace all treated wood which is attacked by subterranean termites up to a total cost of \$20,000.00 over the guaranty period.

- B. Provide a five-year guaranty to replace all treated wood which is attacked by dry wood termites or deteriorates due to dry rot. The Surety shall not be held liable beyond two years from the project acceptance date.
- C. Guarantee periods shall commence on Project Acceptance date.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Mill lumber to finish size and shape prior to treating and treat before assembly.
- B. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
  - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece, or omit marking and provide certificates of treatment compliance issued by inspection agency.

### 2.02 PRESSURE TREATMENT WITH WATER-BORNE PRESERVATIVES

- A. Treating solutions:
  - 1. Copper azole, Type A (CBA-A).
  - 2. Inorganic boron (SBX).
- B. Treatment Methods:
  - 1. General:
    - a. All water-borne treatment methods require incising of lumber of nominal 2 inch thickness (1-1/2 inches actual dimension).
    - b. Choice of treatment method and conditions of use of each treating solution shall conform to the treatment schedule contained in Part 3.
  - 2. CBA-A: Treatment methods, depth of penetration and treating solution retention shall conform to AWPA C2 for lumber and C9 for plywood.
  - 3. SBX: Treatment method shall conform to AWPA C31. Treating solution retention shall be a minimum of 0.28 pounds per cubic foot (equivalent to 0.42 DOT).
- C. Drying:
  - 1. Before Treatment:
    - a. CBA-A Treatment: Wood shall be air dried or kiln-dried before treatment to average moisture content of 28 percent or less per AWPA standards.
    - b. SBX Treatment: Wood having a moisture content higher than 28% is acceptable when treating with SBX.

2. After Treatment:
  - a. All 1 inch and 2 inch lumber and all plywood shall be dried to a moisture content of 19 percent or less after treatment.

## 2.03 PRESSURE TREATMENT WITH OIL-BORNE PRESERVATIVES

### A. Treating Solution:

1. 0.50 percent by weight chlorpyrifos, 0.75 percent by weight 3-iodo-2-propynyl butyl carbamate (IPBC). The solvent used in formulating the preservative solution shall meet the requirements of AWPA hydrocarbon solvent Type C, Standard P9, Paragraph 3.1.
2. For interior application use low odor mineral spirits as solvent.

### B. Treatment Methods:

1. Treated wood shall attain the following net retention requirements: 0.0175 pounds of Chlorpyrifos per cubic foot of wood, 0.035 pound of 3-Iodo-2 propynyl butyl carbamate per cubic foot of wood.

### C. Drying:

1. Before Treatment: All wood treated with oil-borne preservatives shall be kiln-dried to an average moisture content of 12% to 15% per AWPA standards.
2. After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

## 2.04 PRESERVATION BY DIP TREATMENT

### A. Treating Solution

1. Any of the Oil-borne Preservatives listed above.
2. A solution of 1 quart chlopyrifos in 55 gallons of a 0.50 percent IPBC solution.

## PART 3 - EXECUTION

### 3.01 SCHEDULE OF TREATMENTS

#### A. Species:

1. Treat all wood species except all-heart redwood.
2. All water-borne and oil-borne treatment solutions are applicable to douglas-fir and hem-fir species except for CBA-A treatment which is acceptable for hem-fir species only.

B. Application:

1. Pressure Treatment:
  - a. General: All lumber shall be pressure treated.
  - b. Hardwood flooring and exposed lumber 1-1/2" (net thickness) and over that will be unpainted or receive a clear finish shall be and pressure treated with oil-borne preservative. Do not incise lumber.
  - c. SBX treated wood shall not be used in areas exposed to direct precipitation (e.g. exposed decking, trellises, fencing, etc.) unless painted or covered with a finish material.
2. Field Cuts: Treat end cuts, notches and penetrations into treated lumber or plywood. Exception: Cuts and penetrations made in SBX treated wood 2 inches or less in nominal thickness need not be field treated.

END OF SECTION

## SECTION 06100

### ROUGH CARPENTRY

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. The General Conditions, the Special Provisions, and all other applicable documents preceding these specifications shall govern all work specified hereinafter in all DIVISIONS AND SECTIONS.

##### 1.02 SUMMARY

- A. Section includes work associated with rough carpentry.
- B. Related Work Described Elsewhere:
  - Section 06160 – SHEATHING for roof sheathing.
  - Section 09900 – PAINTING and FINISHING for Hardwood sealing.

##### 1.03 REFERENCES

- A. 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 designation only.
  - 1. American Institute of Timber Construction (AITC):
    - a. AITC 111 – Recommended Practice for Protection of Structural Glued Laminated Timber During Transit, Storage and Erection
    - b. AITC TCM – Timber Construction Manual (TCM)
    - c. ANSI/AITC A190.1 – American National Standard, Structural Glued Laminated Timber
  - 2. American Lumber Standards Committee (ALSC):
    - a. ALSC PS 20 – American Softwood Lumber Standard
  - 3. American Wood Council (AWC):
    - a. AWC NDS – National Design Specification (NDS) for Wood Construction
    - b. AWC WFCM – Wood Frame Construction Manual (WFCM) for One (1)- and Two (2)- Family Dwellings
  - 4. American Wood Protection Association (AWPA):

- a. AWWA Book – AWWA Book of Standards
  - b. AWWA M2 – Standard for Inspection of Preservative Treated Wood Products for Industrial Use
  - c. AWWA M6 – Brands Used on Preservative Treated Materials
  - d. AWWA P18 – Nonpressure Preservatives
  - e. AWWA P5 – Standard for Waterborne Preservatives
  - f. AWWA T1 – Use Category System: Processing and Treatment Standard
5. American Plywood Association (APA) – The Engineered Wood Association
- a. APA E30 – Engineered Wood Construction
  - b. APA E445 – Performance Standards and Qualification Policy for Structural-Use Panels (APA PRP-108)
  - c. APA EWS R540 - Builder Tips: Proper Storage and Handling of Glulam Beams
  - d. APA EWS T300 - Technical Note: Glulam Connection Details
  - e. APA F405 - Product Guide: Performance Rated Panels
  - f. APA L870 - Voluntary Product Standard, PS 1-09, Structural Plywood
  - g. APA S350 - PS 2-10, Performance Standard for Wood-Based Structural-Use Panels

#### 1.04 SUBMITTALS

##### A. Shop Drawings:

- 1. Rafters.
- 2. Drawings of rafters, and other fabricated structural members indicating materials, shop fabrication, and field erection details; including methods of fastening.
- 3. Drawings of field erection details, including materials and methods of fastening in conformance with Factory Mutual wind uplift rated systems specified in other sections of these specifications.

##### B. Certificates:

- 1. Certificates of Grade: Manufacturer’s certificates (approved by an American Lumber Standards approved agency) attesting that lumber and material not normally grade marked meet the specified requirements. Certificate of

Inspection for grade marked material by and American Lumber Standards Committee (ALSC) recognized inspection agency prior to shipment.

2. Preservative Treatment: For Engineered Wood Products, submit each Manufacturer's written approval of method and types of wood treatment for its products.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the site in an undamaged condition. Store, protect, handle, and install elements in accordance with Manufacturer's instructions and as specified. Store materials off the ground to provide proper ventilation, with drainage to avoid standing water, and protection against ground moisture and dampness. Store materials with a moisture barrier at both the ground level and as a cover forming a well ventilated enclosure. Store glue-laminated beams and joists on edge. Adhere to requirements for stacking, lifting, bracing, cutting, notching, and special fastening requirements. Laminated timber shall be handled and stored in accordance with AITC 111 or APA EWS R540. Remove defective and damaged materials and provide new materials.

#### 1.06 GRADING AND MARKING

- A. Lumber: Mark each piece of framing and board lumber or each bundle of small pieces of lumber with the grade mark of a recognized association or independent inspection agency. Such association or agency shall be certified by the Board of Review, American Lumber Standards Committee, to grade the species used. Surfaces that are to be exposed to view shall not bear grademarks, stamps, or any type of identifying mark. Hammer marking will be permitted on timbers when all surfaces will be exposed to view.
- B. Plywood: Mark each sheet with the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood. The mark shall identify the plywood by species group or span rating, exposure durability classification, grade, and compliance with APA L870. Surfaces that are to be exposed to view shall not bear grademarks or other types of identifying marks.
- C. Preservative-Treated Lumber and Plywood: The Contractor shall be responsible for the quality of treated wood products. Each treated piece shall be inspected in accordance with AWWA M2 and permanently marked or branded, by the producer, in accordance with AWWA M6. The Contractor shall provide Contracting Officer with the inspection report of an approved independent inspection agency that offered products comply with applicable AWWA Standards. The appropriate Quality Mark on each piece will be accepted, in lieu of inspection reports, as evidence of compliance with applicable AWWA treatment standards.

#### 1.07 SIZES AND SURFACING

- A. ALSC PS 20 for dressed sizes of yard and structural lumber. Lumber shall be surfaced four (4) sides. Size references, unless otherwise specified, are nominal

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sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced. Other measurements are IP or SI standard.

#### 1.08 MOISTURE CONTENT

- A. Air-dry or kiln-dry lumber. Kiln-dry treated lumber after treatment. Maximum moisture content of wood products shall be as follows at the time of delivery to the job site:
  - 1. Framing lumber and board, 19 percent (19%) maximum.
  - 2. Timbers 5 inches and thicker, 25 percent (25%) maximum.
  - 3. Roof planking, 15 percent (15%) maximum.
  - 4. Materials other than lumber; moisture content shall be in accordance with standard under which the product is produced.

#### 1.09 PRESERVATIVE TREATMENT

- A. Treat wood products with waterborne wood preservatives conforming to AWPA P5. Pressure treatment of wood products shall conform to the requirements of AWPA BOOK Use Category System Standards U1 and T1. Pressure-treated wood products shall not contain arsenic, chromium, or other agents classified as carcinogenic, probably carcinogenic, or possibly carcinogenic to humans (compounds in Groups 1, 2A, or 2B) by the International Agency for Research on Cancer (IARC), Lyon, France. Pressure-treated wood products shall not exceed the limits of the U.S. EPA's Toxic Characteristic Leaching Procedure (TCLP), and shall not be classified as hazardous waste. Submit certification from treating plant stating chemicals and process used and net amount of preservatives retained are in conformance with specified standards.
  - 1. 0.25 pcf intended for above ground use.
  - 2. All wood shall be air or kiln dried after treatment. Specific treatments shall be verified by the report of an approved independent inspection agency, or the AWPA Quality Mark on each piece. Do not incise surfaces of lumber that will be exposed. Minimize cutting and avoid breathing sawdust. Brush coat areas that are cut or drilled after treatment with either the same preservative used in the treatment or with a two percent (2%) copper naphthenate solution. All lumber and woodwork shall be preservative treated. Plastic lumber shall not be preservative treated.
- B. New Construction: Use a boron-based preservative conforming to AWPA P18, sodium silicate wood mineralization process, or Ammoniacal Copper Quaternary Compound to treat wood. Use boron-based preservatives for above-ground applications only.

#### 1.10 QUALITY ASSURANCE

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- A. Drawing Requirements: For structural members, rafters, indicate materials, details of construction, methods of fastening, and erection details. Include reference to design criteria used. Submit drawings for all proposed modifications of structural members. Do not proceed with modifications until the submittal has been approved.
- B. Date Required: Submit calculations and drawings for all proposed modifications of structural members. Do not proceed with modifications until the submittal has been approved.
- C. Certificates of Grade: Submit certificates attesting that products meet the grade requirements specified in lieu of grade markings where appearance is important and grade marks will deface material.
- D. Qualifications for Laminating Wood Manufacturer: Provide factory glued-laminated structural wood members produced by an American Institute of Timber Construction (AITC) or American Plywood Association (APA) licensed manufacturer. Factory mark every member of the structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark and provide a certificate of conformance.

#### 1.11 ENVIRONMENTAL REQUIREMENTS

- A. During and immediately after installation of treated wood, and laminated wood products at interior spaces, provide temporary ventilation.

### PART 2 - PRODUCTS

#### 2.01 LUMBER

- A. Structural Lumber: Any of the species and grades listed in AWC NDS that have allowable unit stresses indicated. Use for rafters, headers, beams, posts, and all other members indicated to be stress rated. Structural lumber exposed to view shall be appearance grade meeting the allowable unit stresses indicated. Design of members and fastenings shall conform to AITC TCM. Other stress graded or dimensioned items such as blocking, carriages, and studs shall be standard or No. 2 grade except that studs may be Stud grade.
- B. Framing Lumber: Framing lumber such as studs, plates, caps, beams, cant strips, bucks, sleepers, nailing strips, and nailers and board lumber such as wall and roof sheathing shall be Douglas Fir Larch or approved equal pressure preservative treated and graded as No.1 or approved substitute.

#### 2.02 PLYWOOD

- A. APA L870, APA S350, APA E445, and APA F405 respectively.
- B. Roof Sheathing: Per Section 06160 – SHEATHING.
- C. Building Paper: Per Section 06160 – SHEATHING.
- D. Miscellaneous Wood Members.

1. Nonstress Graded Members: Members shall include bridging, corner bracing, furring, grounds, and nailing strips.
2. Sill Plates: Sill plates shall be standard or number two (2) grade.
3. Blocking: Blocking shall be standard or number two (2) grade.
4. Rough Bucks and Frames: Rough bucks and frames shall be straight standard or number two (2) grade.

### 2.03 HARDWOOD

A. W.R. Cedar, Redwood or approved substitute. Treated and clear sealed.

1. 2x12 Fascia Board
2. 1x10 Trim Board
3. 1x4 Tongue and Groove Soffit Board

### 2.04 ROUGH HARDWARE

- A. Unless otherwise indicated or specified, rough hardware shall be of the type and size necessary for the project requirements. Sizes, types, and spacing of fastenings of manufactured building materials shall be as recommended by the product manufacturer unless otherwise indicated or specified. Rough hardware exposed to the weather or embedded in or in contact with preservative treated wood on exterior masonry, or slabs shall be stainless steel or hot-dip zinc-coated as indicated on the drawings.
- B. Connectors: Shall be type indicated on the drawings and shall be “Simpson Company Strong Tie” or equal having equivalent International Code Council Evaluation Service (ICC-ES) ratings. Connectors shall be installed per manufacturer specifications. All connectors shall have minimum yield and tensile strengths of 33 ksi and 52 ksi, respectively. Connectors shall be Stainless Steel Type 316 conforming to ASTM A 276, unless noted otherwise. Otherwise, connectors shall be hot dip galvanized conforming to ASTM A 153. Connectors with chipped coatings shall not be used.
- C. Fasteners: Stainless steel fasteners shall be used unless noted otherwise. Hot-dip galvanized fasteners shall be used with hot-dip galvanized connectors. Fasteners in contact with mild steel members shall be hot-dip galvanized. Fasteners with chipped coatings shall not be used.
1. Bolts: Stainless Steel conforming to ASTM F593 Type 316 OR ASTM A193 Type 316. Hot-dip galvanized conforming to ASTM A307, Grade A galvanized per ASTM F2329.

2. Nuts: Stainless Steel conforming to ASTM F594 Type 316 OR ASTM A194 Type 316. Hot-dip galvanized conforming to ASTM A563 galvanized per ASTM F2329.
3. Washers: Stainless Steel Type 316. Hot-dip galvanized conforming to ASTM F436, Type 1 galvanized per ASTM F2329.
4. Lag Screws and Lag Bolts: ASME B18.2.1. Stainless Steel Type 316. Hot-dip galvanized per ASTM F2329.
5. Wood Screws: ASME B18.6.1. Stainless Steel Type 316. Hot-dip galvanized per ASTM F2329.
6. Nails: ASTM F547. Nails shall be Stainless Steel Type 316 or hot-dipped galvanized in accordance with ASTM A153 as required. For sheathing, length of nails shall be sufficient to extend 1 inch into supports. In general, 8-penny or larger nails shall be used for nailing through 1 inch thick lumber and for toe nailing 2 inch thick lumber; 16-penny or larger nails shall be used for nailing through 2 inch thick lumber. Nailing shall be in accordance with the recommended nailing schedule contained in AWC WFCM. Where detailed nailing requirements are not specified, nail size and spacing shall be sufficient to develop an adequate strength for the connection. The connection's strength shall be verified against the nail capacity tables in AWC NDS. Reasonable judgment backed by experience shall ensure that the designed connection will not cause the wood to split. If a load situation exceeds a reasonable limit for nails, a specialized connector shall be used.

D. Felt: Asphalt saturated inorganic 30# roofing felt (ply).

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Conform to AWC WFCM and install in accordance with the National Association of Home Builders (NAHB) Advanced Framing Techniques: Optimum Value Engineering, unless otherwise indicated or specified. Select lumber sizes to minimize waste. Fit framing lumber and other rough carpentry, set accurately to the required lines and levels, and secure in place in a rigid manner. Do not splice framing members between bearing points. Set rafters with their crown edge up. Frame members for the passage of pipes, conduits, and ducts. Provide adequate support as appropriate to the application, climate, and modulus of elasticity of the product. Do not cut or bore structural members for the passage of ducts or pipes without approval. Reinforce all members damaged by such cutting or boring by means of specially formed and approved sheet metal or bar steel shapes, or remove and provide new, as approved. Provide as necessary for the proper completion of the work all framing members not indicated or specified. Spiking and nailing not indicated or specified otherwise shall be in accordance with the Nailing Schedule contained in ICC IBC; perform bolting in an approved manner. Spikes, nails, and bolts shall be drawn up tight. Timber connections and fastenings shall conform to

AWC NDS. Use slate or steel shims when leveling beams on masonry or concrete. Do not use shimming on wood or metal bearings. When joists, beams, and girders are placed on masonry or concrete, a wood base plate shall be positioned and leveled with grout. The beam shall then be placed on the plate.

- B. Roof Framing or Rafters: Tops of supports or rafters shall form a true plane. Ridge and hip members shall be of depth equal to cut on rafters where practicable, but in no case less than depth of rafters. Rafters shall have full and solid bearing on plates. Hips and ridges shall be straight and true intersections of roof planes. Rafters shall be spiked to wall plate with no less than three (3) 16-penny nails, unless otherwise indicated. Rafters shall be toe-nailed to ridge or hip members with at least three 16-penny nails. Rafters shall be braced to prevent movement until permanent sheathing is installed. Hip rafters shall be secured to wall plates by clip angles. Openings in roof shall be framed with headers and trimmers. Unless otherwise indicated, headers carrying more than two rafters and trimmers supporting headers carrying more than one rafter shall be double. Hip rafters longer than the available lumber shall be butt jointed and scabbed. Trussed rafters shall be installed in accordance with TPI HIB.
- C. Metal Framing Anchors: Provide framing anchors at every rafter or trussed rafter to fasten rafter or trussed rafter to plates and studs against uplift movement and forces as indicated. Anchors shall be punched and formed for nailing so that nails will be stressed in shear only. Nails shall be zinc-coated; drive a nail in each nail hole provided in the anchor.
- D. Decking shall be installed with tongues up on slope or pitched roofs, with pattern faces down, intended to be exposed on the underside.
  - 1. Each piece of 2" decking shall be toe-nailed through the tongue and also one face nail per piece per support using 16d common nails.
  - 2. Each piece of 3" decking shall be toe-nailed at each support with one 40d nail and face nailed with one 6 inch spike. There shall be a minimum of 4 feet between joints in adjacent courses. Courses shall be spiked to each other with 8 inch spikes at intervals not to exceed 30 inches through pre-drilled edge holes and with one spike at a distance not exceeding 10 inches from each end of each piece.
- E. Plywood Sheathing: Install with the grain of the outer plies or long dimension at right angles to supports. Stagger end joints and locate over the centerlines of supports. Allow 1/8 inch spacing at panel ends and 1/4 inch at panel edges. Nail panels with 10-penny common nails or screw-type nails spaced 6 inches o.c. at supported edges and 12 inches o.c. at intermediate bearings. Do not use staples in roof sheathing. Where the support spacing exceeds the maximum span for an unsupported edge, provide adequate blocking, tongue-and-groove edges, or panel edge clips, in accordance with APA E30.

### 3.02 MISCELLANEOUS

- A. Wood Roof Nailers, Edge Strips, Crickets, Curbs, and Cants: Provide sizes and configurations indicated or specified and anchored securely to continuous construction.
- B. Sill Plates: Sill plates shall be set level and square and anchor bolted at not more than 4 feet on centers and not more than 6 inches from end of each piece. A minimum of two anchors shall be used for each piece.
- C. Installation of timber connectors shall conform to applicable requirements of AWC NDS.
- D. Protect wood in contact with concrete with one (1) layer of felt between wood and concrete.
- E. Welding of fabricated connectors shall conform to AWS D1.1. Remove galvanizing on surfaces to receive field weld material. Touch up with cold galvanizing after field welding.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07560

FLUID APPLIED ROOFING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.02 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the fluid-applied roofing work as indicated on the drawings and/or specified herein.

1.03 RELATED SECTIONS

- A. DIVISION 5 – METALS
- B. DIVISION 7 – THERMAL AND MOISTURE PROTECTION

1.04 REFERENCES

- A. Factory Mutual (FM Global) – Approval Guide.
- B. Factory Mutual Standard 4470 – Approval Standard for Class 1 Roof Covers.
- C. Underwriters Laboratories (UL) - Roofing Systems and Materials Guide (TGFU R1306).
- D. ASTM D 1079 – Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials.
- E. ASTM D1644 – Standard Test Methods for Nonvolatile Content of Varnishes.
- F. ASTM D2697 – Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings.
- G. ASTM D2370 – Standard Test Method for Tensile Properties of Organic Coatings.
- H. ASTM D624 – Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.

- I. ASTM D3960 – Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
- J. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- K. National Roofing Contractors Association (NRCA).
- L. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

#### 1.05 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

#### 1.06 SYSTEM DESCRIPTION

- A. The roofing work includes roofing, flashing and reinforcing of joints and junctions, and roof accessories integrally related to roof installation.
- B. Provide an installed roofing system that does not permit the passage of water.
- C. Contractor shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

#### 1.07 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Show including plans and details of cool insulated roof waterproofing system including membrane, penetration flashings, base flashings, and expansion joints size, flashing details, and attachment.
  - 1. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, thickness, color, texture and surfacing.
  - 2. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

3. Field Quality Control: Submit the following.
4. Daily Inspection and Testing Reports
5. Substrate and Bond Testing Reports
6. Completed Membrane Reports
7. Closeout Submittals: Submit roofing/waterproofing manufacturer and applicator's warranty and ensure forms have been completed in Owner's name and registered with manufacturer. Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

#### 1.08 QUALITY ASSURANCE

- A. Submit under provisions of Section 01300. Manufacturer Qualifications: Company specializing in manufacturing cold fluid-applied reinforced polyurethane system with a minimum of 10 years experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with a minimum of 5 years documented experience in cold fluid applied reinforced systems and approved by system manufacturer for warranted membrane installation.
- C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- D. Manufacturer's Field Service: Membrane manufacturer shall provide the services of a competent field representative on-site to provide the following inspections:
  1. Job start inspection at the beginning of each phase of the project, to review special detailing conditions and substrate preparation.
  2. Periodic in-progress inspections throughout duration of the project to evaluate membrane and flashing application.
  3. Observe field quality control testing.
  4. Final punch-list inspection at the completion of each phase of the project prior to installation of any surfacing or overburden materials.
  5. Warranty inspection to confirm completion of all punch list items, and surfacing.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are

chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.

- F. Source Limitations: Obtain all principal components of roofing/waterproofing system from a single manufacturer. Secondary products that are required shall be as recommended and approved in writing by the roofing/waterproofing system manufacturer. Upon request of the Architect or the State (Owner), submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the manufacturer.

#### 1.09 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-roofing conference approximately two weeks before scheduled commencement of roofing/waterproofing system installation and associated work.
- B. Require attendance of installers of substrate construction to receive roofing/waterproofing, installers of work in and around roofing/waterproofing which must precede or follow roofing/waterproofing work including mechanical and electrical penetration, equipment openings, subsequent finish work, and the Architect, the State (Owner), and roofing/waterproofing system manufacturer's representative.
- C. Objectives include:
  - 1. Review foreseeable methods and procedures related to roofing/waterproofing work, including set up and mobilization areas for stored material and work area.
  - 2. Tour representative areas of roofing/waterproofing substrates, inspect and discuss condition of substrate, penetrations and other preparatory work.
  - 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
  - 4. Review roofing/waterproofing system requirements, Drawings, Specifications and other Contract Documents.
  - 5. Review and finalize schedule related to roofing/waterproofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
  - 6. Review required inspection, testing, certifying procedures.
  - 7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
  - 8. Record conference including decisions and agreements reached. Furnish a copy of records to each party attending.

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store materials off the ground or on pallets, under cover and in a cool, dry location, out of direct sunlight, in accordance with manufacturer's recommendations. Storage temperatures should be between 60°F to 80°F (15.6° to 26.7°C) and not exceed 90°F (43.3°C). Indoor ventilated storage is recommended. Ensure jobsite storage is in a shaded and ventilated area. Do not store in direct sunlight. Keep materials away from open flame or welding sparks.
- C. Store roll goods horizontally on platforms sufficiently elevated to prevent contact with water and other contaminants. Do not use rolls that are wet, dirty or have damaged ends. Materials must be kept dry at all times. Plastic wrapping installed at the factory should not be used as outside storage covers.
- D. Do not store materials in quantities that exceed design loads, damage substrate materials, hinder installation or drainage.
- E. Follow manufacturer's directions for protection of materials prior to and during installation. Do not use materials that have been damaged to the point that they will not perform as specified. Fleece reinforcing materials must be clean, dry and free of all contaminants.
- F. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of the MSDS and local authorities having jurisdiction.
- G. Maintain copies of all current MSDS for all components on site. Provide personnel with appropriate safety data information and training as it relates to the specific chemical compounds to be utilized.

#### 1.11 SEQUENCING

- A. Apply roofing/waterproofing in a timely manner in conjunction with work of other trades. Coordinate with other trades to avoid traffic over or against completed membrane surfaces.
- B. Coordinate with installation of drains as shown on Drawings, including flashing, and associated roofing/waterproofing work.
- C. Field Quality Control:
  1. Regular tests of substrates shall be successfully completed prior to installation of roofing/waterproofing membrane.
  2. Random testing to determine tensile strength of membrane to substrate shall be successfully completed during the progress of the Work.

#### 1.12 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within

limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

- B. Weather Condition Limitations: Do not apply roofing/waterproofing membrane during or with the threat of inclement weather or when precipitation is expected.
- C. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- E. When applying materials with spray equipment, take precautions to prevent over spray and/or solvents from damaging or defacing surrounding walls, building surfaces, vehicles or other property. Care should be taken to do the following:
  - 1. Close air intakes into the building.
  - 2. Have a dry chemical fire extinguisher available at the jobsite.
  - 3. Post and enforce "No Smoking" signs.
- F. Avoid inhaling spray mist, take precautions to ensure adequate ventilation.
- G. Where required by the Architect, implement odor control and elimination measures prior to and during the application of the roofing/waterproofing materials. Control/elimination measures shall be field tested at off-hours and typically consists of 1 or a multiple of the following measures.
  - 1. Sealing of air intakes with activated carbon filters. Install filters in accordance with requirements and recommendations of the filter manufacturer. Seal filters at joints and against building exterior walls to prevent leakage of unfiltered air.
  - 2. Sealing of doorways, windows, and skylights with duct tape and polyethylene sheeting to prevent leakage of air into the building.
  - 3. Erection and use of moveable enclosure(s) sized to accommodate work area(s) and stationary enclosure for resin mixing station. Enclosure shall be field constructed or pre-manufactured of fire retardant materials in compliance with local requirements in accordance with requirements of the Owner or his designated Representative. Provide enclosure(s) with mechanical air intake/exhaust openings and Odor Control Air Cleaners, as required to clean enclosed air volume and to prevent odor migration outside the enclosure. Exhaust opening shall be sealed with activated carbon filter.
  - 4. Protection of Contractor personnel and occupants of the structure and surrounding buildings as necessary to comply with requirements of OSHA, NIOSH and/or governing local authority.
- H. Ensure that substrate materials are dry and free of contaminants. Do not commence with the application unless substrate conditions are suitable. Contractor shall

demonstrate that substrate conditions are suitable for the application of the materials.

- I. Protect completed roof sections from foot traffic for a period of at least 48 hours at 75 degrees F (24 degrees C) and 50 percent relative humidity or until fully cured.
- J. Minimum temperature for application is 50 degrees F (10 degrees C) and rising.

### 1.13 WARRANTY

- A. Manufacturer's Premier Warranty: Provide 20-year manufacturer's premier warranty that provides for cost of labor and materials for loss of water tightness, limited to amounts necessary to effect repairs necessitated by either defective material or defects in related installation workmanship, with no dollar limitation ("NDL").
- B. Roofing/waterproofing applicator's Warranty: Provide 5 year "Applicator Maintenance Warranty" covering workmanship for all work of this section including installation of membrane, flashings, metal work, and roofing/waterproofing accessories.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Acceptable Manufacturer: GAF, Commercial Roofing Products Division, which is located at: 1 Campus Drive; Parsippany, NJ 07054; Toll Free Tel: 877-423-7663, Web: [www.gaf.com](http://www.gaf.com) or accepted equivalent.

### 2.02 COATING

- A. GAF Unisil High Solids Silicone Roof Coating: A high solids, moisture cure silicone coating that provides protection against weather elements, UV rays, and leaks due to ponding water for a variety of substrates.

- 1. Application Rate: 1.5 to 2.5 gal per 100 ft<sup>2</sup> (4.07 to 10.19 L/ 10 m<sup>2</sup>).
- 2. Application Method: Airless sprayer, brush, or roller.

Application Temperature (air, surface): 40°F (5°C) - 110°F (43°C)

### 2.03 FLASHINGS AND ACCESSORIES

- A. GAF Unisil Silicone Mastic: a thick, high build silicone sealant.

- 1. Application Rate: 2.5 - 4 gallons per 100 ft<sup>2</sup> (10.19 – 16.3 L/ 10 m<sup>2</sup>)
- 2. Application Method: Trowel or brush.

- 3. Application Temperature (air, surface): 40°F (4°C) - 110°F (43°C)

4. Clean-up: Mineral Spirits.
- B. GAF Premium Fabric: Tough, non-woven, stitch-bonded, polyester fabric that is designed for use as a reinforcing material in GAF coatings or BarrierGuard® systems.
1. Length: 300 ft. (91 m). Widths available: 4" (102 mm), 6" (152 mm), 8" (203 mm), 12" (305 mm), 16" (406 mm), 20" (508 mm), 24" (610 mm).
  2. Length: 336 ft. (102 m). Width available: 40" (1.02 m).
- C. GAF Seam Tape: A coatable fabric surface backed with a polymer modified butyl adhesive. It is designed for application to a wide range of substrates where additional strength is required over loose or open seams and membrane tears.
1. Temperature Limits for Service 32°F to 110°F (0°C to 43°C)
  2. Bond Time: Initial bond is immediate; full bond requires approximately 24 hours.

#### 2.04 PRIMERS AND SEALANTS

- A. GAF Multi-Purpose Primer: A two-component, water-based epoxy, 9 to 1 ratio primer. It is effective at increasing the adhesion of acrylic, polyurethane, butyl, and silicone coats over most new or existing roof, deck, and wall substrates, as well as existing coatings/prefinished panels and residual asphalt.
1. Application Rate: 0.33 to 1.3 gal per 100 ft<sup>2</sup> (1.34 to 5.3 L/10 m<sup>2</sup>); varies depending on substrate, surface, and porosity.
  2. Application Method: Brush, roller or sprayer.
  3. Application Temperature (air, surface): 50°F (10°C) – 120°F (48°C).
  4. Dry Time: 1 hour at 75°F (24°C), 50% relative humidity.
- B. GAF Bonding Primer: A two-component, epoxy polyamide penetrating primer and sealer specially formulated to penetrate, prime and seal porous substrates and non-ferrous metal.
1. Application Rate: 0.20 – 0.5 gal per 100 ft<sup>2</sup> (0.81 – 2.0 L/ 10 m<sup>2</sup>) depending on substrate porosity.
  2. Application Method: Brush, roller or sprayer.

3. Application Temperature (air, surface): 40°F (4.4°C) – 110°F (43°C).
4. Dry Time: 1 hour at 75°F (24°C), 50% relative humidity.

#### 2.05 CLEANER

A. GAF Cleaning Concentrate: A highly effective cleaning agent and degreaser that, when combined with water, penetrates the existing coating or substrate and allows contaminants to be flushed from the surface. Used for the proper cleaning of existing elastomeric coating on roofs, metal surfaces, concrete and masonry substrates, as well as uncoated roof, deck and wall surfaces.

1. Application Rate: 0.5-0.7 gallon per 100 ft<sup>2</sup>. (2.04-2.9 L/10m<sup>2</sup>).
2. Application Method: Low pressure sprayer or brush.

#### 2.06 EQUIPMENT

A. Airless sprayer, brush or roller and other accessories: As recommended by GAF's Design Services.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared and conditions are suitable to proceed with the Work of this specification.
1. Substrates shall be inspected and repaired as needed to provide a proper surface to receive roofing/waterproofing system.
  2. Verify substrate surface slopes to drain for horizontal roofing/waterproofing applications.
  3. Identify incompatible or unsatisfactory substrates, if any.
- B. Verify substrate openings, curbs, and protrusions through deck/substrate.

#### 3.02 ROOF PREPARATION AND REPAIR

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

- B. Repair existing roof membrane as necessary to provide a sound substrate for the fluid-applied membrane. All surface defects (cracks, blisters, tears) must be repaired with similar materials. See structural portion of repair.
- C. Priming of Pre-Finished Metal Panels: Where roof panel surfaces are known or suspected to contain Kynar-500, other fluoropolymers or silicone, test patches shall be prepared with and without the use of Multi-Purpose Primer. Based on test patch adhesion results, Installer shall apply Multi-Purpose Primer on pre-finished metal panels per specifications.
- D. Neoprene Pipe Boots: Install neoprene boots prior to flashing work being performed for certain types of pipe penetrations. Neoprene boots shall first be sealed to the roof using a bead of FlexSeal™ Sealant prior to mechanical attachment with fasteners.
- E. Open Ridge Vents: See structural portion of repair.

### 3.03 FLASHING APPLICATION

- A. After completion of substrate preparation, all flashing details, horizontal seams, penetrations and curbs shall be treated with the manufacturer's silicone mastic per the manufacturer's installation requirements. Flashing shall be feathered at the edges) to ensure that water flows over the various flashing details.
- B. Rakes: All fixed rake details for the roof shall be secured and sealed with a 12 inches (305 mm) minimum width of the manufacturer's silicone mastic. If fixed rake metal is fastened to the top of roof panel ribs and extends back onto the roof, trim off any excess metal and follow horizontal seam flashing procedures. All voids and open areas shall be filled with polyurethane foam prior to application of manufacturer's silicone mastic.
- C. Penetrations: manufacturer's silicone mastic shall be applied around the base of all penetrations, extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Both the top and bottom of neoprene pipe boots shall be flashed.
- D. Treat seams:
  1. If horizontal seams have gaps larger than 1/8" when pressure is applied at the lower panel add additional stitch screws and treat with manufacturer's silicone mastic.
  2. Overlap seams must be treated with manufacturer's silicone mastic. All other seams may forgo treatment if the seal/tape is intact on the seam or if they are double locked.

### 3.04 FIELD OF ROOF APPLICATION AND RATES

- A. 20-year system:

1. Apply GAF Unisil High Solids Silicone Roof Coating at the rate of 2.5 gal per 100 ft<sup>2</sup> (10.19 L/m<sup>2</sup>). When coating is dry enough to walk on, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The specified GAF Unisil High Solids Silicone Roof Coating system dry coating thickness is approximately 39 mils in the field of the roof. All unsatisfactory areas must be repaired within 24 hours.
2. Coating may be applied in a single pass, as long as the substrate and slope conditions allow (no slumping), and the required DFT (Mils) are met.

### 3.05 INSPECTION INFORMATION

- A. Inspect Preliminary Work / Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.
- B. Inform the Architect and State, and roofing manufacturer when all preliminary work and flashing details will be complete and the Installer is ready to proceed with application of roof coating. Allow a minimum of two (2) weeks for the interim inspection to be made by the roofing manufacturer field services department. Any final roofing installation prior to this interim inspection is subject to rejection.

### 3.06 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Repair or replace defaced or disfigured finishes caused by Work of this section.

### 3.07 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.
- C. Protect installed products until completion of project.
- D. Touch-up, repair or replace damaged products before Substantial Completion.

### 3.08 FIELD QUALITY CONTROL

- A. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system.
- B. Correct defects or irregularities discovered during field inspection.

### 3.09 FINAL INSPECTION

- A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, roofing system manufacturer's representative and others directly concerned with performance of roofing system.
- B. Walk roof surface areas, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. Identify all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. Repair or replace deteriorated or defective work found at time above inspection as required to produce an installation that is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- D. Advise architect upon completion of corrections.
- E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

END OF SECTION

## SECTION 07620

### SHEET METAL FLASHING

#### PART 1 GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.02 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the sheet metal flashing as indicated on the drawings and/or specified herein, including, but not limited to, the following:
  1. Stainless steel cap metal flashing.
  2. Stainless steel through-wall flashing.
  3. Field fabricating (including bending, cutting, soldering, etc.), if required, of stainless steel flashing.
  4. Stainless steel flashing elsewhere, where metal flashing is indicated on drawings.
  5. Separation of contacting surfaces of dissimilar metals.

##### 1.03 RELATED SECTIONS

- A. DIVISION 7 – THERMAL AND MOISTURE PROTECTION.

##### 1.04 SUBMITTALS

- A. Shop Drawings: Submit, showing all materials, finishes, fastenings, joint details, fabrication, construction, and relation to adjoining construction.
- B. Samples: Submit 12" x 12" samples of flashing materials and finishes.

##### 1.05 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the Owner.

##### 1.06 WARRANTY

- A. The Contractor shall warrant that all Metal Flashing Work executed under this Section will be free from defects in materials and workmanship for a period of ten (10) years

from date of acceptance of the Project, and he shall remedy any defects in the Metal Flashing Work.

## PART 2 PRODUCTS

### 2.01 MATERIALS

#### A. Stainless Steel Flashing Materials

1. Stainless Steel Flashing: ASTM A 240, Type 304, stainless steel, with 2D finish, dead soft temper, fully annealed, as manufactured by International Nickel Co., Republic Steel Corp., United States Steel, or Washington Steel Corp. Thickness of stainless steel shall be as listed below.
  - a. Concealed Flashings: 0.012" thick, thirty (30) gauge (U.S. Standard).
  - b. Exposed Flashings: 0.015" thick, twenty-eight (28) gauge (U.S. Standard).
  - c. Edge Strips: 0.025" thick, twenty-four (24) gauge (U.S. Standard).
2. Through-wall flashing shall have sawtooth ribs at three (3) inch intervals, as manufactured by Keystone Flashing Co., or approved equal.
3. Accessories and Fastenings: AISI, Types 302 and 304 stainless steel.
4. Solder: Composed of sixty (60) percent block tin and forty (40) percent pig lead, except that solder at seams exposed to public view shall be eighty (80) percent tin and twenty (20) percent lead.
5. Flux: An acid type flux manufactured specifically for soldering stainless steel, as approved.

- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Examine the areas and conditions where sheet metal flashing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.02 METAL FLASHING INSTALLATION

- A. Reference Standard: Conform to the requirements of 7<sup>th</sup> Edition of the Sheet Metal and Air Conditioning Contractors Association (SMACNA) Architectural Sheet Metal Manual.
- B. General: Fabricate and install metal flashing work in accordance with details and specifications of above Reference Standard, with manufacturer's instructions, and as herein specified, to provide a watertight installation. Apply metal flashing to smooth, even, sound, clean, dry surfaces free from defects. Make provisions to allow for

expansion and contraction of metal flashing work. Wherever practicable, shop form all metal flashing work and deliver ready for installation. Form metal flashing work accurately to required profiles, with flat surfaces, straight edges and corners, free from defects. Fold exposed metal edges back not less than 1/2" and form drip.

- C. Nailing: Confine to sheets twelve (12) inches or less in width. Confine nailing to one edge only, locate nails where concealed. Use No. 12 x 1" long flat headed, annular threaded, Type 302 stainless steel nails for nailing to wood blocking; use one (1) inch long masonry nails for nailing to concrete. Space nails four (4) inches o.c. maximum.
- D. Joining: Join metal flashings with one (1) inch locked and soldered seams except at slip joints. Mallet seams flat and solder full length of seam as specified below.
- E. Soldering: Clean and pre-tin edges of metal flashing to be soldered before soldering is begun with solder on both sides for a width of not less than 1-1/2". Solder slowly with well heated metal surfaces. Use ample solder. Show not less than one full inch of evenly flowed solder on seam. Seams shall have a liberal amount of flux brushed in before soldering is commenced. Where soldering paste or killed acid is employed as a flux, soldering shall follow immediately after application of the flux. Upon completion of soldering, clean surfaces of all flux.
- F. Miscellaneous Flashing: Provide all other miscellaneous metal flashing not specifically mentioned herein but indicated on drawings and/or required to provide a watertight installation.
- G. Separation of Dissimilar Materials: Back paint surfaces of metal flashing in contact with dissimilar metals or with concrete or masonry with bituminous paint.

END OF SECTION

## SECTION 07900

### JOINT SEALANTS

#### PART 1 GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.02 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the joint sealants work as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
  - 1. Interior wall joints not specified to be sealed in other Sections of work, including caulking to fill between architectural woodwork and any wall, floor and/or ceiling imperfections.
  - 2. Control and expansion joints in walls.
  - 3. Joints at wall penetrations.
  - 4. Joints between items of equipment and other construction.
  - 5. All other joints required to be sealed to provide a positive barrier against penetration of air and moisture.

##### 1.03 RELATED SECTIONS

- A. Division 2 – Sitework.
- B. Division 7 – Thermal and Moisture Protection.
- C. Division 9 – Finishes

##### 1.04 QUALITY ASSURANCE

- A. Qualification of Installers: Use only personnel who are thoroughly familiar, skilled and specially trained in the techniques of sealant work, and who are completely familiar with the published recommendations of the sealant manufacturer.
- B. Pre-Construction Field Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to project joint substrates according to the method in ASTM C 794 and C 1521 that is appropriate for the types of Project joints.
- C. Perform testing per ASTM C 1248 on interior and exterior sealants to determine if sealants or primers will stain adjacent surfaces. No sealant work shall start until results

of these tests have been submitted and the Architect has given written approval to proceed with the work.

#### 1.05 SUBMITTALS

- A. Shop Drawings: Submit shop drawings showing all joint conditions, indicating relation of adjacent materials, all sealant materials (sealant, bond breakers, backing, primers, etc.), and method of installation.
  - 1. Submit joint sizing calculations certifying that movement capability of sealant is not being exceeded.
- B. Samples: Submit the following:
  - 1. Color samples of sealants, submit physical samples (not color chart).
  - 2. Sealant bond breaker and joint backing.
- C. Product Data: Submit manufacturer's technical information and installation instructions for:
  - 1. Sealant materials, indicating that material meets standards specified herein.
  - 2. Backing rods.
- D. Submit manufacturer's certification as required by Article 1.6 herein.
- E. Submit results of testing required in Article 1.4 herein.

#### 1.06 MANUFACTURER'S RESPONSIBILITY AND CERTIFICATION

- A. Contractor shall require sealant manufacturer to review the Project joint conditions and details for this Section of the work. Contractor shall submit to the Architect written certification from the sealant manufacturer that joints are of the proper size and design, that the materials supplied are compatible with adjacent materials and backing, that the materials will properly perform to provide permanent watertight, airtight or vaportight seals (as applicable), and that materials supplied meet specified performance requirements.

#### 1.07 ENVIRONMENTAL CONDITIONS

- A. Temperature: Install all work of this Section when air temperature is above forty (40) degrees F. and below eighty (80) degrees F., unless manufacturer submits written instructions permitting sealant use outside of this temperature range.
- B. Moisture: Do not apply work of this Section on surfaces which are wet, damp, or have frost.

#### 1.08 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section, before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

C. Storage

1. Store sealant materials and equipment under conditions recommended by their manufacturer.
2. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.
3. Material shall be stored in unopened containers with manufacturers' name, batch number and date when shelf life expires.

#### 1.09 WARRANTY

- A. Provide a written, notarized warranty from the manufacturer stating that the applied sealants shall show no material failure for a period of twenty (20) years.
- B. Contractor to provide a written, notarized warranty stating that the applied sealants shall show no failure due to improper installation for a period of five (5) years.
- C. Warranty shall be in a form acceptable to the Owner and executed by an authorized individual.
- D. Include in the warranty an agreement to repair and/or replace, at the Contractor's expense, sealant defects that develop during the warranty period as a result of faulty labor and/or materials.

### PART 2 PRODUCTS

#### 2.01 SEALANT MATERIALS

A. Elastomeric Joint Sealants

1. One-part, non-acid-curing silicone sealant conforming to the minimum standards of ASTM C 920, Type S, Grade NS, Class 50:
  - a. "DOWSIL 790" by Dow.
  - b. "Silpruf SCS 2000" by G.E.
  - c. "864" by Pecora Corporation.
  - d. "Spectrem 2" by Tremco.
2. One-Part, Mildew-Resistant Silicone Sealant
  - a. "DOWSIL 786" by Dow.
  - b. "SCS 1702" by G.E.
  - c. "863," #345 White, by Pecora Corporation.
  - d. "Proglaze White" by Tremco.
3. Two-Part, Pourable Urethane Sealant

- a. "Chem-Calk 550" by Bostik Construction Products Div.
- b. "Vulkem 245" by Mameco International, Inc.
- c. "Pourthane" by W.R. Meadows, Inc.
- d. "NR-200 Urexpan" by Pecora Corporation.
- e. "THC-900" by Tremco.

B. Latex Joint Sealants

1. Acrylic-emulsion sealant conforming to ASTM C 834:

- a. "Chem-Calk 600" by Bostik Construction Products Div.
- b. "AC-20+ Silicone" Pecora Corporation.
- c. "Tremco Acrylic Latex 834" by Tremco.

C. Fire-Resistant Joint Sealants: Refer to Section 07840.

D. Miscellaneous Joint Sealants

- 1. Butyl-Polyisobutylene Sealant: Manufacturer's standard, solvent- release-curing, butylpolyisobutylene sealant complying with AAMA 809.2, for concealed metal-to-metal joints.
- 2. Joint Filler for Concrete Paving: Preformed strips of sponge rubber complying with ASTM D 1752, of size and shapes as shown.

E. Colors: Colors selected from manufacturer's standard selection.

2.02 MISCELLANEOUS MATERIALS

- A. Back-Up Materials: Provide back-up materials and preformed joint fillers, nonstaining, non-absorbent, compatible with sealant and primer, and of a resilient nature, equal to "HBR" made by Nomaco Inc. or approved equal, twenty-five (25) percent wider than joint width. Materials impregnated with oil, bitumen or similar materials shall not be used. Provide back-up materials only as recommended by sealant manufacturer in writing.
- B. Provide bond breakers, where required, of polyethylene tape as recommended by manufacturer of sealant.
- C. Provide primers recommended by the sealant manufacturer for each material to receive sealant. Note that each exterior joint must be primed prior to sealing.
- D. Provide solvent, cleaning agents and other accessory materials as recommended by the sealant manufacturer.
- E. Materials shall be delivered to the job in sealed containers with manufacturer's original labels attached. Materials shall be used per manufacturer's printed instructions.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions where joint sealants are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.02 INSTALLATION

- A. Sealant Installation Standard: Comply with instructions and recommendations of the manufacturer and in accordance with ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions required by this Project where more stringent installation requirements are specified herein, such requirements shall apply.

- B. Sample Section of Sealant

- 1. During sealant installation work in exterior wall, the manufacturer of sealant shall send their representative to the site, under whose supervision a section of the wall (used as "control section") shall be completed for purposes of determining performance characteristics of sealant in joints. Architect shall be informed of time and place of such installation of control section.
- 2. Control section shall be installed according to specification given herein and shall not be considered as acceptable until written acceptance is provided by the Architect.
- 3. Accepted control section shall be standard to which all other sealant work must conform.

- C. Supervision: The Contractor shall submit to the Architect written certification from the sealant manufacturer that the applicators have been instructed in the proper application of their materials. The Contractor shall use only skilled and experienced workmen for installation of sealant.

- D. Apply sealant under pressure with a hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. Neatly point or tool joint to provide the contour as indicated on the drawings.

- E. Preparation and Application

- 1. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied film must be entirely removed.
- 2. Stone, masonry and concrete surfaces to receive sealant shall be cleaned where necessary by grinding, water blast cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.
  - a. Do not use any acid or other material which might stain surfaces.

- b. Remove laitance by grinding or mechanical abrading.
  - c. Remove loose particles present or resulting from grinding, abrading, or blast cleaning by blowing out joints with compressed air, oil and water free, or vacuuming joints prior to application of primer or sealant.
3. Clean non-porous surfaces such as metal and glass chemically. Remove protective coatings on metallic surfaces by solvent that leaves no residue and is compatible with sealant. Use solvent and wipe dry with clean, dry lint free paper towels. Do not allow solvent to air dry without wiping. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.
4. Do not seal joints until they are in compliance with drawings, or meet with the control section standard.
5. Joint Size and Sealant Size: Joints to receive sealant shall be at least 1/4" wide. In joint 1/4" to 3/8" wide, sealant shall be 1/4" deep. In joints wider than 3/8" and up to 1" wide, sealant depth shall be one half the joint width. For joints wider than 1", sealant depth shall be as recommended by the sealant manufacturer. Depth of joint is defined as distance from outside face of joint to closest point of the filler.
6. Primer: Thoroughly clean joints and apply primer to all surfaces that will receive sealant. Apply primer on clean, dry surfaces, and prior to installation of joint backing. Completely wet both inner faces of the joint with primer. Mask adjacent surfaces of joint with non-staining masking tape prior to priming. Apply primer with clean brush and only when temperature is above 45 deg. F.
7. Joint Backing: In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight "hourglass" shape, with back and front face having slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Joint backing shall be installed with approximately twenty-five (25) percent compressions. Do not stretch, twist, braid, puncture, or tear joint backing. Butt joint backing at intersections.
8. Bond Breaker: Install bond breaker smoothly over joint backing so that sealant adheres only to the sides of the joint and not backing.
9. Sealant Application: Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates, completely filling joints to eliminate air pockets and voids. Mask adjacent surfaces of joint with non-staining masking tape. Force sealant into joint in front of the tip of the "caulking gun" (not pulled after it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.
10. Tooling: Tool exposed joints to form smooth and uniform beds, with slightly concave surface conforming to joint configuration per Figure 5A in ASTM C 1193.

Finished joints shall be straight, uniform, smooth and neatly finished. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.

11. Replace sealant which is damaged during construction process.

### 3.03 FIELD QUALITY CONTROL

#### A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
  - a. Perform 5 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
  - b. Perform one test for each 5,000 feet of joint length thereafter or one test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
  - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
  - a. Whether sealants filled joint cavities and are free of voids.
  - b. Whether sealant dimensions and configurations comply with specified requirements.
  - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

#### B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to

comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

END OF SECTION

## DIVISION 8 – DOORS AND WINDOWS

### SECTION 08113

#### HOLLOW METAL DOORS AND FRAMES

##### PART 1 - GENERAL

###### 1.01 SUMMARY

- A. Provide hollow metal door, door frames, and window frames as indicated and scheduled on drawings.
- B. Related Work Described Elsewhere:
  - 1. Finish hardware is specified in SECTION 08700 - FINISH HARDWARE.

###### 1.02 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's technical product data substantiating that products comply with requirements.
- B. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections, gauges, and finishes. Show anchorage and accessory items.
- C. Schedule: Furnish schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
- D. Label Construction Certification: For assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer's certification for that each door and frame assembly has been constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.

###### 1.03 QUALITY ASSURANCE

- A. Provide doors and frames complying with ANSI/SDI A250.8, "Recommended Specifications for Standard Steel Doors and Frames", and as herein specified.
- B. Fire-Rated Assemblies: Where fire-rated assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with ICC IBC Section 715, "Opening Protectives", NFPA 80, "Fire Doors and Fire Windows", and have been tested, listed, and labeled in accordance with UL 10C, "Fire Tests of Door Assemblies", and NFPA 252, "Fire Tests of Door Assemblies", by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction. These requirements shall take precedence over details indicated or specified.

- C. Door Hardware Mounting Heights: The Contractor shall be responsible to coordinate all mounting heights of various finish hardware with all project requirements. Accessible hardware shall be mounted per ADAAG Section 404.2.7.

#### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Strap knock-down frames in bundles. Provide temporary steel spreaders securely fastened to the bottom of each welded frame.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover in a dry, secure place. Place units on minimum 4-inch high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chambers. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inch spaces between stacked doors to promote air circulation.
- D. Handle manufactured materials as recommended by the manufacturer.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Steel Sheets: All doors and frames shall be manufactured of commercial quality, stretcher leveled flatness as follows:
  - a) Galvannealed steel for interior openings per ASTM A 568/A 568M, "Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for". Sheet shall be galvannealed to 'A-60' minimum coating weight for interior applications.
  - b) Galvanized steel for exterior openings per ASTM A 924/A 924M, "Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process" to 'G-90' minimum coating weight for exterior applications.
  - c) Internal reinforcing shall be manufactured of hot rolled pickled and oiled steel per ASTM A 1011/A 1011M, "Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability and Ultra-High Strength".
- B. Core Materials: Polystyrene foam core, self-extinguishing, non-toxic, and as standard with the manufacturer for rated doors to conform to design requirements.
- C. Supports and Anchors: Fabricate of not less than 18 gauge galvanized sheet steel.
- D. Frame Anchors:

1. Wall Anchors for Attachment to Drywall Partitions:
    - a. Use manufacturer's adjustable type compression anchors with knocked down die mitered frames at drywall locations.
    - b. Use stud anchors sized to accommodate frame jamb depth and face dimension on all welded frames.
  2. All frame jamb anchors to be provided; one each jamb per 30-inches of frame height or fraction thereof, (3 minimum).
  3. Floor Anchors: Angle clip type:
    - a. 16 gauge minimum.
    - b. To receive 2 fasteners per jamb.
    - c. Welded to the bottom of each jamb.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except hot-dip galvanize, complying with ASTM A 153/A 153M, "Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware", Class C or D as applicable.
- F. Factory Applied Primer Paint: Rust-inhibitive enamel paint, either air-drying or baking, suitable as a base for specified finish paints conforming to ANSI/SDI A250.10, "Test Procedures and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames". Primers shall be free from asbestos, lead, mercury, chromate, and cadmium.

## 2.02 FABRICATION, GENERAL

- A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at project site. Comply with ANSI/SDI A250.8 requirements as follows:
1. Exterior Flush Panel Doors: Level 3, extra heavy-duty, Model 2, minimum 16 gauge faces. Fabricated of G90 galvanized steel.
  2. Interior Flush Panel Doors: Level 2, heavy-duty, Model 1 or 2, minimum 18 gauge faces. Fabricated of A60 galvanized steel.
- Doors shall conform to ANSI/SDIA250.4, "Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing", minimum Level A performance for doors as applicable.
- B. Fabricate exposed faces of doors and panels from only galvanized steel.
- C. Fabricate frames, concealed stiffeners, reinforcement, edge channels, and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).

- D. Fabricate all doors and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16 gauge inverted steel channels, flush end cap cover plate, and sealed to prevent water intrusion. Door hinge edge shall be one-piece full height, 14 gauge channel, formed and tapped for hinges. Doors shall have a beveled (1/8-inch in 2-inches) lock edge and square hinge edge.
- E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.
- F. Finish Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI/SDI A250.8, ANSI/SDI A250.6, and additional requirements of ANSI/BHMA A156.115 specifications for door and frame preparation for hardware.
1. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site. Provide minimum gauge hardware reinforcing for mortise or surface applied hardware as follows:
    - a. Hinges:
      - (1) 10 gauge or equivalent number of threads on doors.
      - (2) 7 gauge on frames.
    - b. Locks: 12 gauge or equivalent number of threads.
    - c. Surface Closers: 12 gauge.
    - d. Hold Open Arms: 12 gauge.
    - e. Panic Devices: 12 gauge.
  2. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with ANSI/SDI A250.8, "Recommended Specification for Standard Steel Doors and Frames", and the Americans with Disabilities Act Accessibility Guidelines (ADAAG) Section 404.2.7.
- G. Factory Painting:
1. Clean, phosphatize, and prime paint exposed surfaces of steel door and frame units, including galvanized surfaces.
  2. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
  3. Apply factory coat of prime paint to an even consistency to provide a uniformly finished surface ready to receive finish paint.

## 2.03 STANDARD STEEL DOORS

- A. Provide metal doors of types and styles indicated on drawings or schedule. Fill all doors with polystyrene foam panel reinforcement at standard hollow metal or as standard with manufacturer for rated doors to conform to design requirements.
- B. Louvers: SDI-111-C, "Recommended Louver Details for Standard Steel Doors". Louvers, where indicated, shall be sight proof type inserted into the door. Louvers in exterior doors shall be inverted Y or V type. Form louvers of 20 gauge galvanized steel for interior doors and 18 gauge galvanized steel for exterior doors. Louvers shall be non-removable from the outside of exterior doors. Insect screen for exterior doors shall be removable type mesh aluminum or bronze cloth.

## 2.04 STANDARD STEEL FRAMES

- A. Provide metal frames for doors of type and style as shown on drawings and schedules conforming with ANSI/SDI A250.8. Conceal fastenings, unless otherwise indicated. Fabricate frames of cold-rolled furniture steel minimum 14 gauge, G90 galvanized steel, for exterior and 16 gauge, A60 galvanized steel for interior to conform with door physical performance level.
  - 1. Fabricate exterior frames of 14 gauge, G90 galvanized steel with mitered corners, standard face welding, with appropriate anchors.
  - 2. Fabricate interior frames of 16 gauge, A60 galvanized steel with mitered corners, knock-down (mechanical interlock joint) with hairline seam for frames.
    - a. Knock-Down Frames: Design corners for simple field assembly by concealed tenons, splice plates, or interlocking joints that produce square, rigid corners and a tight fit and maintain the alignment of adjoining members. Provide locknuts for bolted connections.
  - 3. Frames shall comply with ANSI/SDI A250.4, minimum Level A, one million cycle swing test performance for a 4070 door frame.
- B. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.
- C. Plaster Guards: Provide 26 gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.
- D. Template Hardware: Factory cut doors and frames for all template hardware, including hinges, bolts, etc.

## 2.05 FIRE-RATED ASSEMBLIES

Assemblies shall bear the listing identification label of the Underwriters Laboratories, Inc. (UL), Factory Mutual Engineering Corp. (FM), Warnock Hersey International (WHI), or a

nationally recognized testing laboratory qualified to perform tests of fire assemblies in accordance with ANSI/UL 10C and NFPA 252 and having a listing for the tested assemblies. Doors exceeding the sizes for which listing label service is offered shall be inspected in accordance with NFPA 80 and NFPA 80A. Listing identification labels shall be constructed and permanently applied by a method which results in their destruction should they be removed. Labels shall be metal with raised letters and shall bear the rating followed by the letter "s", and name and file number of the door and frame manufacturer and service conducting the inspection.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of ANSI/SDI A250.11, "Recommended Erection Instructions For Steel Frames", unless otherwise indicated.
  - 1. Anchors: Provide sufficient anchorage to attach to wall and floor in accordance with ANSI/SDI A250.4, test compliance minimum Level A of one million cycles, or anchorage as detailed on drawings to specific wall conditions. Anchor exterior door frames for wind pressure requirements.
  - 2. Except for frames located at in-place concrete and masonry installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
  - 3. In concrete and masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.
  - 4. At in-place concrete and masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.
  - 5. Install fire-rated frames in accordance with the more restrictive requirements of NFPA 80 and current ICC IBC as amended.
  - 6. At frames to be grouted, the inside of the frame shall be given a coat of heavy-bodied bituminous paint supplied and applied on site.
- C. Door Installation:
  - 1. Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI A250.8.
  - 2. Weatherstripping shall be installed at exterior door openings to provide a weathertight installation.

3. Place fire-rated doors with the more restrictive clearances as specified in NFPA 80 and current ICC IBC as amended. Smoke rated assemblies shall conform with NFPA 105, "Installation of Smoke Door Assemblies".
- D. Door Clearances: Unless otherwise recommended by the manufacturer, provide uniform clearances as listed below:
1. Head, Jamb, and Lock Edge: 1/8-inch maximum.
  2. Meeting Stile: 1/4-inch maximum (3/16-inch maximum for fire doors).
  3. Top of Decorative Floor Finish or Covering: 5/8-inch maximum.
  4. Threshold: 1/8-inch (1/4-inch maximum).

### 3.02 ADJUST AND CLEAN

- A. Factory Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of factory coating and apply touch-up of matching air-drying coating.
- B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating conditions.

END OF SECTION

## SECTION 08700

### FINISH HARDWARE

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Provide all finishing hardware required for all doors and cabinet work, complete as specified.
- B. It is the intent of this Specification to cover in general the class and character of all finish hardware required.
- C. The hardware list specified has been made for the convenience of the Contractor and covers in general the necessary hardware for doors, casework, etc., but all other doors, etc., shown on the Drawings 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 specified.
- D. Suppliers proposing substitutes of equivalent products of other than the manufacturers named shall submit schedules listing the product and manufacturer specified and the product and manufacturer of proposed substitute. This schedule shall be submitted in accordance with the GENERAL CONDITIONS.

##### 1.02 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTAL PROCEDURES.
- B. Door Hardware Schedule: Furnish copies of the schedule of hardware in compliance with specifications and Drawings. Schedule format shall be vertical type as listed in DHI document “Sequence and Format for the Hardware Schedule”. List each opening using same door numbers as shown and hardware to be applied. State materials finish, and manufacturer’s number for each item. Required types are listed. Double space entries and number and date each page. Include the following information:
  - 1. Identification number, location, hand, fire rating and material of each door and frame.
  - 2. Type, style, function, size, quantity and finish of each door hardware item.
  - 3. Complete designations of every item required for each door opening including name and manufacturer.
  - 4. Fastenings and other pertinent information.

5. Location of each door hardware set, cross referenced to the Drawings, both on floor plans and in door schedules.
  6. Explanation of abbreviations, symbols, and codes contained in the schedule.
  7. Mounting locations for door hardware.
  8. Door and frame sizes and materials
  9. List of related door devices specified in other Sections for each door and frame.
- C. Manufacturer's Data: Submit manufacturer's descriptive literature along with schedule.
- D. Tools and Maintenance Instructions: Furnish a complete set of special wrenches, tools, maintenance instructions applicable to each different or special hardware component, but not less than the number supplied with the finish hardware materials.
- E. Warranty: Submit written warranty as specified in paragraph entitled "WARRANTY" herein below.

### 1.03 QUALITY ASSURANCE

- A. Codes and Reference: Comply with the version year adopted by the Authority Having Jurisdiction. Perform work in accordance with ANSI A117.1 – Accessible and Usable Buildings and Facilities, ICC/IBC – International Building Code, NFPA 80 – Fire Doors and Windows, NFPA 101 – Life Safety Code, State Building Codes, Local Amendments.
- B. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
- E. Existing Openings:
  - 1. Where patching of existing doors and frames is necessary, patching shall be done as directed by the Contracting Officer.
  - 2. Where new hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.
- F. Manufacturer's Warranty Response Time: Complete repair or replacement within 36 hours after being notified by the user. If repair at the site is not possible because the exact make and model replacement is not available within the specified response time, a temporary substitute of equal quality shall be provided within the specified response time. If a temporary replacement is provided, the permanent repair/replacement response time will be extended to 7 calendar days.

#### 1.04 REGULATORY REQUIREMENTS

- A. Conform to applicable code for accessibility and requirements applicable to fire rated doors and frames.
- B. Definition: "Door Hardware" includes items known commercially as finish hardware which are required for swing and sliding doors, except special types of unique and non-matching hardware specified in same Section as door and door frame.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Delivery, store, protect and handle products to prevent damage of any kind and to maintain security to site.
- B. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- C. Deliver individually packaged hardware items at proper times to proper locations (shop or project site) for installation.
- D. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.
- E. Deliver permanent keys as directed by Contracting Officer.
- F. Provide secure lock-up for hardware delivered to project but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the Work will not be delayed by hardware losses, both before and after installation.

1.06 WARRANTY

- A. Locks shall have a minimum 5-year manufacturer's warranty.
- B. Door closers shall have a minimum 10-year manufacturer's warranty.
- C. The Surety shall not be liable for manufacturer's warranty beyond 1 year of the project acceptance date.
- D. Procedure for providing manufacturer warranty is described in General Conditions, article 7.35.3. Contractor shall complete the manufacturer's forms in the name of the Department and submit such forms to the manufacturer within such time as required to validate the warranty/guaranty and submit the forms to the Contracting Officer.

1.07 PROJECT RECORD DOCUMENTS

- A. Record actual locations of installed cylinders and their master key code.

1.08 OPERATION AND MAINTENANCE DATA

- A. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- B. The manufacturer's representative shall instruct the User's staff on the hardware's maintenance procedures (type of lubricant needed and frequency of maintenance).

PART 2 - PRODUCTS

2.01 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in HARDWARE GROUPS at end of this Section. Products are identified by using proprietary catalog numbers, and are used to establish quality and function of products desired.
- B. Product numbers indicated in the HARDWARE GROUPS are those of the manufacturers listed and are used to establish the quality of products intended.
- C. Products listed hereinafter are pre-approved as equals to those products listed in the HARDWARE GROUPS

2.02 MATERIALS AND FABRICATION

- A. Hand of Door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of indicated door.
- B. Base Metals: Produce hardware units of basic metal and forming method specified, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable

hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated.

- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated. Fasteners exposed to the weather shall be non-ferrous metal or stainless steel.
- D. Furnish appropriate screws for installation, with each hardware item. Provide Phillips flat head screws except as otherwise indicated. Finish exposed screws to match hardware finish. If exposed in surfaces of other work, to match finish of such other work as closely as possible, including prepared-for-paint finish in surfaces to receive painted finish.
- E. Provide concealed fasteners for hardware units which are exposed when door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the Work. In such cases, provide sleeves for each through bolt or use sex screws fasteners.
- F. Expansion shields in concrete or masonry shall fill the depth and diameter of drilled holes.
- G. Bring to the attention of the Contracting Officer any discrepancy between the Hardware Groups and door schedule prior to ordering.

## 2.03 HINGES

- A. General: Hinges shall conform to ANSI/BHMA A156.1, Grade 1 as a certified product by BHMA and the requirements of this specification.
  - 1. The following hinges will be considered equal subject to project conditions:
    - a. Hager:
      - Type 1: BB1279
      - Type 2: BB1191
      - Type 3: BB1168
      - Type 4: BB1199
    - b. McKinney:
      - Type 1: TA2714
      - Type 2: TA2314
      - Type 3: T4A3786
      - Type 4: T4A3386

- c. Stanley:
  - Type 1: FBB179
  - Type 2: FBB191
  - Type 3: FBB168
  - Type 4: FBB199
- 2. Hinge Application Requirements:
  - a. Exterior Outswing Doors: Type 2 or 4 x NRP as specified.
  - b. Exterior Inswing Doors and Vestibule Doors: Type 2 or 4 as specified.
  - c. Interior Doors With Closers: Type 1, 2, 3 or 4 as specified.
  - d. Interior Doors Over 36 Inches Wide. Type 3 or 4 as specified.
- B. Templates: Except for hinges to be installed entirely (both leaves) into wood doors and frames, provide only template producing units.
- C. Screws: Furnish Phillips flat head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges.
- D. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - 1. Nonferrius Hinges: Stainless steel pins
  - 2. Exterior, Out-swing Doors: Non-removable pins (NRP).
  - 3. Interior Doors: Nonrising pins.
  - 4. Tips: Flat button and matching plug, finished to match leaves.
  - 5. Oil impregnated or ball bearing hinges are acceptable products.
- E. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90-inches or less in height and one additional hinge for each 30-inches of additional height.
- F. Size of hinges shall be as follows:

<u>Door Thickness/Width</u>	<u>Hinge Height</u>	<u>Hinge Width</u>
1-3/4 inches to 36-inches	4-1/2 inches	4-1/2" or as specified
1-3/4 inches over 36-inches	5-inches	4-1/2" or as specified
1-3/4 inches over 48-inches	6-inches	4-1/2" or as specified

Note: Hinge width shall be of sufficient size to clear frame and trim when door swings 180 degrees.

## 2.04 LOCKS, LATCHES AND BOLTS

- A. General: Mortise locks and latches shall conform to ANSI/BHMA A156.13, Series 1000, Grade 1 unless Grade 2 is listed; bored locks and latches shall conform to ANSI/BHMA A156.2, Series 4000, Grade 1 unless Grade 2 is listed; auxiliary locks shall conform to ANSI/BHMA A156.5, Grade 1; bolts shall conform to ANSI/BHMA A156.16, Grade 1; ADAAG and the requirements of this specification.
  - 1. The following mortise locksets and deadbolts will be considered equal:
    - a. Best 38H series, 45H Series.
    - b. Sargent 4870 series, 8200series.
    - c. Schlage L460 series, L9000 series.
- B. Mortise locksets shall be manufactured in a single sized case formed from 12 gauge minimum steel. The case shall be closed on all sides and back. The lockset shall have a field-adjustable, beveled armored front, with a 0.125-inch minimum thickness.
- C. Strikes: Provide manufacturer's standard wrought box strike for each latch of lock bolt, with lip extended to protect frame, finish matching hardware set. Provide dustproof recessed floor strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolts.
- D. Lock Throw:
  - 1. Provide 3/4-inch minimum throw of latch and one-inch minimum for deadbolt.
- E. Provide locksets, latches, and cylinders equal in all respects to those specified in the Hardware Groups

## 2.05 CLOSERS AND DOOR CONTROL DEVICES

- A. General: Closers shall conform to ANSI/BHMA A156.4, Series C02000, Grade 1, with features necessary for the particular application, UL10C listed for fire rated doors, ADAAG, and the requirements of this specification.
  - 1. The following closers will be considered equal for medium use on interior doors:
    - a. Corbin Russwin DC 3000 series
    - b. LCN 1461 series.
    - c. Norton 8501 series.
    - d. Sargent 1431 series.
- B. Size of Units: Provide non-sized closers, adjustable to meet maximum opening force requirements of ADA. Comply with manufacturer's recommendations for size of door control unit, dependin

- C. g upon size of door, exposure to weather, and anticipated frequency of use. Where parallel arm closers are installed, provide closer unit one size larger than recommended for use with standard arms.
- D. Closers shall have adjustment operating valves for closing speed, latching speed, and backcheck control as a standard feature.
- E. Provide parallel arm or regular arm closer as required to mount closer on door face least exposed to public traffic.
- F. Provide drop plates, brackets, or adapters for arms as required to suit details or conditions.
- G. Closer covers shall be rectangular, full cover type, high impact non-corrosive, and flame retardant.
- H. Closer shall not require removal for adjustments to be made

## 2.06 FLAT GOODS

- A. General: Flat goods shall conform to ANSI/BHMA A156.6 and the types listed in the HARDWARE GROUPS.
  - 1. The products of the following manufactures will be considered equal subject to project conditions:
    - a. Baldwin Hardware Corporation
    - b. Burns Manufacturing Incorporated
    - c. Hager Companies
    - d. Ives Hardware
    - e. Rockwood Manufacturing Company
    - f. Trimco
- B. Door Plates for single doors shall be 2-inches less than door width. Door plates for double doors shall be 1-inch less than door width. Height of plate shall be as listed but 1-inch less than bottom rail for panel doors.

## 2.07 THRESHOLDS

- A. General: Thresholds shall conform to ANSI/BHMA A156.21 and ADAAG. Provide size, thickness, and profile as listed in the HARDWARE GROUPS.
  - 1. The products of the following manufacturers will be considered equal subject to project conditions:
    - a. Hager Companies
    - b. National Guard Products

- c. Pemko Manufacturing Co.
- d. Reese Enterprises
- e. Zero International

## 2.08 FINISHES

### A. Finishes: Identified in schedule at end of Section.

1. Designations used are those listed in ANSI/BHMA A156.18 “Materials and Finishes”, including coordination with traditional U.S. finishes shown by certain manufacturers for their products
2. If no BHMA finish is established, match specified product.

### B. Provide matching finishes for hardware units at each door or opening to greatest extent possible, except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where base metal or metal forming process is different for in

### C. Individual units of hardware exposed at same door or opening.

### D. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer’s standards, but in no case less than specified for applicable units of hardware by referenced standards.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Pre-Installation Meeting: Before start of work under this contract, the Contractor, hardware installer, hardware manufacturer’s representative or supplier, the Contracting Officer, and a user representative shall meet to review the keying system, hardware installation instructions, and installation conditions.
- B. Verify that doors and frames are ready to receive Work and dimensions are as indicated.

### 3.02 INSTALLATION

- A. Install each hardware item in compliance with manufacturer’s instructions and recommendations.
- B. Mount hardware units at height indicated in the Door and Hardware Institute’s Recommended Locations for Builders Hardware for Standard Steel Doors and Frames, except:
  1. As otherwise indicated or as required to comply with governing regulations.

2. Mount deadbolt (if any) centerline not more than 5-inches above latch set handle centerline.
- C. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work. Do not install surface mounted items until finishes have been completed on the substrate.
  - D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
  - E. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
  - F. Set metal thresholds for exterior doors in full bed of butyl rubber, polyisobutylene mastic sealant, or preformed butyl-polyisobutylene sealant tape as specified under SECTION 07900 - SEALANTS.
  - G. Fit face of all mortise parts snug and flush.
  - H. Operating parts shall move freely and smoothly without binding, sticking or excessive clearance.
  - I. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
  - J. Install with manufacturer's fasteners conforming to requirements of this section or those required for substrate. Expansion shields securing hardware such as door stops/holders to concrete or solid grouted masonry substrates shall completely fill the depth and diameter of the drilled holes. Shimming of the shields or using of plastic shields is not acceptable.
  - K. Protect hardware from damage or marring of finish during construction. Use strippable coatings, removable tapes or other approved means.
  - L. Ensure that hardware displays no evidence of finish paint after building cleanup with exception of prime coated hardware installed for finish painting. The Contractor may achieve this by sequencing installation, removing after fittings and reinstalling after painting is completed, providing protection, cleaning original hardware finish, or other approved means.
  - M. Latch and Bolt: Install latch and bolt to automatically engage in keeper, whether activated by closer or manual push. In no case shall additional manual pressure be required to engage latch or bolt in keeper.
  - N. Closers:
    1. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

2. Carefully adjust closers to operate noiselessly and evenly.
3. Have manufacturer's representative regulate closers prior to Contracting Officer's acceptance of building.

### 3.03 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace items which cannot be adjusted to operate freely and smoothly as intended for application made.
- B. Clean adjacent surface soiled by hardware installation.
- C. Final Adjustment:
  1. Clean operating items as necessary to restore proper function and finish of hardware and doors.
  2. Adjust door control devices to compensate for final operation of ventilating equipment.
  3. Lubricate bearings surface of moving parts and adjust latching and holding devices for proper function.
  4. Test keys in every lock for proper operation and conformance with keying system.

### 3.04 HARDWARE GROUPS

#### A. Door Hardware:

#### MANUFACTURER LIST

<u>CATEGORY</u>	<u>VENDOR NAME</u>	<u>MFG</u>
HINGE	BY MCKINNEY PRODUCTS COMPANY	MCK
THRESHOLD	BY PEMKO MANUFACTURING CO.	PEM
KICKPLATE	BY ROCKWOOD MANUFACTURING CO.	ROC
DOOR CLOSER	BY SARGENT MANUFACTURING COMPANY	SAR
PRIVACY SET	BY SARGENT MANUFACTURING COMPANY	SAR

HW GROUP - 001

DOORS 01 & 02:

3.0 EA	HINGE	TA2314 4.5 X 4.5 US26D	MCK
1.0 EA	PRIVACY SET	V54-8265 LNL US26D WBS	SAR
1.0 EA	DOOR CLOSER	1431 CPS EN	SAR
1.0 EA	KICKPLATE	K1050 10" X 2" LDW 630 B4E CSK	ROC
1.0 EA	THRESHOLD	171A VERIFY THRESHOLD CONDITION	PEM

END OF SECTION

DIVISION 9 – FINISHES

SECTION 09250

GYPSUM DRYWALL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents

1.02 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the gypsum drywall as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Gypsum board work for partitions, ceilings, column enclosures, furring, and elsewhere where gypsum drywall work is shown on drawings.
  - 2. Metal supports for gypsum drywall construction.
  - 3. Acoustical insulation for gypsum drywall work.
  - 4. Sealant for gypsum drywall work.
  - 5. Concealed metal reinforcing for attachment of railings, toilet partitions, and other items supported on drywall partitions and walls.
  - 6. Taping and finishing of drywall joints.
  - 7. Installing rings and frames in drywall surfaces for grilles, registers, and lighting fixtures.
  - 8. Gypsum shaft wall construction.
  - 9. Bracing and connections.

1.03 RELATED SECTIONS

- A. SECTION 08113 – HOLLOW METAL DOORS AND FRAMES.
- B. SECTION 09990 – PAINTING AND FINISHING.

## 1.04 QUALITY ASSURANCE

A. The following standards, as well as other standards which may be referred to in this Section, shall apply to the work of this Section:

1. The Gypsum Construction Handbook, latest edition, USG.
2. Construction Guide, latest edition, National Gypsum.
3. ASTM A 568 "Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements For"
4. ASTM C 475 "Standard Specification for Joint Treatment Materials for Gypsum Wallboard Construction"
5. ASTM C 645 "Standard Specification for Non-Structural Steel Framing Members"
6. ASTM C 754 "Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products"
7. ASTM C 840 "Standard Specification for Application and Finishing of Gypsum Board"
8. ASTM C 919 "Standard Specification for Use of Sealants in Acoustical Applications"
9. ASTM C 954 "Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs From 0.033 in. to 0.112 in. in Thickness"
10. ASTM C 1002 "Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Board"
11. ASTM C 1177 "Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing"
12. ASTM C 1178 "Standard Specification for Glass Mat Water Resistant Gypsum Backing Board"
13. ASTM C 1278 "Standard Specification for Fiber-Reinforced Gypsum Panel"
14. ASTM C 1396 "Standard Specification for Gypsum Board"
15. ASTM D 3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber"

B. Allowable Tolerances: 1/32" offsets between planes of board faces, and 1/16" in 8'-0" for plumb, level, warp, and bow.

C. System Design Load

1. Provide standard drywall wall assemblies designed and tested by manufacturer to withstand a lateral load of 5 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.
    - a. Drywall assemblies with tile finish shall have a deflection limit of L/360.
  2. Provide drywall ceiling assemblies designed, fabricated, and installed to have a deflection not to exceed L/360.
- D. Fire-Resistance Rating: Where gypsum drywall with fire resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories, or to design designations in UL "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction, and compliant with UL Test #2079; criteria for cycle movement for all field height wall sections requiring allowance for vertical deflection within framing details.
- E. Installer: Firm with not less than 5 years of successful experience in the installation of specified materials.
- F. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Framing Industry Association (SFIA) or be a part of a similar organization that provides verifiable code compliance program.

#### 1.05 SUBMITTALS

- A. Submit shop drawing for each drywall partition, furring and ceiling system showing size and gauges of framing members, hanger and anchorage devices, wallboard types, insulation, sealant, methods of assembly and fastening, control joints indicating column lines, corner details, joint finishing and relationship of drywall work to adjacent work.
- B. Samples: Each material specified herein, 12" x 12", or 12" long, or in manufacturer's container, as applicable for type of material submitted.
- C. Manufacturer's Literature: Submit technical and installation instructions for each drywall partition, furring and ceiling system specified herein, and for each fire-rated and sound-rated gypsum board assembly. Submit other data as required to show compliance with these specifications, including data for mold resistant joint compound.
- D. Test Reports: This Contractor shall submit test report, obtained by drywall manufacturer, indicating conformance of drywall assemblies to required fire ratings and sound ratings.
- E. Evaluation Reports: Submit evaluation reports certified under an independent thirdparty inspection program administered by an agency accredited by IAS to ICC-ES AC98, IAS Accreditation Criteria for Inspection Agencies.

## 1.06 PRODUCT HANDLING AND PROTECTION

- A. Deliver, store and handle drywall work materials to prevent damage. Deliver materials in their original, unopened containers or bundles, and store where protected from moisture, damage and from exposure to the elements. Store wallboard in flat stacks.
- B. Protect wallboard from becoming wet.
- C. Protect metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI's "Code of Standard Practice."

## 1.07 ENVIRONMENTAL CONDITIONS

- A. Provide and maintain minimum temperature of fifty-five (55) degrees F. and adequate ventilation to eliminate excessive moisture within the building in the area of the drywall work for at least twenty-four (24) hours, prior to, during and after installation of drywall work. Installation shall not start until windows are glazed and doors are installed, unless openings are temporarily closed. Space above suspended ceilings shall be vented sufficiently to prevent temperature and pressure build up.

## 1.08 JOB MOCK-UP

- A. At a suitable location, where directed by the Architect, lay up a portion of a finished wall and ceiling demonstrating the quality of work, including finishing, to be obtained under this Section. Omit drywall boards in locations as directed by the Architect to show stud spacing and attachments; after acceptance, complete assembly.
- B. Adjust the finishing techniques as required to achieve the finish required by the Architect as described in this Section of these specifications.
- C. Upon approval of the mock-up, the mock-up may be left in place as a portion of the finished work of this Section.
- D. All drywall work shall be equal in quality to approved mock-up.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Acceptable Manufacturers for Gypsum Drywall Panels and Accessories: U.S. Gypsum Co., Georgia Pacific, CertainTeed Corporation, Continental Building Products, or National Gypsum Co. meeting specification requirements are acceptable.
  - 1. All drywall products must be manufactured in North America.
- B. Acceptable Manufacturers for Metal Supports of Drywall Assemblies: Unless otherwise noted, provide products manufactured by ClarkDietrich, Super Stud Building Products, Marino/Ware, or approved equal.

## 2.02 METAL SUPPORTS

### A. Metal Floor and Ceiling Runners

1. Drywall Track: Formed from 0.0312 inch (20 U.S. Std. gauge) (minimum unless otherwise noted or required by performance requirements) cold formed steel, width to suit shaped metal studs. Use 20 ga. top runners with 1-1/4" minimum flanges.
2. Deflection track or head of wall connections at rated partitions shall conform to UL #2079 for cycle movement. Provide positive mechanical connection of framing to structure, allowing for vertical movement within connections. Minimum of 0.0312 (20 ga.) cold formed steel for clips, 25 ga. cold formed steel for deflection track.
  - a. Product: "BlazeFrame DSL" or "MaxTrak Slotted Deflection Track" as manufactured by ClarkDietrich, "VertiClip" or "VertiTrack" as manufactured by the Steel Network or equal made by Metal-Lite Inc.
  - b. FireTrak (including stud clips) by FireTrak Corp. or equal made by MetalLite Inc.
3. Shaft Wall "J" Type Runner: Formed from 0.0329" (20 U.S. Std. gauge) galvanized steel, 1" x 2-1/2" or 4" wide (to suit detail) x 2-1/4" (for shaft wall).

### B. Metal Studs, Framing and Furring

1. C-Shaped Studs: Channel type with holes for passage of conduit formed from minimum 0.0312" (20 U.S. Std. gauge) (unless heavier gauge is required to meet deflection limits) cold-formed steel, width as shown on drawings.
2. Furring Channels: Hat shaped, formed from galvanized steel, 25 U.S. Std. gauge.
  - a. Product: ClarkDietrich; Furring Channel, or a comparable product.
3. "C-H," "CT," or "I" Type Stud: 1-1/2" x 2-1/2", 4" or 6" wide (to suit detail) galvanized steel. Use for shaft wall construction; gauge and size as required to meet deflection limits given herein.
  - a. Product: ClarkDietrich; CT Stud, or a comparable product.
4. Double "E" Type Stud or "J" Track with Holding Tabs: 1" x 2-1/2", 4" or 6" wide (to suit detail) galvanized steel. Use for shaft wall construction; gauge and size as required to meet deflection limits given herein.
  - a. Product: ClarkDietrich; J-Ribbed Track, or a comparable product.
5. Continuous 16 gauge x 8" wide steel wall plate screwed to studs as required for support of railings, toilet partitions, and other items supported on drywall partitions and walls.

C. Suspended Ceiling and Fascia Supports

1. Main Runners: 1-1/2" steel channels, cold rolled at 0.475 lbs. per ft., rustinhibitive paint finish.
  2. Furring Members: Screw-type hat-shaped furring channels of 25 ga. zinc-coated steel; comply with ASTM C 645.
  3. Hangers: Galvanized, 1" x 3/16" flat steel slats capable of supporting 5x calculated load supported.
  4. Hanger Anchorages: Provide inserts, clips, bolts, screws, and other devices applicable to the required method of structural anchorage for ceiling hangers. Size devices for 5x calculated load supported.
  5. Furring Anchorages: 16 ga. galvanized wire ties, manufacturer's standard clips, bolts or screws as recommended by furring manufacturer.
- D. Protective Coating: All cold-formed steel members shall have coating conforming to AISI S220; ASTM A 653, G60 or coating with equivalent corrosion resistance of ASTM A653/A653M, G60. Galvannealed products are not acceptable.

2.03 GYPSUM WALLBOARD TYPES

- A. Gypsum Wallboard: 5/8" thick "Sheetrock" by USG, "Gold Bond" by National Gypsum, or "Regular Gypsum" by CertainTeed Corp., 48" wide, in maximum lengths available to minimize end-to-end butt joints.
- B. Gypsum Ceiling Board: 5/8" thick, sag-resistant, long edges tapered.
- C. Fire-Rated Gypsum Wallboard: 5/8" thick "Sheetrock Firecode C" by USG, "Firecheck Type C" by Lafarge/Continental, "Gold Bond Fireshield" by National Gypsum, or "Type C" and "Type X" by CertainTeed Corp., 48" wide, in maximum lengths available to minimize end-to-end butt joints.
- D. Water-Resistant Backing Board for Tile Finish: 1/2" thick, "DUROCK Glass Mat Tile Backerboard" by USG, "Dens-Shield Tile Backer Board" by Georgia Pacific or "DiamondBack Tile Backer" by CertainTeed Corp. Cover joints with a pressure sensitive woven glass fiber tape equal to Imperial Type P Tape.
- E. Mold-Resistant Paperless Gypsum Wallboard: 5/8" thick, 48" wide "DensArmour Plus" and "DensArmour Plus Fireguard C" by Georgia Pacific, or equal by National Gypsum, USG or approved equal that has a rating of 10 per ASTM D 3273 with core that meets ASTM C 1396, Section 6 or ASTM C 1658.
- F. Moisture/Mold-Resistant Gypsum Wallboard (at all exterior walls and wet areas): 5/8" thick "Mold Tough," "Mold Tough FR," by U.S. Gypsum, "DensArmor Plus" by Georgia Pacific, "Mold Defense" and/or "Mold Defense Type X" by Lafarge/Continental, or "Gold Bond EXP Interior Extreme Gypsum Board" by National Gypsum, 48" wide, in maximum lengths available to minimize end-to-end butt joints.

1. Board must have a rating of 10 per ASTM D 3273 with a core that meets ASTM C 1396, Section 6, or ASTM C 1658.
- G. Mold-Resistant Shaft Wall Liner: Solid gypsum board liner for shaft wall construction, 1" thick, 24" wide, as required to suit condition, by standard lengths as required, beveled edges. Provide "Mold Tough Liner Panel" by USG, "DensGlass Shaftliner" by Georgia Pacific, "Mold Defense Shaftliner Type X" and/or "Weather Defense Shaftliner Type X" by Lafarge/Continental, "Gold Bond Brand Fireshield Shaft Liner XP" or "Gold Bond Brand EXP Extended Exposure Shaft Liner" by National Gypsum, or "M2Tech Shaftliner" by CertainTeed Corp.
1. Liner board must have a rating 10 per ASTM D 3273 with a core that meets ASTM C 1396 Section 6.

#### 2.04 ACCESSORIES

- A. Acoustical Insulation: Paper-less, non-combustible, semi-rigid mineral fiber mat, 2" thick, in walls (unless otherwise indicated), 3 lb./cu. ft. maximum density; Thermafiber "Thermafiber SAFB," Rockwool "Rockwool AFB," or approved equal.
- B. Fasteners for Wallboard: USG Brand Screws; Type S Bugle Head for fastening wallboard to lighter gauge interior metal framing (up to 20 ga.). Type S-12 Bugle Head for fastening wallboard to heavier gauge interior metal framing (20 ga. to 12 ga.); Type S and Type S-12 Pan Head for attaching metal studs to door frames and runners; and Type G Bugle Head for fastening wallboard to wallboard. Lengths specified below under "Part 3 - Execution" Articles and as recommended by drywall manufacturer.
- C. Laminating Adhesive: "Sheetrock Brand Joint Compound."
- D. Metal Trim - Corner Beads: For 90-degree external corners, provide ClarkDietrich "103 Deluxe Corner Bead (CBU)" or "103 Dur-A-Bead" by USG, 26 U.S. Std. ga. galvanized steel, 1-1/4" x 1-1/4".
- E. Metal Trim - Edge Beads: "Sheetrock Brand Paper Faced Metal Bead and Trim."
- F. Partition/Concrete Ceiling Trim: Trim-Tex Super Seal Tear Away or approved equal.
- G. Metal Trim Treatment Materials and Joint Treatment Materials for Gypsum Drywall Boards: Paper tape for joint reinforcing; Setting Type (Durabond 90) or Lightweight Setting Type Joint Compound for taping and topping; and Ready Mix Compound for finishing.
1. For mold-resistant drywall, water-resistant drywall, and tile backer board, use glass mesh tape with setting joint compound that is rated 10 when tested in accordance with ASTM D 3273 and evaluated in accordance with ASTM D 3274. Acceptable joint compound is "Rapid Set One Pass" made by CTS Cement Manufacturing Corp. or "Rapid Joint" manufactured by Lafarge North America or approved equal meeting standards noted herein.
- H. Control Joints: ClarkDietrich; #093 Control Joint or No. 0.093 by USG.

- I. Acoustical Sealant: Pecora Corporation "AC-20 FTR" or "AIS-919," Tremco Mfg. Co. "Tremco Acoustical Caulking," Mason Industries' "Acoustical Caulking CC-75," or approved equal.
- J. Acoustical Sealant for Fire-Rated Partitions: 3M Corporation "CP 25 Caulk," or approved equal.
- K. Neoprene Gaskets: Conform to ASTM D 1056.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Examine the areas and conditions where gypsum drywall is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.02 GENERAL INSTALLATION REQUIREMENTS

#### A. General

1. Install drywall work in accordance with drywall manufacturer's printed instructions and as indicated on drawings and specified herein.
  2. All metal framing for drywall partitions shall extend from floor to underside of structural deck above. Provide for vertical deflection with positive mechanical connections of framing members to structure.
  3. Provide concealed reinforcement, 16 ga. Thick by eight (8) inches wide or as detailed or as recommended by manufacturer, for attachment of railings, toilet partitions, and other items to be supported on the partitions which cannot be attached to the metal framing members. Concealed reinforcement shall span between metal studs and be attached thereto using two (2) self-tapping pan head screws at each stud.
    - a. Back of drywall shall be scored or notched to prevent bulging out where reinforcement plate occurs.
- B. Fire-Rated Assemblies: Install fire-rated assemblies in accordance with requirements of authorities having jurisdiction, Underwriters' Laboratories and test results obtained and published by the drywall manufacturer, for the fire-rated drywall assembly types indicated on the drawings.
  - C. Acoustical Assemblies: Install acoustically-rated assemblies to achieve a minimum STC as noted on drawings, in accordance with test results obtained and published by the drywall manufacturer, for the drywall assembly type indicated on the drawings.

#### D. Sealant

1. Install continuous acoustical sealant bead at top and bottom edges of wallboard where indicated or required for sound rating as wallboard is installed, and between metal trim edge beads and abutting construction.
2. Install acoustical sealant in 1/8" wide vertical control joints within the length of the wall or partitions, and in all other joints, specified below under "Control Joints." Install bead of acoustical sealant around electric switch and outlet boxes, piping, ducts, and around any other penetration in the wallboard; place sealant bead between penetrations and edge of wallboard.
3. Where sealant is exposed to view, protect adjacent surfaces from damage and from sealant material, and tool sealant flush with and in same plane as wallboard surface. Sealant beads shall be 1/4" to 3/8" diameter.

#### E. Wallboard Application

1. Do not install wallboard panels until steel door frames are in place; coordinate work with Section 08113, "Hollow Metal Doors and Frames."
2. See drawings for all board types. Use fire-rated wallboard for fire-rated assemblies. Use sag-resistant board for ceilings. Use water-resistant wallboard where indicated on drawings and where wallboard would be subject to moisture. Install water-resistant wallboard in full, large sheets (no scraps) to limit number of butt joints.
3. Apply wallboard with long dimension parallel to stud framing members, and with abutting edges occurring over stud flanges.
4. Install wallboard for partitions from floor to underside of structure above and secure rigidly in place by screw attachment, unless otherwise indicated.
5. Provide "Thermafiber" safing insulation meeting standards of Section 078413 at flutes of metal deck where partitions carry up to bottom of metal deck.
6. Neatly cut wallboard to fit around outlets, switch boxes, framed openings, piping, ducts, and other items which penetrate wallboard; fill gaps with acoustic sealant.
7. Where wallboard is to be applied to curved surfaces, dampen wallboard on back side as required to obtain required curve. Finish surface shall present smooth, even curve without fluting or other imperfections.
8. Screw fasten wallboard with power-driven electric screwdriver, screw heads to slightly depress surface of wallboard without cutting paper, screws not closer than 3/8" from ends and edges of wallboard.
9. Where studs are doubled-up, screw fasten wallboard to both studs in a staggered pattern.

F. Cementitious Backer Board

1. General: Furnish cementitious backer board in maximum available lengths. Install horizontally, with end joints over framing members.
2. Fastening: Secure cementitious backer board to each framing member with screws spaced not more than 12 inches on center and not closer than ½" from the edge. Install screws with a conventional screw gun so that the screw heads are flush with the surface of the board.
3. Joint Treatment: Fill space between edge of backer and receptor with dry-set Portland cement or latex-Portland cement mortar. Fill all horizontal and vertical joints and corners with dry-set Portland cement or latex-Portland cement mortar. Apply fiberglass tape over joints and corners and embed with same mortar.

G. Metal Trim: Install and mechanically secure in accordance with manufacturer's instructions; and finish with three (3) coats of joint compound, feathered and finish sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions.

1. Corner Beads: Install specified corner beads in single lengths at all external corners, unless corner lengths exceed standard stock lengths.
2. Edge Beads: Install specified edge beads in single lengths at all terminating edges of wallboard exposed to view, where edges abut dissimilar materials, where edges would be exposed to view, and elsewhere where shown on drawings. Where indicated on drawings, seal joint between metal edge bead and adjoining surface with specified gasket, 1/8" wide minimum and set back 1/8" from face of wallboard, unless other size and profile indicated on drawings.
3. Casing beads shall be set in long lengths, neatly butted at joints. Provide casing beads at juncture of board and vertical surfaces and at exposed perimeters.

H. Control Joint Locations: Gypsum board surfaces shall be isolated with control joints where:

1. Ceiling abuts a structural element, dissimilar wall or other vertical penetration.
2. Construction changes within the plane of the partition or ceiling.
3. Shown on approved shop drawings.
4. Ceiling dimensions exceed thirty (30) feet in either direction.
5. Wings of "L," "U," and "T" shaped ceiling areas are joined.
6. Expansion or control joints occur in the structural elements of the building.
7. Shaft wall runs exceed 30' without interruption.
8. Partition or furring abuts a structural element or dissimilar wall or ceiling.

9. Partition or furring runs exceed 30' without interruption.
10. Where control joints are required, ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners.

I. Joint Treatment and Spackling

1. Joints between face wallboards in the same plane, joints at internal corners of intersecting partitions and joints at internal corners of intersections between ceilings and walls or partitions shall be filled with joint compound.
2. Screw heads and other depressions shall be filled with joint compound. Joint compound shall be applied in three (3) coats, feathered and finish surface sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions. Treatment of joints and screw heads with joint compound is also required where wallboard will be covered by finish materials which require a smooth surface, such as vinyl wall coverings.

3.03 FURRED WALLS AND PARTITIONS

- A. Use specified metal furring channels. Run metal furring channel framing members vertically, space sixteen (16) inches o.c. maximum. Fasten furring channels to concrete or masonry surfaces with power-driven fasteners or concrete stub nails spaced sixteen (16) inches o.c. maximum through alternate wing flanges (staggered) of furring channel. Furring channels shall be shimmed as necessary to provide a plumb and level backing for wallboard. At inside of exterior walls, an asphalt felt protection strip shall be installed between each furring channel and the wall. Furring channel and splices shall be provided by nesting channels at least eight (8) inches and securely anchoring to concrete or masonry with two (2) fasteners in each wing.
- B. Wallboard Installation: Same as specified under Article 3.4 - "Metal Stud Partitions."

3.04 METAL STUD PARTITIONS

- A. Unless otherwise noted, steel framing members shall be installed in accordance with ASTM C 754.
- B. Runner Installation: Use channel type. Align accurately at floor according to partition layout. Anchor runners securely sixteen (16) inches o.c. maximum with power-driven anchors to floor slab, with power-driven anchors to structural slab above. See "Stud Installation" below for runners over heads of metal door frames. Where required, carefully remove sprayed-on fireproofing to allow partition to be properly installed.
- C. Stud Installation
  1. Use channel type, positioned vertically in runners, spaced as noted on drawings, but not more than sixteen (16) inches o.c.
  2. Anchor studs to floor runners with screw fasteners. Provide snap-in or slotted hole slip joint bolt connections of studs to ceiling runners leaving space for movement.

Anchor studs at partition intersections, partition corners and where partition abuts other construction to floor and ceiling runners with sheet metal screws through each stud flange and runner flange.

3. Connection at ceiling runner for non-rated partitions shall be snap-in or slotted hole slip joint bolt connection that shall allow for movement. Seal studs abutting other construction with 1/8" thick neoprene gasket continuously between stud and abutting construction.
  4. Connections for fire rated partitions at ceiling runners shall conform to UL Design #2079.
  5. Install metal stud horizontal bracing wherever vertical studs are cut or wallboard is cut for passage of pipes, ducts or other penetrations, and anchor horizontal bracing to vertical studs with sheet metal screws.
  6. At jambs of door frames and borrowed light frames, install doubled-up studs (not back to back) from floor to underside of structural deck, and securely anchor studs to jamb anchors of frames and to runners with screws. Provide cross braces from hollow metal frames to underside of slab.
  7. Over heads of door frames, install cut-to-length section of runner with flanges slit and web bent to allow flanges to overlap adjacent vertical studs, and securely anchor runner to adjacent vertical studs with sheet metal screws. Install cut-to-length vertical studs from runner (over heads of door frame) to ceiling runner sixteen (16) inches maximum o.c. and at vertical joints of wallboard, and securely anchor studs to runners with sheet metal screws.
  8. At control joints, in field of partition, install double-up studs (back to back) from floor to ceiling runner, with 1/4" thick continuous compressible gasket between studs. When necessary, splice studs with eight (8) inches minimum nested laps and attach flanges together with two (2) sheet metal screws in each flange. All screws shall be self-tapping sheet metal screws.
- D. Runners and Studs at Chase Wall: As specified above for "Runners" and "Studs" and as specified herein. Chase walls shall have either a single or double row of floor and ceiling runners with metal studs sixteen (16) inches o.c. maximum and positioned vertically in the runners so that the studs are opposite each other in pairs with the flanges pointing in the same direction. Anchor all studs to runner flanges with sheet metal screws through each stud flange and runner flange following requirements of paragraph 3.4, B. Provide cross bracing between the rows of studs by attaching runner channels or studs set full width of chase attached to vertical studs with one self-tapping screw at each end. Space cross bracing not over thirty-six (36) inches o.c. vertically.
- E. Wallboard Installation - Single Layer Application (Screw Attached)
1. Install wallboard with long dimension parallel to framing member and with abutting edge joints over web of framing member. Install wallboard with long dimension perpendicular to framing members above and below openings in

drywall extending to second stud at each side of opening. Joints on opposite sides of wall shall be arranged so as to occur on different studs.

2. Boards shall be fastened securely to metal studs with screws as specified. Where a free end occurs between studs, back blocking shall be required. Center abutting
3. ends over studs. Correct work as necessary so that faces of boards are flush, smooth, true.
4. Wallboard screws shall be applied with an electric screw gun. Screws shall be driven not less than 3/8" from ends or edges of board to provide uniform dimple not over 1/32" deep. Screws shall be spaced twelve (12) inches o.c. in the field of the board and 8" o.c. staggered along the abutting edges.
5. All ends and edges of wallboard shall occur over screwing members (studs or furring channels). Boards shall be brought into contact but shall not be forced into place. Where ends or edges abut, they shall be staggered. Joints on opposite sides of a partition shall be so arranged as to occur on different studs.
6. At locations where piping receptacles, conduit, switches, etc., penetrate drywall partitions, provide non-drying sealant and an approved sealant stop at cut board locations inside partition.

F. Wallboard Installation - Double-Layer Application

1. General: See drawings for wallboard partition types required.
2. First Layer (Screw Attached): Install as described above for single layer application.
3. Second Layer (Screw Attached): Screw attach second layer unless laminating method of attachment indicated on drawings or necessary to obtain required sound rating or fire rating. Install wallboard vertically with vertical joints offset thirtytwo (32) inches from first layer joints and staggered on opposite sides of wall. Attach wallboard with 1-5/8" screws sixteen (16) inches o.c. along vertical joints and sixteen (16) inches o.c. in the field of the wallboard. Screw through first layer into metal framing members.
4. Second Layer (Laminated): Install wallboard vertically. Stagger joints of second layer from first layer joints. Laminate second layer with specified laminating adhesive in beads or strips running continuously from floor to ceiling in accordance with manufacturer's instructions. After laminating, screw wallboard to framing members with 1-5/8" screws, spaced twelve (12) inches o.c. around perimeter of wallboard.

G. Wallboard Installation - Laminated Application: Where laminated wallboard is indicated, use specified laminating adhesive, install wallboard vertically and maintain tolerances as specified for screw attached wallboard.

H. Insulation Installation: Install where indicated on drawings. Place blanket tightly between studs.

- I. Deflection of Structure Above: To allow for possible deflection of structure above partitions, provide top runners for non-rated partitions with 1-1/4" minimum flanges and do not screw studs or drywall to top runner. Where positive anchorage of studs to top runner is required, anchorage device shall be by means of slotted hole (in clip connection with screw attachment to web of steel through bushings located in slots of clips), or other anchorage device approved by Architect.
- J. Control Joints
  1. Leave a 1/2" continuous opening between gypsum boards for insertion of surface mounted joint.
  2. Back by double framing members.
  3. Attach control joint to face layer with 9/16" galvanized staples six (6) inches o.c. at both flanges along entire length of joint.
  4. Provide two (2) inch wide gypsum panel strip or other adequate seal behind control joint in fire rated partitions and partitions with safing insulation.

### 3.05 DRYWALL FASCIAS AND CEILINGS

- A. Furnish and install inserts, hanger clips and similar devices in coordination with other work.
- B. Secure hangers to inserts and clips. Clamp or bolt hangers to main runners.
- C. Space main runners 4'-0" o.c. and space hangers 4'-0" o.c. along runners, except as otherwise shown.
- D. Level main runners to a tolerance of 1/4" in 12'-0", measured both lengthwise on each runner and transversely between parallel runners.
- E. Metal Furring Channels: Space sixteen (16) inches o.c. maximum. Attach to 1-1/2" main runner channels with furring channel clips (on alternate sides of main runner channels). Furring channels shall not be let into or come in contact with abutting masonry walls. End splices shall be provided by nesting furring channels no less than eight (8) inches and securely wire tying. At any openings that interrupt the furring channels, install additional cross reinforcing to restore lateral stability.
- F. Mechanical accessories, hangers, splices, runner channels and other members used in suspension system shall be of metal, zinc coated, or coated with rust inhibitive paint, of suitable design and of adequate strength to support units securely without sagging, and such as to bring unit faces to finished indicated lines and levels.
  1. Provide special furring where ducts are over two (2) feet wide.
- G. Apply board with its long dimension at right angles to channels. Locate board butt joints over center of furring channels. Attach board with one (1) inch self-drilling drywall screws twelve (12) inches o.c. in field of board at each furring channel; eight (8) inches o.c. at butt joints located not less than 3/8" from edges.

### 3.06 SHAFT WALLS

- A. Runner Installation: Use "J" metal runners at floor and ceiling, with the short leg toward finish side of wall. Securely attach runners to structural supports with powerdriven fasteners at both ends and twenty-four (24) inches o.c.
- B. Shaft Wall Liner: Cut shaft wall liner panels one (1) inch less from floor to ceiling height and erect vertically between J-runners.
- C. C-H Studs: Cut metal studs 3/8" to not more than 1/2" less than floor to ceiling height and install between shaft wall liner panels so that panels are fitted snugly into the one (1) inch wide "H," "T," or "I" portion of the stud. Space studs twenty-four (24) inches o.c., unless otherwise indicated on drawings. Install full-length steel E-Studs or J-runners vertically at T-intersections, corners, door jambs, and columns. Install full length E-Studs or J-runners over shaft wall liner both sides of closure panels. Frame openings cut within a liner panel with J-Runner around perimeter. For openings, frame with vertical E-Stud or J-runner at edges, horizontal runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall. Over metal doors, install a cut to length section of runner and attach to strut-studs with clip angles and 3/8" Type S Screws space twelve (12) inches o.c.
- D. Wallboard Installation - Double Layer Installation: Erect gypsum wallboard base layer vertically or horizontally to meet fire rating on one side of studs with end joints staggered. Fasten base layer panels to studs with one (1) inch Type S screws twentyfour (24) inches o.c. Caulk perimeter of base layer panels. Apply gypsum wallboard face layer vertically over base layer with joints staggered and attached with 1-5/8" Type S screws staggered from those in base, spaced eight (8) inches o.c. and driven into studs.
- E. Wallboard Installation (Where Both Sides of Shaft Wall are Finished): Apply gypsum wallboard face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels with one (1) inch or two (2) inches Type S screws spaced eight (8) inches o.c. in field and along edges into studs.
- F. Where handrails are indicated for direct attachment to drywall shaft system, provide not less than a sixteen (16) ga. x eight (8) inches wide galvanized steel reinforcement strip, accurately positioned and secured to studs and concealed behind not less than one 1/2" thick course of gypsum board in the system.
- G. Integrate stair hanger rods with drywall shaft system by locating cavity of system as required to enclose rods.

### 3.07 FINISHING

- A. Taping: A thin, uniform layer of compound shall be applied to all joints and angles to be reinforced. Reinforcing tape shall be applied immediately, centered over the joint, seated into the compound. A skim coat shall follow immediately but shall not function

as a fill or second coat. Tape shall be properly folded and embedded in all angles to provide a true angle.

- B. Filling: After initial coat of compound has hardened, additional compound shall be applied, filling the board taper flush with the surface. The fill coat shall cover the tape and feather out slightly beyond the tape. On joints with no taper, the fill coat shall cover the tape and feather out at least four (4) inches on either side of the tape. No fill coat is necessary on interior angles.
- C. After compound has hardened, a finishing coat of compound shall be spread evenly over and extending slightly beyond the fill coat on all joints and feathered to a smooth, uniform finish. Over tapered edges, the finished joint shall not protrude beyond the plane of the surface. All taped angles shall receive a finish coat to cover the tape and taping compound and provide a true angle. Where necessary, sanding shall be done between coats and following the final application of compound to provide a smooth surface, ready for painting.
- D. Fastener Depressions: Compound shall be applied to all fastener depressions followed, when hardened by at least two (2) coats of compound, leaving all depressions level with the plane of the surface.
- E. Finishing Beads and Trim: Compound shall be applied to all bead and trim and shall be feathered out from the ground to the plane of the surface. When hardened, this shall be followed by two (2) coats of compound each extending slightly beyond the previous coat. The finish coat shall be feathered from the ground to the plane of the surface and sanded as necessary to provide a flat, smooth surface ready for decoration.
- F. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840 and GA-214 of the Gypsum Association.
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 2: Panels that are a substrate for tile, and where indicated.
  - 3. Level 4: Level of finish for surfaces exposed to view shall conform to Level 4.
- G. Drywall construction with defects of such character which will mar appearance of finished work, or which is otherwise defective, will be rejected and shall be removed and replaced at no expense to the Owner.

### 3.08 CLEANING AND ADJUSTMENT

- A. At the completion of installation of the work, all rubbish shall be removed from the building leaving floors broom clean. Excess material, scaffolding, tools, and other equipment shall be removed from the building.
- B. Work shall be left in clean condition ready for painting or wall covering. All work shall be as approved by Architect.
- C. Cutting and Repairing: Include all cutting, fitting and repairing of the work included herein in connection with all mechanical trades and all other trades which come in

conjunction with any part of the work and leave all work complete and perfect after all trades have completed their work.

3.09 PROTECTION OF WORK

- A. Installer shall advise Contractor of required procedures for protecting drywall work from damage and deterioration during remainder of construction period.

END OF SECTION

## SECTION 09300

### PORCELAIN TILE

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Work Includes: Complete all tile, accessories, and related work as indicated or required by drawings and as specified herein.
- B. Related Work Described Elsewhere:
  - 1. Sealants are specified under Section 07900 – Sealants.

##### 1.02 SUBMITTALS

- A. Submit under the provisions of Section 01300 - SUBMITTALS.
- B. Manufacturer's Data: Submit manufacturer's technical information and installation instructions for selected tile, grout, and sealer materials.
- C. Qualification Data: For Installer and Manufacturer.
- D. Samples: If not matching as specified submit 4 each samples of tile base.
- E. Certificate: Before installation of tile, submit to the Contracting Officer the Standard Form of Master Grade Certificate signed by the Contractor and Manufacturer, stating grade and kind of tile.
- F. Sealant Compatibility Test Report: From sealant manufacturer, complying with requirements in Section 07900 - SEALANTS and indicating that sealants will not stain or damage stone.
- G. Warranty: Warranty for a minimum of 2 years against defects resulting from the use of defective or inferior materials, equipment or workmanship.
- H. Maintenance Data: For ceramic and stone tile to include in maintenance manuals. Include Product Data for stone-care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products
- I. Installation Specifications: Submit manufacturer's installation specifications.

### 1.03 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate ceramic and stone tiles similar in material, design, and extent to that indicated for this Project, whose work has resulted in applications with a record of successful in- service performance.
- B. Installer Qualifications: An installer who has completed ceramic tile and stone work similar in material, design, and extent to that indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- C. Source Limitations for Other Materials: Obtain each type of grout, tile accessories, sealants, and other material from a single manufacturer for each product.

### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all packages of tile to the job in sealed cartons bearing grade seals in compliance with ANSI A137.1.
- B. Protect tile, mortar materials and accessories during storage and construction against moisture, soiling, staining, and physical damage.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

### 1.05 PROJECT CONDITION

- A. Field Measurements: Verify dimensions of construction to receive tile products by field measurements indicate measurements on Shop Drawings.
- B. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

### 1.06 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Floor and Wall Tile: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Porcelain Shower Floor Tiles: MileStone Area 51, Color: Clay, Size: 2"x2" mosaic on a 12"x12" sheet, For each type of tile provides all trim shapes as detailed and/or as required. corners shall be rounded convex unless otherwise noted in detail to achieve a neat complete installation.
- B. Porcelain Cove Base: MileStone Area 51, Color: Clay, Size: 6"x12", For each type of tile provides all trim shapes as detailed and/or as required. corners shall be rounded convex unless otherwise noted in detail to achieve a neat complete installation.
- C. Porcelain Shower Wall Tiles: 4EARTH, Color: Sky, Size: 3"x12", for each type of tile provides all trim shapes as detailed and/or as required. Corners shall be rounded convex unless otherwise noted in detail to achieve a neat completion installation.
- D. Acceptable Manufacturer: Milestone, 300 International Blvd, Clarksville, TN 37040. Toll-Free Tel: 1-877-356-7461, Direct Work 808-358-9030, Email: rick@bellapietra.com.

### 2.02 SETTING MATERIALS

- A. Thin-Set Mortar: Latex-Portland cement mortar, ANSI A118.4, with manufacturer's standard latex additive (water emulsion) serving as a replacement for part or all of gauging water.
- B. Water: Fresh, clean and drinkable.

### 2.03 GROUTING MATERIALS

- A. Manufacturer and Colors as indicated by MAPEI on the Drawings.
  - 1. Polymer-modified cement tile grout, complying with ANSI A118.6 and ISO 13007 CG2WA.
    - a. Ultracolor Plus FA Grout for joints less than 1/8-inch.

### 2.04 SEALANTS

- A. Joint Sealants: Manufacturer's standard sealants of characteristics indicated below that comply with applicable requirements in Section 07920 - SEALANTS and will not stain the stone they are applied to.
  - 1. Single-component, mildew-resistant, neutral curing silicone sealant conforming to ASTM C 920 and ASTM C 794, Type S, Grade NS, Use NT, Class 25.
  - 2. Colors: Provide colors of exposed sealants to match colors of grout in stone adjoining sealed joints, unless otherwise indicated.

## 2.05 INSTALLATION OF TRANSITIONS

- A. Install transition strips at all flooring changes and elevation changes.
  - 1. Material: Aluminum / Stainless steel.
  - 2. Profile: Edge protection profile for abutting tile to lower transitions /threshold type as required at transition between flooring types and at changes in elevation.
  - 3. Sample: Submit for approval.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates and areas where tile will be installed for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm, dry, clean, and free from oil or waxy films and curing compounds.
  - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
- B. Report unsatisfactory conditions to the Contractor for corrective measures; send copy of report to the Contracting Officer. Do not proceed with installation until unsatisfactory conditions have been corrected. Proceeding with tile work will imply acceptance of the substrate condition by the ceramic tile contractor. Wall substrate must be plumb to within tolerances.

### 3.02 PREPARATION

- A. Remove coatings that are incompatible with tile-setting materials from substrates, including curing compounds and other substances that contain soap, wax, oil, or silicone.
- B. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.
- C. For concrete substrates for tile installed with thin-set mortar, correct conditions that do not comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
  - 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
  - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- D. Clean dirty or stained stone tile surfaces by removing soil, stains, and foreign materials before setting. Clean stone tile by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

### 3.03 INSTALLATION

- A. ANSI Tile Installation Standard: Comply with parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods indicated.
- B. TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.
- E. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown. All joints regardless of material shall be 1/8" or less.
- F. Grout: Grouts shall comply with ANSI A108.10.
- G. Allow tiles to set a minimum of 48 hours prior to grouting. The grout shall be forced into the joints to the full depth. Take special care not to scratch glazed tile during this operation. Remove surplus grout before it has hardened and leave the face of the tile clean. Keep expansion and control joints free of grout.
- H. Sound tiles after setting to ensure proper bonding. Hollow sounding tiles shall be replaced.
- I. Sealer: Apply 1-2 coats to tile and grout in accordance to the manufacture's instructions.

### 3.04 CONSTRUCTION TOLERANCES

- A. Variation in Line: For positions shown in plan for edges of flooring and changes in color or finish, and continuous joint lines, do not exceed 1/8 inch in 96 inches, 1/4 inch in 20 feet, or 3/8 inch maximum.
- B. Variation in Surface Plane of Paving and Flooring: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch maximum from level or slope indicated.

- C. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/8 inch in 96 inches, 1/4 inch maximum.
- D. Variation in Joint Width: Do not vary joint thickness more than 1/16 inch or one-fourth of the nominal joint width, whichever is less.
- E. Variation in Plane between Adjacent Tiles (Lipping): Do not exceed 1/32-inch difference between planes of adjacent units.

### 3.05 GROUTING JOINTS

#### A. General:

1. Grout tile to comply with ANSI A108.10.
2. Remove temporary shims before grouting.
3. Tool joints uniformly and smoothly with plastic tool.

#### B. Tile:

1. Grout joints as soon as possible after initial set of setting bed. Force grout into joints, taking care not to smear grout on adjoining stone and other surfaces. After initial set of grout, finish joints by tooling to produce a slightly concave polished joint, free of drying cracks.
2. Cure grout by maintaining in a damp condition for seven days except as otherwise recommended by latex-additive manufacturer.

### 3.06 JOINT SEALANT INSTALLATION

- A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Section 07920 - SEALANTS. Remove temporary shims before applying sealants.

### 3.07 CLEANING AND PROTECTION

- A. Cleaning: Upon completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.
  1. Remove grout residue from tile as soon as possible. Clean in accordance with applicable ANSI installation procedure.
  2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
  3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove

coating to prevent it from clogging drains.

- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensure that tile is without damage or deterioration at time of Substantial Completion.
  - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
  - 2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
  - 3. Protect tiled corners and external angles with board corner strips in areas used as passageways by workers.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

## SECTION 09900

### PAINTING AND FINISHING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Interior paint and coating commercial systems including surface preparation.

##### 1.02 RELATED SECTIONS

- A. Section 03300 - Cast-in-Place Concrete.
- B. Section 08113 - Hollow Metal Doors and Frames.
- C. Section 09250 - Gypsum Drywall.
- D. Section 15000 – General Mechanical Requirements.
- E. Section 16011 - General Electrical Requirements.

##### 1.03 REFERENCES

- A. Steel Structures Painting Council (SSPC):
  - 1. SSPC-SP 1 - Solvent Cleaning.
  - 2. SSPC-SP 2 - Hand Tool Cleaning.
  - 3. SSPC-SP 3 - Power Tool Cleaning.
  - 4. SSPC-SP5/NACE No. 1, White Metal Blast Cleaning.
  - 5. SSPC-SP6/NACE No. 3, Commercial Blast Cleaning.
  - 6. SSPC-SP7/NACE No. 4, Brush-Off Blast Cleaning.
  - 7. SSPC-SP10/NACE No. 2, Near-White Blast Cleaning.
  - 8. SSPC-SP11, Power Tool Cleaning to Bare Metal.
  - 9. SSPC-SP12/NACE No. 5, Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating.
  - 10. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.
- B. Material Safety Data Sheets / Environmental Data Sheets: Per manufacturer's MSDS/EDS for specific VOCs (calculated per 40 CFR 59.406). VOCs may vary by base and sheen.
- C. California Department of Public Health (CDPH):
  - 1. CDPH v1.1-2010 and V1.2-2017

##### 1.04 SUBMITTALS

- A. Submit under provisions of Section 01300 - Submittals.

- B. Product Data: For each paint system indicated, including.
  1. Product characteristics.
  2. Surface preparation instructions and recommendations.
  3. Primer requirements and finish specification.
  4. Storage and handling requirements and recommendations.
  5. Application methods.
  6. Cautions for storage, handling and installation.
- C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's products, colors and sheens available.
- D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.
- E. Coating Maintenance Manual: Upon conclusion of project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams, "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
- F. Only submit complying products based on project requirements (i.e. LEED). One must also comply with the regulations regarding VOCs (CARB, OTC, SCAQMD, LADCO). To ensure compliance with district regulations and other rules, businesses that perform coating activities should contact the local district in each area where the coating will be used.

#### 1.05 QUALITY ASSURANCE

- A. Installer 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. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors and sheens available.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.
- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  1. Finish surfaces for verification of products, colors and sheens.
  2. Finish area designated by Architect.
  3. Provide samples that designate primer and finish coats.
  4. Compatibility and Adhesion: Check after one week of drying and curing by testing in accordance with ASTM D3359; Adhesion by tape test. If coating system is incompatible, additional surface preparation up to and including complete removal may be required.

5. Do not proceed with remaining work until the Architect approves the mock-up.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.
  1. Product name, and type (description).
  2. Application and use instructions.
  3. Surface preparation.
  4. VOC content.
  5. Environmental handling.
  6. Batch date.
  7. Color number.
- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

#### 1.07 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

#### 1.08 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Furnish State with an additional one percent of each material and color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Basis of Design Manufacturer: Sherwin-Williams. Contact Richard Condie, [richard.condie@sherwin.com](mailto:richard.condie@sherwin.com). 916-267-3232
- B. Requests for substitutions will be considered in accordance with provisions of these Contract Documents. Substituted products must be equal to or better in quality than the SW products listed below. Lesser products will not be accepted.

## 2.02 APPLICATIONS/SCOPE

- A. Interior Paint and Coating Commercial Systems:
  - 1. Concrete: Non-vehicular floors.
  - 2. Masonry: Concrete masonry units, including split-face, scored, and smooth block.
  - 3. Drywall: Drywall board, Gypsum board.

## 2.03 PAINT MATERIALS - GENERAL

- A. Paints and Coatings:
  - 1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
  - 2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufacturer's product instructions for optimal color conformance.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- D. Color: Refer to Finish Schedule for paint colors, and as selected.

## 2.04 INTERIOR PAINT AND COATING COMMERCIAL SYSTEMS

- A. Masonry CMU: Concrete, Split Face, Scored, Smooth, High Density, Low Density, and Fluted.
  - 1. Latex Systems:
    - a. Semi-Gloss Finish: High Performance (HP) Upgrade.
      - 1) 1st Coat: S-W PrepRite Block Filler, B25W25 (75-125 sq ft/gal).
      - 2) 2nd Coat: S-W ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1950 Series.
      - 3) 3rd Coat: S-W ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1950 Series (4 mils wet, 1.6 mils dry per coat).
  - 2. Epoxy Systems; Waterbased (Storage Rooms & Restrooms):
    - a. Semi-Gloss Finish:
      - 1) 1st Coat: S-W Loxon Block Surfacer, LX01W200 (50-100 sq ft/gal).
      - 2) 2nd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-Series.
      - 3) 3rd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-Series (4 mils wet, 1.5 mils dry per coat).
- B. Drywall: Walls, Ceilings, Gypsum Board and similar items.

1. Latex Systems:
  - a. Semi-Gloss Finish: High Performance (HP) Upgrade.
    - 1) 1st Coat: S-W ProMar200 Zero VOC Interior Latex Primer, B28W2600 (4 mils wet, 1.5 mils dry).
    - 2) 2nd Coat: S-W ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1950 Series.
    - 3) 3rd Coat: S-W ProMar 200 HP Zero VOC Latex Semi-Gloss, B31-1950 Series (4 mils wet, 1.6 mils dry per coat).
  
2. Epoxy Systems; Waterbased (Storage Rooms & Restrooms):
  - a. Semi-Gloss Finish:
    - 1) 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W2600 (4 mils wet, 1.5 mils dry).
    - 2) 2nd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-Series.
    - 3) 3rd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-Series (4 mils wet, 1.5 mils dry per coat).
  
- C. Metal (Doors & Frames)
  1. Waterbased Urethane Systems:
    - a. Semi-Gloss Finish:
      - 1) 1st Coat: S-W ProCryl Primer B66-310 (4 mils wet, 1.5 mils dry).
      - 2) 2nd Coat: S-W Pro Industrial Waterbased Urethane B53 Series.
      - 3) 3rd Coat: S-W Pro Industrial Waterbased Urethane B53 Series (4 mils wet, 1.6 mils dry per coat).
  
  - Metal (Interior Handrails)
    2. Waterbased Urethane Systems:
      - a. Semi-Gloss Finish:
        - 1) 1st Coat: S-W ProCryl Metal Primer B66-310 (75-125 sq ft/gal).
        - 2) 2nd Coat: S-W Pro Industrial Acrolon 100 B65 Gloss.
        - 3) 3rd Coat: S-W Pro Industrial Acrolon 100 B65 Gloss (4-8 mils wet, 1.7-3.5 mils dry per coat).

## 2.05 EXTERIOR PAINT AND COATING COMMERCIAL SYSTEMS

- A. Metal - Steel: Exterior Handrails
  1. Waterbased Urethane Systems:
    - a. Semi-Gloss Finish:
      - 1) 1st Coat: S-W Macropoxy 646 (75-125 sq ft/gal).
      - 2) 2nd Coat: S-W Pro Industrial Acrolon 100 B65 Gloss.
      - 3) 3rd Coat: S-W Pro Industrial Acrolon 100 B65 Gloss (4-8 mils wet, 1.7-3.5 mils dry per coat).
  
- B. CMU (Clear Sealer)

- a. Clear Sealer:
    - 1) 1st Coat: S-W Conflex 7 percent Siloxane Water Repellant, CF31T7.
    - 2) 2nd Coat: S-W Conflex 7 percent Siloxane Water Repellant, CF31T7.
  
- C. Masonry CMU & Concrete:
  - 1. Latex Systems:
    - a. Satin Finish:
      - 1) 1st Coat: S-W PrepRite Block Filler, B25W25 (75-125 sq ft/gal).
      - 2) 2nd Coat: S-W Super Paint Satin A8.
      - 3) 3<sup>rd</sup> Coat: S-W Super Paint Satin A8 Series(4 mils wet, 1.6 mils dry per coat)
  
- D. Gyp Board & Siding:
  - 1. Acrylic Systems:
    - a. Semin-Gloss Finish
      - 1) 1st Coat: S-W PrepRite ProBlock Promer, B51 Series (75-125 sq ft/gal).
      - 2) 2nd Coat: S-W Pro Industrial Acrylic Semi-Gloss.
      - 3) 3<sup>rd</sup> Coat: S-W Pro Industrial Acrylic Semi-Gloss.
  
- E. Misc Metal – Exposed Metal Deck, Doors & Door Frames:
  - 1. Waterbased Urethane System
    - a. Semi-Gloss Finish
      - 1) 1st Coat: S-W ProCyl Metal Primer B66-310 (4 mils wet, 1.5 mils dry).
      - 2) 2nd Coat: S-W Pro Industrial Waterbased Urethane B53 Series.
      - 3) 3<sup>rd</sup> Coat: S-W Industrial Waterbased Urethane B53 Series (4 mils wet, 1.6 mils dry per coat)

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead-based paints, notify Architect immediately if lead based paints are encountered.

### 3.02 SURFACE PREPARATION

- A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
  - 1. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
  - 2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply solution and scrub the mildewed area. Allow

solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow surface to dry before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

3. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
  4. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.
- B. Aluminum: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
  - C. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.
  - D. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
  - E. Copper and Stainless Steel: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning.
  - F. Exterior Composition Board (Hardboard): Some composition boards may exude a waxy material that must be removed with a solvent prior to coating. Whether factory primed or unprimed, exterior composition board siding (hardboard) must be cleaned thoroughly and primed with an alkyd primer.
  - G. Drywall - Exterior: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting. Exterior surfaces must be spackled with exterior grade compounds.
  - H. Drywall - Interior: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must

be sanded smooth and all dust removed prior to painting.

- I. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP16 is necessary to remove these treatments.
  
- J. Steel: Structural, Plate, And Similar Items: Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
  - 1. Solvent Cleaning, SSPC-SP1: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
  - 2. Hand Tool Cleaning, SSPC-SP2: Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
  - 3. Power Tool Cleaning, SSPC-SP3: Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
  - 4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
  - 5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
  - 6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon

methods.

7. Power Tool Cleaning to Bare Metal, SSPC-SP11: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
  8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2: A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
  9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials: SSPC-SP12 or NACE 5: This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.
  10. Water Blasting, SSPC-SP12/NACE No. 5: Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.
- K. Wood: Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

### 3.03 INSTALLATION

- A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content. Wait until wood is fully dry after rain or morning fog or dew.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F. Regardless of number of coats specified, apply as many coats as necessary for complete hide,

and uniform appearance.

- G. Inspection: The coated surface must be inspected and approved by the Architect just prior to the application of each coat.

#### 3.04 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

## DIVISION 10 – SPECIALTIES

### SECTION 10400

#### SIGNAGE

##### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.02 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the signage as shown on the drawings and/or specified herein, including the following:
  - 1. Interior panel signs.

##### 1.03 RELATED SECTIONS

- A. DIVISION 16 – ELECTRICAL WORK - EXIST SIGNS.

##### 1.04 QUALITY ASSURANCE

- A. For actual installation of signage, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are completely trained in the required skills.

##### 1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of signage required.
- B. Samples: Submit samples of each type of signage showing finishes, colors, surface textures and qualities of manufacture and design of each sign component including graphics.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of signage. Include plans, elevations, and large-scale details of sign wording and lettering layout. Show anchorage and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

## 1.06 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

## PART 2 - PRODUCTS

### 2.01 INTERIOR PANEL SIGNS

- A. Manufacturers: Provide signs manufactured by ASI-Modulex, Inc., Best Sign Systems, Inc., InPro Corporation, or approved equal.
- B. Fire egress, floor, and other signs required by Code shall be as follows:
  - 1. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner, manufactured from manufacturer's standard acrylic sheet, unframed. Comply with requirements indicated for finishes, colors, designs, shapes, sizes, and details of construction (as selected by the Engineer).
  - 2. Engraved Copy: Machine engrave letters, numbers, symbols, and other graphic devices into panel sign on face indicated to produce precisely formed copy, incised to uniform depth. Fill engraved copy with enamel.
  - 3. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surfaces, in contrasting color.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Examine the areas and conditions where signage is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.02 INSTALLATION

- A. Install units and components at the locations directed by the Engineer, securely mounted with concealed theft-resistant fasteners. Attach to substrates in accordance with the manufacturer's instructions.
- B. Install level, plumb, and at the proper height. Cooperate with other trades for installation of sign units to finish surfaces. Repair or replace damaged units as directed by the Engineer.

END OF SECTION

## SECTION 10800

### TOILET ACCESSORIES

#### PART 1 - GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.
- B. Section includes: All labor, tools and equipment necessary to assemble and install all Toilet accessories and miscellaneous related work as called for or required by the drawings and specifications.

##### 1.02 REFERENCES

- A. 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 primary designation only.
  - 1. Automated ASM International (ASTM)
  - 2. ADA Standards for Accessibility Design
  - 3. ADAAG – Americans with Disabilities Act Accessibility Guidelines.

##### 1.03 GENERAL REQUIREMENTS

- A. Coordinate with SECTION 09250 – GYPSUM WALLBOARD

##### 1.04 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTAL PROCEDURES.
- B. Manufacturer's Catalog Data: Submit catalog data for each type of accessory specified, including descriptions of materials, finishes, fastening and anchoring devices, and appurtenances.
- C. Samples: Submit one representative sample of each accessory specified for finish and workmanship for approval. After approval, install each sample in the work identified and record its location.

##### 1.05 DELIVERY AND STORAGE

- A. Deliver materials to the site in unopened containers, labeled with the manufacturer's names and brands, ready for installation. Store accessories in safe, dry locations until needed for installation.

1.06 WARRANTY

- A. The Contractor shall execute to the State a 2- year written warranty after the Project Acceptance Date that the installation of the toilet accessories is following the manufacturer’s requirements. Any damages that develop during that period that are not due to improper use or will full damage will be replace at no cost to the State.

PART 2 - PRODUCT

2.01 MATERIALS

- A. Bobrick manufacturers the following Toilet Accessories to establish minimally acceptable qualities. Products of equal or better quality and finishes as manufactured by Bobrick are acceptable. The Products of other manufacturers are acceptable provided they meet or exceed the material and construction requirements specified herein and are qualified as required by the DLNR Interim General Conditions and accepted by the Engineer.
- B. Materials and Fabrication: Accessories fabricated following commercial practice, with welds ground smooth. Bending, flanging, drawing, forming, and similar operations are performed in a manner to ensure that there are no defects. Flanged or recessed accessories to return to walls to provide a continuous, tight-against-the-wall installation. Doors shall be warp free. Key manufacturer’s standard locks alike, for groups of accessories, two keys furnished for each group.
- C. Finishes: Finishes on metals not specified otherwise shall be provided as follows:

Metal	Finish
Stainless Steel	General-purpose Polished
- D. The surface-mounted single jumbo-roll toilet tissue dispenser: door shall be 22-gauge stainless steel with satin-finish. Door shall be equipped with a lock keyed like other Bobrick washroom accessories. Door shall have a slot have a slot to reveal toilet tissue supply inside cabinet. Spindle shall accommodate one toilet tissue roll up to 10” diameter with a 1-1/2” diameter core roll convertible for 3” diameter core rolls or 2-1/8” diameter core roll by adding rubber o-rings(2) furnished. Bobrick No. 2890, or approved equal.
- E. Tile Mirror with Stainless Steel Frame: Glass Mirror with Stainless Steel Angle Frame: Frame Heavy-gauge, type 304 stainless steel, 3/4 inch x 3/4 inch angle with vertical-grain satin finish. One piece, rolled-formed construction forms a continuous integral stiffener on all sides. Bobrick No. B-293, or approved equal. Vandal-resistant. Refer to drawings for sizes.
- F. Grab Bars: Grab bar shall be Type-304 stainless steel with a satin-finish, slip-resistant surface. Grab bar shall have 18-gauge wall thickness and 1-1/4” outside diameter. Clearance between the grab bar and wall shall be 1-1/2. Concealed mounting flanges shall be 11-gauge thick stainless steel plate, 2”x3-1/8”, and equipped with at least two

screw holes for attachment to wall. Flange covers shall be 22-gauge stainless steel, 3-1/4" diameter, and shall snap over mounting flanges to conceal mounting screws and /or WingIt fasteners. Ends of grab bar shall pass through concealed mounting flanges and be heliarc welded to form one structural unit. Grab bar shall comply with accessible design (including ADAAG in the U.S.A.) for structural strength. Bobrick B-5806 or approved equal.

- G. Heavy-Duty Shower Curtain Rod: Shower curtain rod shall be Tyle-304, 20-gauge (1.0mm) stainless steel tubing with satin finish and 1" outside diameter. Flanges shall be Type-304, 20gauge (1.0mm) stainless steel with satin finish and drawn, one-piece. Bobrick B-6107 or approved equal.
- H. Mop Holder 3 Station Wall Mount: Overall dimensions are 24"x1-11/16"x3-13/16". Made of stainless steel. Elkay LK403 or approved equal.
- I. Under lavatory Guard:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Plumberex Specialty Products, Inc.
    - b. Truebro by IPS Corporation
  - 2. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping: allow service access without removing coverings.
  - 3. Material and Finish: Antimicrobial, Molded Plastic, White.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Do not begin installation until substrates have been adequately prepared.
- B. If substrates are the responsibility of another installer, notify the Contracting Engineer of unsatisfactory preparation before proceeding.

#### 3.02 INSTALLATION

- A. Surface of fastening devices exposed after installation shall have the same finish as the attached accessory. Exposed fasteners shall be vandal-proof type. The installed location and height of the accessories are as indicated. Protect exposed surfaces of accessories with strip-able plastic or other approved means until the installation is accepted. Coordinate accessory manufacturer's mounting details with other trades as their work progresses and with installation requirements of ADDAG 603. After installation, thoroughly clean exposed surfaces and restore damaged work to its original condition or replace it with new work at no cost to the State.
- B. Grab Bars: ADAAG 609.3 Spacing. The space between the wall and the grab bar shall be 1 1/2inches. The space between the grab bar and projecting objects below and at the

ends shall be 1 1/2 inches. The space between the grab bar and projecting objects above shall be 12 inches.

### 3.03 PROTECTION AND CLEARING

- A. Check and clean all washroom accessories and replace damaged products before substantial completion.
- B. After his work, the Contractor shall clean up and remove all rubbish, debris, and unused materials from the premises. He shall also clean and protect installed products until the completion of the project.

END OF SECTION

## DIVISION 13 - SPECIAL CONSTRUCTION

### SECTION 13283

#### DISTURBANCE OF LEAD-CONTAINING MATERIAL

##### PART 1 - GENERAL

###### 1.01 SUMMARY

- A. Disturbance of materials containing lead during planned renovation activities.
- B. Disturbance of materials containing lead during planned demolition activities.
- C. All paint shall be considered to be lead-based paint until proven otherwise.
- D. All paint shall be considered to contain lead until proven or confirmed that no lead is present.
- E. Lead paint testing conducted did not confirm the absence of lead in the painted surfaces tested.

###### 1.02 DESCRIPTION OF WORK

- A. All paint shall be presumed to contain lead proven or confirmed otherwise.
- B. Whenever lead paint (lead-containing or lead-based) or lead material is being disturbed, this Section shall take precedence over others.
- C. The preparation and treatment of existing paint with lead (lead-containing or lead-based) material on various surfaces. Lead paint (lead-containing or lead-based) removal work shall be selective and only where existing paint (lead-containing or lead-based) is peeling, blistering, flaking, delaminating, chalky, in poor condition, not adhering to the existing substrate and/or fails adhesion testing.
- D. 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 to complete work required.
- E. Contractor shall coordinate work in this Section with contract drawings and documents to determine where painted surfaces (lead-containing or lead-based), regardless of condition, are going to be disturbed and are required to be completely removed (deleading) to structural substrate to complete work required.
- F. Demolition of surfaces and/or components containing lead and/or lead paint (lead-containing or lead-based).
- G. All preparation of lead paint (lead-containing or lead-based) shall be identified in advance so that the preparation/treatment of surfaces will be one continuous operation.



C. Equipment: All equipment for preparation, clean-up and disposal are on hand.

#### 1.07 SUBMITTALS

A. Submit in accordance with SECTION 01330 - SUBMITTAL PROCEDURES.

B. Submittals shall be submitted in the order listed herein. Failure to do so will result in automatic rejection of submittals.

C. All submittals shall be made to the Contracting Officer no later than 10 consecutive calendar days from award date unless specified otherwise.

D. Schedule of Work: Contractor shall submit detailed lead paint disturbance schedule. Project schedule shall indicate the start and completion dates for each phase of work.

E. Shop Drawing and Diagram: Contractor shall submit the following:

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 approved by the Contracting Officer.
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, chalky and/or blistering paint, during demolition and during any disturbances of surfaces containing lead paint including methods to suppress dust emissions during the disturbance of lead paint.
7. Required air monitoring procedures and sampling protocols when the likelihood of airborne exposure of lead 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.

F. Product Data: The Contractor shall submit samples or product data sheet for approval. Product data sheet 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.

- G. SDS Sheet: Liquid sanders, encapsulants and any other materials brought on-site that are considered as hazardous materials under 29 CFR 1910.1200, shall include Safety Data Sheets.
- H. Other: The Contracting Officer 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.
- I. Certificate - Documentation for Instruction:
  - 1. Submit documentation satisfactory to the Contracting Officer 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, have received training in accordance with OSHA lead in construction standard for all workers disturbing lead paint.
  - 2. Submit to the Contracting Officer, 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.
- J. Other - 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 by 29 CFR 1926.62.
  - 1. Before exposure to lead dust or fumes, the Contractor will provide workers with a comprehensive medical examination as required 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; 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 materials by persons trained, knowledgeable and

qualified in the techniques of handling and disposing of lead 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.

- 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. The Contractor shall give, at a minimum, 10 working days notification to the State's Inspector/Air Monitoring Consultant prior to the start of any lead paint related work.
- D. The Contractor shall not begin with any work without the State's Inspector/Air Monitoring Consultant present onsite.
- E. 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-containing 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.
- F. Specific Statutory and Regulatory Requirements:
  - 1. Office of Public and Indian Housing, Department of Housing and Urban Development: Lead Paint Guidelines dated June 1995.
  - 2. Title 29 Code of Federal Regulations Part 1926.62, Safety and Health Standards (Lead Exposure in Construction, May 1993).
  - 3. Title 29 Code of Federal Regulations Part 1910.134, Respiratory Protection.
  - 4. Title 40 Code of Federal Regulations Part 261, Identification and Listing of Hazardous Waste.
  - 5. Title 40 Code of Federal Regulations Part 262, Standards Applicable to Generators of Hazardous Waste.
  - 6. Title 40 Code of Federal Regulations Part 263, Regulations Hazardous Waste Transporters.
  - 7. 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.

G. 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 Contracting Officer 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 approved in writing by the Contracting Officer before implementation.

1.09 DEFINITIONS

- A. Abatement: Procedure to control lead dust release from lead paint.
- B. Removal: All herein specified procedures necessary to remove lead paint that is peeling, blistering, flaking, chalky, delaminating, in poor condition, not adhering to the existing substrate, fails adhesion testing, going to be disturbed in an acceptable manner and/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. NIOSH Method 7082 or 7702 shall be used to determine airborne lead concentration.
- E. Authorized Visitor: The Contracting Officer, 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 Air filter capable of trapping and retaining 99.97 percent of particulate greater than 0.3 micron in length.
- I. HEPA Vacuum Equipment: Vacuuming equipment that utilizes a High Efficiency Particulate Air (HEPA) filter.
- J. Holding Area: A secure area used for the storage of properly contained 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 Paint: Lead-containing paint, lead-based paint and/or paint containing any amount of lead.
- M. Lead-Containing Paint: Lead-containing paint, lead-based paint and/or paint containing any amount of lead.
- N. Lead Control Area: An Area where lead-containing 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.
- O. 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.
- P. 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. The breathing zone shall be considered an area within 12-inches of the nose or mouth of an employee.
- Q. 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 Emission 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 orange tape, minimum 2 inches wide for exit arrows.
- 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.
- D. Warning Labels and Signs: As required by 29 CFR 1926.62.
- 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 tools for the lead treatment/preparation procedures.
- B. Other tools and equipment as necessary to accomplish the specified 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 size 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 materials may cause lead 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 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 materials. Such measures shall include at minimum, the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

### 3.02 LEAD MATERIALS

- A. Lead-based paint was detected at some painted surface locations tested. Lead-containing paint was detected at some painted surface locations tested. Lead-containing painted components may be present, as lead concentration of some painted surface locations tested were below lead paint analyzer level of detection of 0.01mg/cm<sup>2</sup>.
  1. 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 or lead paint that will not be disturbed in any manner during the work to be performed under this contract. The Contracting Officer shall have the authority to require special engineering controls described under this Section of 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 regulations at location/approaches to location(s) where airborne concentration 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 approved work plan wherever it is necessary to protect the public, employees of the facility and non-working personnel from lead 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. 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.
3. 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.
4. The Contractor shall at all times suppress dust emission while disturbing any material containing lead paint. No visible emission will be permitted.
5. 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, no visible lead paint debris is present.
6. 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, flaking, chalky, not adhering to the existing substrate, and/or fails adhesion testing.

#### C. Paint Stripping:

1. Work included under this subsection 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 SDS, 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 spray equipment or 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 an approved 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.

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 HEPA filtered 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. Wet sanding shall be conducted by hand or pneumatic driven sanders. Electric powered sanders shall not be used for wet sanding.
4. 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.
5. 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 Contracting Officer for further instructions.

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, tri-sodium phosphate (TSP), 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 area with specified primer.
  - 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. 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. Isolating the Work Area: The Contractor shall isolate work area, with barricades and signs to prevent unauthorized persons from entering.
3. 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.
4. The Contractor shall at all times suppress dust emission while disturbing any material containing lead. No visible emission will be permitted.

5. Re-establishment of the work area shall only occur when clean-up procedures have been completed, all demolition activities have been performed, and no visible debris is present.
6. Ground contamination all demolition 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 waste, liquid waste or non-lead 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 is not damaged. The Contractor shall post warning signs outside the secured storage area as specified in the OSHA requirement 29 CFR 1926.62.
  3. Dumpster Waste Material: If waste material is to be stored in dumpster, the Contractor shall use a secured storage area for this purpose. Dumpster shall have doors that can be closed and locked to prevent vandalism. The Contractor shall only store non-hazardous waste material in the dumpster(s). The Contractor shall ensure that the dumpsters are not damaged. The Contractor shall post warning signs outside the secured storage area as required by OSHA, DOT and any other applicable Federal, State and Local regulations.
- B. Waste Disposal and Landfill Requirements:
  1. Representative sample(s), of paint chip debris and demolition debris, shall be submitted for hazardous/special/regulated waste determination (characterization) as required by the landfill and all applicable regulations. All testing and any other associated costs related to hazardous/special/regulated waste determination shall be paid for by the Contractor. If results are below the EPA limit(s) and characterized as a non-hazardous waste, the materials shall be disposed of at a landfill approved for such purposes. The Contractor shall submit to the Contracting Officer, documentation that the waste material removed from the work area has been accepted by the landfill owner.

2. If waste characterization or other required landfill testing result(s) of the demolition and/or paint chip debris are above EPA limits or landfill limits the materials shall be disposed of at an approved facility for receiving hazardous, regulated or special waste materials. The Contractor shall be responsible for all disposal costs including all transportation fees. The Contractor shall submit to the Contracting Officer, documentation that the waste material removed from the work area has been accepted by the hazardous materials approved landfill owner.

C. Disposal of Non-Hazardous 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 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.

D. Recycling of Non-Hazardous Lead Waste:

1. The Contractor is responsible for all cost relating to materials with lead painted surfaces to be recycled. It is the responsibility of the Contractor to determine which materials may or may not be re-cycled.
2. The Contractor is to perform all testing, at his own cost, to ensure the material to be recycled may be accepted and recycled in accordance the recyclers permit conditions.
3. If the material cannot be recycled, the Contractor shall be responsible for the proper disposal of the debris at his own cost.

### 3.07 TESTING/AIR MONITORING

#### A. 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), and all other applicable law.
2. Area air/dust 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 Contractor. The full cost of additional monitoring and testing shall be borne by the Contractor and shall be deducted from the final contract payment in the event of working double shifts to meet deadlines, working longer hours than stated in the accepted proposal, for working beyond the scheduled completion date, violating regulations, not conforming to specifications and plans, or for failing clearance test requirements.

END OF SECTION

## SECTION 13288

### TESTING/AIR MONITORING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Project and air monitoring requirements during lead disturbance related activities.

##### 1.02 LEAD PAINT PROJECT MONITORING BY CONTRACTING OFFICER

- A. Daily project air monitoring and testing shall be supplied by the Contracting Officer for the purpose of:

1. Verifying compliance with the specifications listed in SECTION 13283 - DISTURBANCE LEAD-CONTAINING MATERIAL;
2. Insuring that the State's legally required documentation is collected;
3. Providing engineering control during the project.

##### 1.03 COORDINATION WITH OTHER SECTIONS

- A. 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 LEAD PAINT DISTURBANCE CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall be responsible for providing employee exposure monitoring and maintaining necessary records for all of the Contractor's employees as required by OSHA, 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 Contracting Officer. 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 Contracting Officer. However, the full cost of such additional monitoring and testing shall be borne by the Contractor, and shall be paid directly to the State's Air Monitoring Consultant no later than prior to the final contract payment.
- E. Employee exposure (OSHA) air monitoring that is part of the Inspector's (Testing/Air Monitoring Consultant) 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.
- F. The Contractor shall contact in writing, the State's Air Monitoring Consultant and DOE Construction Management within 10 days of Award.
- G. The Contractor shall give, at a minimum, 10 working days notification to the State's Inspector/Air Monitoring Consultant prior to the start of any lead paint disturbance related work.

### 3.02 TESTING/AIR MONITORING INSPECTOR (AIR MONITORING CONSULTANT)

- A. The Inspector (Testing/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 (Testing/Air Monitoring Consultant) shall have the authority to instigate engineering control measures during the project and stop work if deemed necessary.
- C. Air monitoring shall be performed to detect airborne lead concentrations outside the work area for the duration of the project.
- D. Environmental air monitoring shall be performed by the Inspector/Air Monitoring Consultant. Payment to the Inspector/Air Monitoring Consultant shall be by the State. Any testing initiated by the Contractor shall be paid for by the Contractor and shall be included in the contract amount.
- E. Throughout the entire disturbance and cleaning operations, project monitoring shall be conducted to ensure that the Contractor is complying with this specification, EPA, OSHA and any applicable State and local government regulations.

END OF SECTION

DIVISION 15 – MECHANICAL

SECTION 15011

GENERAL MECHANICAL PROVISIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: Applies to all work of DIVISION 15 - MECHANICAL.

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. SECTION 01300 - SUBMITTALS.

B. SECTION 09990 - PAINTING AND FINISHING.

C. SECTION 15653 - AIR CONDITIONING AND VENTILATING.

D. SECTION 15950 - HVAC TESTING, ADJUSTING AND BALANCING.

1.03 PLANS

A. The plans and specifications direct attention to certain required features of the materials and equipment but do not purport to cover all details entering into its design and construction. Nevertheless, the Contractor shall furnish and install the mechanical systems complete in all details and ready for operation. The mechanical systems shall be installed substantially as shown on the plans and as specified herein and shall be designed for installation in the area designated with proper space allowed for clearance and maintenance access.

B. Attention is directed to the fact that the plans are based upon certain equipment configurations and that equipment components of other approved equal manufacturers may differ from the arrangement indicated on the plans. If other approved equipment is accepted which require an arrangement different from that indicated on the plans or specified, the Contractor shall prepare and submit for approval, detailed civil, architectural, structural, environmental, mechanical and electrical drawings, layouts, calculations, and equipment lists showing all necessary changes and embodying all special features of the equipment which the Contractor proposes to furnish. The cost of such changes shall be borne by the Contractor at no increase in contract price or extension of contract time for the project.

1.04 SUBMITTALS

A. Submit in accordance with SECTION 01300 - SUBMITTALS.

B. General Requirements:

1. Data Required with the Submittal: The Contractor shall submit all data sufficient to demonstrate conformance to the requirements of DIVISION 15 -

MECHANICAL. The submittal shall include, but not be limited to, manufacturer's name, catalog number or designation, and the electrical and physical characteristics of the equipment. The submittal shall be in the form of printed data sheets, catalog cuts and shop drawings. Reference to manufacturer's literature without enclosing a copy of the referenced document will be considered insufficient.

Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal. Incomplete packages will be returned without a review.

2. Approval Requirements: Approval of material and equipment will be based on manufacturer's published data.
  3. Identification: All submittals covering equipment shall be identified with the equipment numbers shown on the contract drawings and the system served.
  4. Substitutions:
    - a. Substitutions shall be subject to the requirements of the specifications. Supporting data shall be furnished for all substitutions. Redesign of civil, architectural, structural, environmental, mechanical, electrical, or any other feature made necessary by the use of substitutions shall be the responsibility of and at the expense of the Contractor, and subject to approval by the Contracting Officer.
    - b. Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring, conduit, equipment or hazardous material abatement from that specified or indicated on the drawings, the Contractor shall furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system, or hazardous material abatement at no additional cost to the State.
  5. Samples: When called for in DIVISION 15 - MECHANICAL, furnish samples of materials that truly represent the materials to be used. Where samples are specified to demonstrate method of installation, furnish all materials and tools. Samples shall also be furnished when materials are proposed as substitutions for those specified. Materials used in the work shall be identical to samples that have been approved by the Contracting Officer.
- C. List of Material and Equipment: The Contractor shall submit to the Contracting Officer for approval six (6) sets of a complete list of proposed material or equipment. This list shall include manufacturer's name and material or equipment identification such as styles, types, or catalog numbers, to permit ready and complete identification. Catalog numbers specified herein are given for reference only. The Contractor shall furnish the latest model manufactured.
- D. Shop Drawings: The Contractor shall submit to the Contracting Officer for approval six (6) sets of prints of shop drawings. Shop drawings shall be submitted for equipment not completely identifiable by information contained in the list of materials and equipment.

1. The Contractor shall submit detailed shop drawings of all equipment and all materials required to complete the project. No material or equipment may be ordered, delivered to the job site or installed until the Contractor has in his possession the approved shop drawings for the particular material or equipment. The shop drawings shall be complete as described herein.
2. Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.
3. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of contract time, and no claim for extension by reason of such default will be allowed.
4. Shop drawings shall be submitted for, but not limited to, the following:
  - a. Plumbing System.
  - b. Ventilating System.
  - c. All items described in specifications and on drawings.
  - d. Other items as the Contracting Officer may direct.
5. Shop drawings shall include as applicable:
  - a. Identification of each piece of equipment and component.
  - b. Dimensioned layouts and arrangement of equipment.
  - c. Operating performance and electrical characteristics.
  - d. Foundation and mounting data.
  - e. Equipment clearances required for servicing and proper operation.
- E. Safety Data Sheets (SDS): The Contractor shall submit to the Contracting Officer for approval six (6) sets of SDS for materials used in this project. Contractor shall perform all work in accordance with the recommendations of the SDS, including all tests.
- F. Test and Balance Report: The Contractor shall submit to the Contracting Officer for approval six (6) sets of ventilating Testing, Adjusting and Balancing (TAB) reports with all test data procedures and descriptions.
- G. As-Built Drawings: The Contractor shall submit to the Contracting Officer one (1) reproducible set of all Contract Drawings corrected to reflect the "AS-BUILT"

conditions of the installation. The drawings shall be kept up to date as the job progresses and shall be available for inspection at all times.

The Contractor shall submit to the Contracting Officer one (1) reproducible set of all Contract Drawings corrected to reflect the "AS-BUILT" conditions of the installation. The drawings shall be kept up to date as the job progresses and shall be available for inspection at all times.

- H. Certificates: The Contractor shall submit to the Contracting Officer for approval six (6) copies of certificates, acceptance and compliance with regulations of agencies having jurisdiction. Work shall not be deemed complete until such certificates have been delivered to the Contracting Officer. Certificates shall include the following:
1. Sterilization of domestic water piping.
  2. Pressure testing of domestic water piping.
  3. Pressure testing of sanitary piping.
  4. Solder and fluxes used in the potable water system are lead-free.
  5. All wetted materials used in the potable water system shall be lead-free and NSF 372 certified.
- I. One Year Guarantee And Maintenance Service Contract:
1. Contractor shall submit six (6) copies of a written Guarantee that all work is as specified and shall be bound to replace material and equipment defective due to workmanship or materials. Contractor shall not be responsible, however, for defects proven to the Contracting Officer's satisfaction to be due to misuse, accident, lack of maintenance, improper operation, or negligence by other parties.
  2. Further, Contractor shall be held responsible for all damages to any part of the premises, building and contents caused by leaks or other defect in pipe, equipment or materials provided under the contract drawings and specifications.
  3. Terms of this Guarantee are in addition to other guarantee provisions of the specifications, and do not substitute for other more stringent terms, if any.
  4. In addition to the Guarantee on material and workmanship, the Contractor shall submit six (6) signed copies of the Maintenance Service Contract. The Maintenance Service Contract shall exclude existing equipment not installed by the Contractor.
  5. The Guarantee and Maintenance Service Contract shall commence immediately after the system/equipment startup date, Project Acceptance Date or the air conditioning equipment acceptance date, whichever occurs first, and extend for a period of one (1) year following thirty (30) consecutive calendar days of trouble-free operation after the Project Acceptance Date. The Guarantee shall include all labor, materials, equipment and parts. The Maintenance Service Contract shall include all labor, materials, equipment and parts necessary to service the complete system, in accordance with the attached SCHEDULE OF

MAINTENANCE SERVICE (see ATTACHMENT NO. 1), so as to assure proper operation and function of the system. All costs for the periodic maintenance, including emergency calls, shall be borne by the Contractor. The guarantee and maintenance periods shall run concurrently (same start and end dates). However, should the Contractor default on the Maintenance Service Contract and must restart or complete the service, then the entire guarantee and maintenance periods shall be extended by the period of time that the Maintenance Service Contract was in default. Similarly, should equipment fail and require repair, the entire guarantee and maintenance periods shall be extended by the period of time it takes to repair the equipment. Furthermore, the Contracting Officer has the option to reject any installed equipment if the Contractor violates any of the corresponding equipment manufacturer's guarantee or warranty terms including maintenance requirements. All rejected equipment shall be replaced with new equipment at no cost to the State.

6. Trouble-free operation is defined as a non-disabling condition, non-recurring failure or disruption, and the following:
  - a. The system shall be free of all discrepancies, contamination and debris, which require correction in excess to those described for the monthly service included in the SCHEDULE OF MAINTENANCE SERVICE.
  - b. The system is maintaining operational conditions and other parameters as measured during the acceptance test.
7. The Contractor shall include a list of the following items along with the Maintenance Service Contract:
  - a. Name of the service contractor and documentation that field service personnel are trained, qualified, and certified to service the equipment.
  - b. Equipment startup date(s).
  - c. Project Acceptance Date.
  - d. Completion of thirty (30) consecutive calendar days of trouble-free operation date.
  - e. Service contract expiration date.
  - f. Service schedule for the maintenance period.
  - g. Itemized list of equipment covered under the service contract, including a description of the equipment identified, its model and serial number(s) and manufacturer's name(s).
8. Maintenance service contractor shall have a local office, staffed with competent , and qualified manufacturer or union trained and certified field service personnel and stocked with full inventory of replacement repair parts, to perform specified service and maintenance tasks on all equipment in accordance with the One-Year Maintenance Service Contract and terms and conditions of all equipment manufacturer's warranties and recommendations. Field service personnel shall be

fully capable of providing routine and emergency maintenance service on all system equipment components.

9. The Maintenance Service Contract shall be submitted along with the Operation and Maintenance Manual on/or before the Project Acceptance Date.

J. Operation and Maintenance Manual:

1. The Contractor shall submit to the Contracting Officer for approval six (6) hardbound (heavy-duty, "D" type, 3-ring binder) copies and six (6) compact disks (CD-R) or thumb drive(s) of the Operation and Maintenance Manual on all equipment and the system as a whole. Operation and Maintenance Manual files on CD-R or thumb drive(s) shall be searchable Portable Document Format (PDF)files. The manual shall identify project name and number, contractor, consultant, date and all equipment provided. It shall include the equipment manufacturer's name and contact information (phone, facsimile, e-mail, website, and address), model and serial number, tag number, capacity, quantity of units, startup date, and their location and area (room) served.
2. Operation and Maintenance Manual shall be submitted for, but not limited to, the following:
  - a. Plumbing System.
  - b. Ventilating System.
  - c. All items described in specifications and on drawings.
  - d. Other items as the Contracting Officer may direct.
3. Operation and Maintenance Manual shall be submitted to the Contracting Officer for approval prior to acceptance of each installation. Manual shall include the following:
  - a. Manufacturer's Literature: Adequately indicate, highlight, arrow, etc. project related information and delete, "X" or cross out non-applicable information.
  - b. Parts List: Submit a parts list and assembly diagrams showing location, number required and identification for each part and subassembly. Submit source of service and replacement parts.
  - c. Control and Wiring Diagrams: Submit control and wiring diagrams.
  - d. Operation Instructions: Submit a brief description of the system(s) with information on the proper control of the system(s) by the operator.
  - e. Maintenance Instructions: Submit a list of each item requiring inspection, lubrication or service with the description of the proper performance of such maintenance.

- f. Maintenance Schedule: Submit a recommended schedule of maintenance activity broken down by recommended frequency of performance (i.e. weekly, monthly, quarterly, semi-annually and annually).
- g. Installation Instructions: Submit installation instructions.
- h. Approved Manufacturer's product data, shop drawings, test reports, certificates, and warranties.

#### 1.05 MANUFACTURER'S INSTRUCTIONS

- A. General: Furnish manufacturer's instructions and data covering installation, operation and maintenance of all materials and equipment. Submittals shall be in six (6) bound copies each.
- B. Installation instructions for materials shall include precautions for handling, storage and preparation for field application. Description of other materials and tools required to complete the installation shall be included. Installation instructions for equipment shall include assembly, recommended supports, aligning and connecting for service. The instructions shall include illustrations, diagrams and step-by-step procedures. Instructions should indicate if delegated design services are recommended/required.
- C. Operation and maintenance instructions shall include instructions for operation, maintenance, repair, recommended inspection points and periods for inspection in a practical, complete and comprehensive manner. The information shall be arranged in a logical, orderly sequence, including a general description of the equipment and significant technical characteristics. Test, adjustment and calibration information shall be furnished and identified to specific equipment. The instructions shall include illustrations, diagrams, and step-by-step procedures.
- D. Spare Parts Data: Spare parts data shall be furnished for each item of equipment. The data shall include a complete list of parts and supplies, with current unit prices and source of supply; a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment, or specified hereinafter to be furnished as part of the contract; and a list of additional items recommended by the manufacturer to assure efficient operation for a period of 365 days. Components not manufactured by the equipment company such as bearings, seals, and packing shall be identified as to trade name and part and identification number. The foregoing shall not relieve the manufacturer of any responsibilities under the Guarantee specified hereinbefore.
- E. Identification: The data shall have complete identification throughout using equipment numbers shown on the drawings and indicating the system to which the data pertains.

### PART 2 - PRODUCTS

#### 2.01 ASBESTOS PROHIBITION

- A. The use of asbestos containing materials is prohibited. The Contractor shall ensure that all materials incorporated in the project are asbestos-free.

## 2.02 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall conform to the requirements of applicable Technical Specifications and publications specified therein and shall be as shown. Materials and equipment shall be new and shall be the products of manufacturers regularly engaged in the manufacturing of such products. All items shall essentially duplicate materials and equipment that have been in satisfactory use at least two (2) years in the State of Hawaii prior to bid opening and shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site of installation.

## 2.03 NAMEPLATES

- A. Each item of equipment shall have manufacturer's nameplate of corrosion resistant metal attached in a conspicuous location. Nameplate data shall include manufacturer's name, address, model number, capacity, rating and such other performance data as required to completely identify the item. In addition, the Contractor shall provide a separate corrosion resistant metal tag to carry the equipment designation as shown on drawings and the installation date. Nameplate lettering shall be stamped upper case. Nameplate shall be fastened by means of corrosion resistant metal screws or wire, 14-gage.

## 2.04 TOOLS AND SUPPLIES

- A. Where specified in DIVISION 15 - MECHANICAL, special tools and supplies shall be provided. The items shall be packaged or boxed to provide protection in storage and shall be identified as to use. Tools and supplies shall be accompanied by information as to source of supply.

## 2.05 FACTORY-APPLIED PAINT

- A. Ferrous surfaces of materials and equipment shall have baked enamel or galvanized finish as standard with the manufacturer. Special coating shall be applied when specified in DIVISION 15 - MECHANICAL.
- B. All interior, exposed ferrous piping and associated support materials shall have factory-applied protective coating as specified under SECTION 09990 - PAINTING AND FINISHING.
- C. All exterior, ferrous piping and associated support materials shall have factory-applied protective prime coat as follows:
  - 1. Pre-Treatment - Commercial Blast Cleaning in accordance with Steel Structures Painting Council No. 6 (not less than 2-mils profile).
  - 2. Paint primer used are free of asbestos, lead, zinc-chromate, mercury, strontium chromate and cadmium.

## PART 3 - EXECUTION

### 3.01 QUALITY CONTROL

- A. The work shall be performed by workers skilled in the type of work involved under experienced supervision. Where methods of application or installation are specified by commercial standards in DIVISION 15 - MECHANICAL, no departures will be permitted except as specified or as directed by the Contracting Officer.

### 3.02 INSPECTION AND TESTS

- A. The Contractor shall give the Contracting Officer written notice a minimum of seven (7) days prior to inspection and tests. Tests shall be performed as required in DIVISION 15 - MECHANICAL. All work rejected by the Contracting Officer shall be repaired or replaced by the Contractor at no additional cost to the State.

### 3.03 VERIFICATION OF DIMENSIONS

- A. The Contractor shall check all dimensions at the site and shall establish all lines and levels. Equipment shall be located to assure proper grade for piping. The Contractor shall be responsible for correctness of all dimensions and fitting of piping and equipment into the available space. Should field measurements show conditions that require relocation of any work, such conditions shall be reported to the Contracting Officer in advance of installation, and the work shall proceed in accordance with his decision.

### 3.04 PROTECTION DURING STORAGE

- A. All materials and equipment shall be stored in a safe manner, secured from weather, vandalism and theft. All materials shall be stored above the ground or floor level to avoid damage by moisture.

### 3.05 PROTECTION OF WORK IN PROGRESS

- A. Pipe openings shall be closed with caps or plugs until connections are made. Equipment shall be securely covered for protection against physical or chemical damage. In areas exposed to weather, materials unused at the end of each day's work shall be stored in weather-protected locations. Damage to materials or equipment due to the Contractor's neglect shall be repaired or replaced to the satisfaction of the Contracting Officer by, and at the expense of, the Contractor. Trenches and excavations shall be properly shored, protected and covered if left open.

### 3.06 PROGRESS OF WORK AND COORDINATION

- A. The work shall be coordinated with the work of other contractors and other trades to avoid interferences, preserve headroom and operating clearances, and to expedite completion of the project.

### 3.07 INSTALLATION OF EQUIPMENT

- A. Installation and adjustments shall be in accordance with the equipment supplier's written instructions. All accessories required shall be properly installed and

connected. Supports shall be adequately anchored and vibration isolation shall be installed where required.

### 3.08 PERMITS, LICENSES AND INSPECTIONS

- A. The Contractor shall obtain all permits and licenses required to perform the work, pay all required fees, and shall cooperate with all inspections required by authorities having jurisdiction. Inspections specified in DIVISION 15 - MECHANICAL shall be permitted without interference. Corrections to work as a result of inspections shall be made promptly.

### 3.09 PAINTING

- A. The Contractor shall be responsible for complete coverage in painting all exposed surfaces that have not been factory finished coated. Painting shall be in accordance with SECTION 09990 - PAINTING AND FINISHING as applicable for exposed surfaces.
- B. The Contractor shall patch and touch-up paint all surfaces damaged and/or disturbed due to Contractor's operations. All patching and touch-up painting shall match existing surrounding surfaces.

### 3.10 LOCAL TECHNICAL SUPPORT

- A. The mechanical equipment supplier shall have an office in the State of Hawaii, staffed with factory trained representatives fully capable of providing instruction on routine and emergency maintenance service on all system components supplied for this project.

### 3.11 FIELD TESTS

- A. The Contractor shall be responsible for testing of the installed work, shall provide all labor, equipment and instruments, and shall conduct pressure tests and operating tests on the piping systems and equipment. During pressure tests, all items in piping systems not designed for test pressures shall be removed from or isolated from the system and shall be reconnected or unblocked after tests are completed. Should operating tests require the presence of manufacturer's representatives, the Contractor shall cooperate with them and shall place at their disposal all assistance, materials and services required to perform such tests. Testing shall be as specified hereinafter.

### 3.12 TESTING AND BALANCING

- A. Prior Tests: Leave concealed and insulated work uncovered until required tests have been completed, but if construction schedule requires it, arrange for prior tests on parts of system as approved.
- B. Preliminary Tests: As soon as conditions permit, conduct preliminary or "turn-over" tests of certain equipment as directed to ascertain compliance with specified requirements. Make needed changes, adjustments or replacements as preliminary tests may indicate, prior to acceptance tests.

- C. Acceptance Tests: Conduct pressure, performance and operating tests as specified for each system or equipment unit, in the presence of the Contracting Officer or other accredited representative of the State, as well as representatives of agencies having jurisdiction.
- D. Costs: Furnish labor, materials, instruments and bear costs in connection with all tests. Installed instruments may not be used for tests.
- E. Defects: All defects disclosed as a result of the following or other tests or operations shall be promptly repaired by and at the expense of the Contractor and to the Contracting Officer's satisfaction. Contractor shall supply all instruments, labor and tools required by tests. Any defective material, equipment and/or work shall be repaired, adjusted or replaced by new, like materials and equipment, and retested/reinspected before acceptance. Caulking of screwed joints or holes will not be accepted.
- F. Certificates: Obtain certificates of approval, acceptance and compliance with regulations of agencies having jurisdiction. Work shall not be deemed complete until such certificates have been delivered to the Contracting Officer.
- G. Instructing Operating Personnel: When equipment have been placed in permanent operation, instruct operating personnel in operation and maintenance of equipment. Instruction shall include all normal operations of the system, troubleshooting, review of the Operation and Maintenance Manual and how to obtain replacement parts. Instruction shall also include answering all questions posed by staff.
- H. Pressure Tests: Before testing piped systems, remove, or otherwise protect from damage, control devices, air vents and other parts, which are not designed to stand pressures used in testing piping.
- I. Hydrostatically test piping for all services to one and one-half times the maximum working pressure, but in no case to less than 50 psi, for at least four (4) consecutive hours, during which time pressure shall remain constant without pumping.
- J. Do not paint, cover or conceal piping, nor connect fixtures or equipment before testing and obtaining approval.
- K. Test piping that will be concealed, in sections as approved. Perform tests in a manner that will not leave any pipe or joint untested.
- L. Testing procedures and conditions stated above shall also apply to all of the following tests:
  - 1. Plumbing Systems Test.
  - 2. Ventilating System Test and Balancing.
  - 3. Operating Test.

### 3.13 PLUMBING SYSTEMS TEST

- A. Test plumbing work as specified herein and according to local Code Regulations. Latter shall govern if they conflict with former. Provide test pump, gauges, meters, instruments, materials, and labor in connection with tests. Check and test gauges, thermometers, meters and instruments after their installation to assure accurate operations.
- B. Clean piping, equipment and specialties before testing.
- C. Water-Supply System Pressure Test: Service pipe shall be subjected to water test under pressure and for duration as directed by agency having jurisdiction. Conduct tests when the roughing-in is completed and before insulation is applied and fixtures are set. Water piping system shall be tested at a hydrostatic pressure of not less than one hundred twenty (120) pounds per square inch gage, and proved tight at this pressure for not less than thirty (30) minutes in order to permit inspection of all joints. Where a portion of the water piping system is to be concealed before completion, this portion shall be tested separately as specified for the entire system. Test water-supply system piping in accordance with the Plumbing Code.
- D. Drainage System Pressure Test: Drainage and venting system piping shall be tested with water or air before concealing, backfilling and installation of fixtures. Water test shall be applied to the drainage and venting system either in its entirety or in sections. If the entire system is tested, all openings in the pipes shall be tightly closed except the highest opening, and the system shall be filled with water to point of over-flow. If the system is tested in sections, all openings except the highest opening of the section under test shall be tightly plugged and each section shall be filled with water and tested with at least a ten (10) foot head of water. After the plumbing fixtures have been set and their traps filled with water, the entire drainage and venting system shall be submitted for a final test with smoke or peppermint.
- E. Make adjustments, repairs, and alterations, as required to meet specified test results. Correct defects disclosed by tests or inspections. In case of pipe defect, replace with same length as defective piece. Repeat tests after defects have been corrected and parts replaced, as directed until pronounced satisfactory.

### 3.14 VENTILATING SYSTEM TEST AND BALANCING

- A. Test work as specified herein and according to local Code Regulations. Latter shall govern if they conflict with former. Provide test pump, gauges, meters, instruments, materials, and labor in connection with tests. Check and test gauges, thermometers, and instruments after their installation.
- B. The completed work shall be tested, adjusted and balanced to meet design requirements as indicated on the drawings and as specified herein. Inside of all ducts shall be blown clean before being placed in operation.
- C. Two (2) weeks before the expected completion date, the Contractor shall put all exhausting systems and equipment into operation and shall continue operation of same during each working day until all adjusting, balancing, testing and cleaning of system have been completed.

- D. Preparation for System Balancing:
    - 1. Contractor shall adjust damper settings to obtain the required air volumes.
    - 2. All fans shall be initially started, lubricated and balanced to eliminate noise and vibration.
  - E. System Balancing: See SECTION 15950 - HVAC TESTING, ADJUSTING AND BALANCING.
  - F. Test and Balance Procedure for Air: Measure air volumes by means of the pitot tube or velometer method.
- 3.15 OPERATING TEST
- A. After installation work has been completed, tested and approved, test equipment and fixtures under normal operating conditions for periods as directed to check capacities and other details as required demonstrating that they fulfill requirements of the plans and specifications, and that they operate satisfactorily.
  - B. Where evidence of stoppage appears in piping, fixtures or equipment, disconnect, clean, repair, and reconnect obstructed parts. Contractor shall bear costs of cutting, patching adjoining work necessitated by such cleaning and repairing.

END OF SECTION

## ATTACHMENT NO. 1 - SCHEDULE OF MAINTENANCE SERVICE

### PART 1 - EQUIPMENT MAINTENANCE

#### 1.01 SUMMARY

- A. All services performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance tasks; Contractor shall also be responsible for performing all maintenance tasks recommended by the equipment manufacturer(s) whether listed below or not.

#### 1.02 FANS

##### A. Quarterly Service:

1. Check back-draft dampers for proper operation; lubricate linkages for free movement.
2. Lubricate fan motors and bearings.
3. Check fan collar, bearings and shaft for wear, repair as needed.
4. Certify performance of quarterly fan maintenance service. Correct and report all discrepancies.

##### B. Semi-Annual Service:

1. Check and clean fan wheels and housings of dust, dirt and grease.
2. Remove and wash all intake grilles and dampers and repair or replace deteriorated bird screens.
3. Examine flex connections for cracks or leaks. Repair or replace damaged material.
4. Certify performance of semi-annual fan maintenance service. Correct and report all discrepancies.

##### C. Annual Service:

1. Submit maintenance report in writing to the Contract Administrator.

#### 1.03 ELECTRIC WATER HEATERS

##### A. Quarterly Service:

1. Service water heater per manufacturer's recommendations.
2. Drain off a gallon of water from the water heater to remove silt and sediment.
3. Certify performance of quarterly electric water heater maintenance service. Correct and report all discrepancies.

B. Semi-Annual Service:

1. Service water heater per manufacturer's recommendations.
2. Check the seal around the heating elements for leaks. Repair/replace seals if leaks are identified.
3. Certify performance of semi-annual electric water heater maintenance service. Correct and report all discrepancies.

C. Annual Service:

1. Service water heater per manufacturer's recommendations.
2. Check the operation of the thermostat.
3. Check the combination temperature and pressure relief valve to ensure that the valve has not become encrusted with lime.
4. Inspect and clean the interior of the tank.
5. Inspect anode rod.
6. Certify performance of annual electric water heater maintenance service. Correct and report all discrepancies. Submit maintenance report in writing to the Contract Administrator.

1.04 EXPANSION TANK

A. Annual Service:

1. Service expansion tank per manufacturer's recommendations.
2. Check the expansion tank for proper air charging.
3. Certify performance of annual expansion tank maintenance service. Correct and report all discrepancies. Submit maintenance report in writing to the Contract Administrator.

PART 2 - MAINTENANCE SCHEDULE AND REPORTING

2.01 WORK SCHEDULE

- A. All maintenance work shall be performed between the hours of 7:30 a.m. and 4:00 p.m. on normal working days, Monday through Friday, excluding State Holidays.

2.02 TROUBLE CALLS

- A. Emergency service and repairs required between regular service calls shall be rendered within 24 hours after the Contractor is notified, State non-work days

excluded. The Contractor shall call the Facility representative the next working day after being notified of a problem and report the status of repairs.

## 2.03 MAINTENANCE REPORT/CHECKLIST

- A. The Contractor shall prepare and maintain a maintenance service report/checklist, which shall include the following:
1. Date maintenance service was performed.
  2. Type of maintenance performed (i.e., monthly, quarterly, semi-annual, annual).
  3. The name of the mechanic who performed said maintenance.
  4. The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.
  5. Documents and other data pertaining to the maintenance performed:
    - a. It shall be the responsibility of the Contractor to maintain the report/checklist by recording the above noted data after each scheduled maintenance and emergency repair and have the checklist available for inspection at the building site. The report shall be sufficiently detailed to properly reflect the past maintenance history of the equipment.
    - b. Reports shall be certified with a signature by a representative of the Facility being served and shall be submitted to the Facility monthly or at the completion of the service trouble call, whichever occurs first.

## 2.04 CLEANUP AND WORK PRACTICES

- A. The Contractor shall keep the job site free of debris, litter, discarded parts, etc. and shall clean all oil drippings during the daily progress of work. The Contractor shall remove all tools, parts and equipment from the service areas upon completion of the work.
- B. The Contractor shall exercise caution during the progress of his maintenance and repair work to prevent damage to roof, roofing, or other existing building elements and equipment. The Contractor shall restore all damages, caused by his negligence, to its original condition at his own expense.

END OF ATTACHMENT

## SECTION 15400

### PLUMBING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. This Section covers the following items:

1. Furnishing, installing and testing of plumbing systems within the building to a point five (5) feet from the building.
2. Water, waste and vent piping within the building to a point five (5) feet from the building.
3. Water heating system.
4. Plumbing fixtures and trim.

##### 1.02 GENERAL REQUIREMENTS

- A. Existing conditions, materials, sizes and dimensions shown on these drawings represent information obtained from existing drawings and field investigations. Prospective bidders shall visit the premises and familiarize themselves with all work details and conditions before submitting a bid. Reasonable modifications to indicated arrangements to suit actual conditions shall not constitute a basis for requesting additional funds from the State.
- B. Provide all necessary labor, delegated design, materials, operations, equipment, tools and techniques required to furnish and install complete the plumbing work as and within the limits indicated.
- C. Prior to ordering materials and equipment, the Contractor shall field verify all existing conditions, materials, sizes and dimensions that affect their work, and shall coordinate their work with all trades involved.
- D. Submit written request for interruption of the existing plumbing system not less than seven (7) days prior to the time for which the interruption is requested.
- E. Obtain all permits and pay the costs thereof. Arrange for inspections in sufficient time to avoid delay to the project. Provide copies of inspection reports, test reports and disinfection certificates.
- F. Inform Contracting Officer of testing date a minimum of seven (7) days prior to testing system and closing in walls and/or trenches.

##### 1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. SECTION 01300 - SUBMITTALS.

- B. SECTION 07900 - JOINT SEALANTS.
- C. SECTION 09990 - PAINTING AND FINISHING.
- D. SECTION 15011 - GENERAL MECHANICAL PROVISIONS.
- E. SECTION 15950 - HVAC TESTING, ADJUSTING AND BALANCING.
- F. DIVISION 16 - ELECTRICAL.

1.04 LAWS, RULES, REGULATIONS AND REFERENCES

A. The entire installation shall comply with the latest applicable laws, codes, rules and regulations of the State of Hawaii, the City and County of Honolulu, and any other applicable laws, codes, rules and regulations whether or not specifically mentioned hereinafter.

B. Codes:

1. Building Code, State of Hawaii and City and County of Honolulu.
2. Energy Code, State of Hawaii and City and County of Honolulu.
3. Plumbing Code, State of Hawaii and City and County of Honolulu.
4. Electrical Code, State of Hawaii and City and County of Honolulu.
5. Fire Code, State of Hawaii and City and County of Honolulu.
6. Wastewater Management Regulations, County.
7. Water System Standards, 2002 as amended.
8. Americans With Disabilities Act Accessibility Guidelines (ADAAG), 36 CFR Part 1191.

C. References:

1. American National Standards Institute (ANSI) Publications:
  - a. Z21.22-15(R2020) Relief Valves for Hot Water Supply Systems
2. American Society for Testing and Materials (ASTM) Publications:
  - a. B32-20 Standard Specification for Solder Metal
  - b. B88-22 Standard Specification for Seamless Copper Water Tube
  - c. C591-22 Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation

- d. D2665-25 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
  - e. E84-24 Standard Test Method for Surface Burning Characteristics of Building Materials
  - f. F891-24 Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core
3. American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) Publications:
    - a. 90.1-22 Energy Standard for Buildings Except Low-Rise Residential Buildings
  4. American Society of Mechanical Engineers (ASME) Publications:
    - a. B16.18-21 Cast Copper Alloy Solder Joint Pressure Fittings
    - b. B16.22-21 Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings
    - c. B16.23-21 Cast Copper Alloy Solder Joint Drainage Fittings: DWV
    - d. B16.26-24 Cast Copper Alloy Fittings for Flared Copper Tubes
  5. American Welding Society (AWS) Publications:
    - a. A5.8-19 Specification for Filler Metals for Brazing and Braze Welding
  6. American Water Works Association (AWWA) Publications:
    - a. C105-18 Polyethylene Encasement for Ductile-Iron Pipe Systems
  7. Manufacturers Standardization Society (MSS) Publications:
    - a. SP 58-25 Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation
    - b. SP 110-10 Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
  8. NSF International (NSF) Publications:
    - a. 61-24 Drinking Water Treatment Chemicals - Health Effects
    - b. 372-22 Drinking Water System Components - Lead Content
  9. Plumbing and Drainage Institute (PDI) Publications:
    - a. WH 201-2017 Water Hammer Arresters Standard

10. Underwriters Laboratories, Inc. (UL) Publications:

- a. UL 174-04(R2025) Standard for Household Electric Storage Tank Water Heaters

1.05 SUBMITTALS

A. General: The Contractor shall submit submittals in accordance with SECTION 01300 – SUBMITTALS and SECTION 15011 - GENERAL MECHANICAL PROVISIONS.

B. Shop Drawings: The Contractor shall submit shop drawings showing the entire work with inverts, sleeves, penetrations, and dimensions. Contractor shall field verify and check project and reference drawings to avoid interferences with structural features and with work of other trades. No plumbing or piping work shall commence until such plans have been approved and accepted by the Contracting Officer. Any deviations from the shop drawings shall require approval by the Contracting Officer.

C. Submit the following:

1. Manufacturer's product data.
2. Shop drawings.
3. SDS.
4. Test reports.
5. As-Built drawings.
6. Certificates.
7. One-Year Guarantee and Maintenance Service Contract.
8. Operation and Maintenance Manual.
9. Warranty: Submit warranty as noted under item entitled "WARRANTY" hereinbelow.

1.06 PLUMBING EQUIPMENT MANUFACTURER'S REPRESENTATIVE AND SERVICE CAPABILITIES

A. Furnish the services of a manufacturer's representative who is factory authorized and trained to perform the services specified. Manufacturer's representative shall have an office in the State of Hawaii unless Manufacturer has no representatives with an office in the State of Hawaii. The manufacturer's representative shall furnish recommendations and shall be on-site to provide assistance on the following matters:

1. Technical direction of the erection including disassembly and reassembly if required, alignment and testing.

2. Starting equipment and furnishing instructions as to its proper care, operation and maintenance.

#### 1.07 ELECTRICAL WORK

- A. Voltage Protection: Voltage protection shall be an in-line monitor made for use with equipment that protects high and low voltage conditions. Three-phase monitors shall also protect against voltage unbalance, phase loss, phase reversal and incorrect sequencing. Equipment voltage range shall fall within the monitor's specified input voltage. Voltage protection may be integral to the equipment or external and furnished as indicated on the drawings.

#### 1.08 WARRANTY

- A. Water Heater Manufacturer's Warranty (6-year).
- B. Warranty Provisions: The warranty provisions and number of years for the warranties required in this Section shall take precedence over the standard provisions in the GENERAL CONDITIONS and SECTION 15011 - GENERAL MECHANICAL PROVISIONS. The Surety and the Contractor shall not be held liable beyond 2 years from Project Acceptance Date. Manufacturer's warranties shall commence no earlier than the respective equipment's startup date.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS AND EQUIPMENT

- A. Plumbing equipment to be considered for bid purposes shall be from a manufacturer that has locally stocked spare parts, representation, and support of a factory authorized service organization within 500 miles of the site of installation who has serviced manufacturer's units of comparable type, size and capacity as those specified herein. The manufacturer must have other units of comparable type, size and capacity installed and operating satisfactorily in the State of Hawaii for a minimum of two (2) years prior to bid opening.

#### 2.02 SOIL, WASTE, DRAIN AND VENT PIPING, BURIED

- A. Copper Tube (Trap Primer Pipe): ASTM B88, Type K with ASME B16.23 cast copper or wrought copper fittings. Provide AWS A5.8, BCup-5 copper phosphorous alloy brazed joints.
- B. PVC Pipe: ASTM D2665 or ASTM F891 with solvent weld joints.

#### 2.03 SOIL, WASTE, DRAIN AND VENT PIPING, ABOVE GRADE

- A. Copper Tube (Trap Primer Pipe): ASTM B88, Type L with ASME B16.23 cast copper or wrought copper fittings. Provide ASTM B32, 95-5 tin-antimony solder joints.
- B. PVC Pipe: ASTM D2665 or ASTM F891 with solvent weld joints.

## 2.04 WATER PIPING, BURIED

- A. Copper Tube: ASTM B88, NSF 61, Type K, annealed with ASME B16.18 or ASME B16.22 solder joint copper fittings. Provide ASTM B32, 95-5 tin-antimony lead free solder joints.

## 2.05 WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88, NSF 61, Type L, hard drawn, with ASME B16.18 or ASME B16.22 solder joint, ASME B16.26 flared joint. Joints shall be ASTM B32, 95-5 tin-antimony lead free solder joints.

## 2.06 POLYETHYLENE ENCASEMENT

- A. Polyethylene encasement shall be AWWA C105 polyethylene tube or sheet.

## 2.07 FLANGES, UNIONS, AND COUPLINGS

- A. Pipe Size 2-Inches and Under: Malleable iron unions for threaded ferrous pipe joints; bronze unions for soldered copper pipe joints.
- B. Dielectric Connection: Union, with galvanized or plated steel threaded end and copper solder end, with water impervious isolation barrier. Epco model FX or approved equal. Flange, with full faced isolation gasket and bolt sleeves. Watts or approved equal.

## 2.08 BALL VALVES

- A. Up to 2-Inches: Two piece silicon bronze body, 600 psi nonshock cold working pressure, 100 psi at 300 degrees F maximum pressure/temperature, full port, stainless steel ball, stainless steel trim, Teflon seats and stuffing box ring, blowout-proof stems, Type 304 stainless steel lever handle, solder, threaded or press fit ends. Valves shall comply with MSS SP-110.

## 2.09 RELIEF VALVES

- A. Temperature and Pressure Relief Valve: Bronze body, automatic, ASME boiler and pressure vessel code and ANSI Z21.22 certified. BTU discharge of the device shall be in excess of the BTU input rating of the heater. Set pressure rating to 125 psi.
- B. Vacuum Breaker Valve: Brass body, automatic, ANSI Z21.22 rated, and furnished with protective cap. Watts N36-M1 or approved equal.

## 2.10 FLEXIBLE PIPE CONNECTIONS

- A. Flexible pipe connections or couplings shall be installed on piping connected to equipment, where indicated on the drawings. Flexible section may be constructed of rubber, tetrafluoroethylene resin, or corrosion-resisting steel, bronze, or monel. The material used and the configuration shall be suitable for pressure, vacuum, temperature and circulation medium. The flexible section may have threaded, soldered, flanged or socket ends and shall be suitable for service intended. The flexible section may be reinforced with metal retaining rings with built-in

reinforcement and restriction bolts or with wire braid cover suitable for the service intended. Flanged assemblies shall be equipped with limit bolts to restrict maximum travel to within limits standard with the manufacturer. The length of the flexible connectors shall be as recommended by the manufacturer for service intended. Internal sleeves or liners shall be provided when recommended by the manufacturer suitable for the circulating medium. Covers to protect the bellows shall be provided when indicated on the drawings. Flexible connectors shall be designed for 125 psi service appropriate for the static head plus the pumping head, and 250 degrees F.

#### 2.11 WATER HAMMER ARRESTORS

- A. PDI WH-201 precharged suitable for operation in temperature range 40 to 180 degrees F and minimum 150 psig working pressure.

#### 2.12 PIPE INSULATION

- A. All material shall be applied in accordance with manufacturer's recommendations by skilled mechanics. Vapor-proof cover where required and insulation shall have a maximum flame spread rating of 25 and a maximum smoke development rating of 50 in conformance with ASTM E84.
- B. Pipe insulation for hot water supply piping shall be fiberglass preformed pipe insulation. Owens-Corning Fiberglass heavy density sectional pipe insulation having a factory applied dual-temp vapor barrier jacket with pre-sized glass cloth cover. Insulation shall have a maximum "K" factor of 0.27 BTU-IN/SF-HR-degrees F at 75 degrees F mean. Vapor barrier shall have a maximum film permeance of 0.03 perms. Insulation thickness shall be a minimum of 1 inch for pipe diameters less than 1-1/2 inches, and 1-1/2 inches for pipe diameters 1-1/2 inches and over.
- C. Rigid insulation shall be rigid cellular polyisocyanurate and meet the requirements of ASTM C591. Maximum thermal conductivity shall be 0.19 BTU-IN/SF-HR-degrees F at 75 degrees mean. Vapor barrier shall have a maximum film permeance of 0.03 perms. Dow Chemical Company Trymer or approved equal. Cellular glass may be substituted in lieu of cellular polyisocyanurate.
- D. Aluminum Jacket: Aluminum sheet metal jacket, minimum 0.016 inches thick, fabricated neatly and secured to insulation with 1/2-inch aluminum bands and wing seals.

#### 2.13 PLUMBING FIXTURES

- A. All exposed piping at fixtures and equipment shall be chrome plated.
- B. Furnish all traps, stop valves, escutcheons, tail pieces, trap arms and other items as required for installation and connection of fixtures and equipment furnished under this or other sections. Coordinate with other trades and disciplines as required.
- C. For each item specified, products of one manufacturer are identified to establish a standard of comparison. Products of other manufacturers will be considered if submitted for approval.
- D. Installation of accessible fixtures and equipment shall conform to ADAAG.

E. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Maximum allowable force shall be 5 pounds per ADAAG 309.4.

F. Fixtures List:

1. Water Closet, Accessible (WC-1) shall be vitreous china, elongated, floor mounted, top spud type with white solid plastic open front seat less cover and self sustaining hinge with check. Provide flush valve with vacuum breaker, bolt caps, and adjustable fixture support. All exposed metal parts shall be chrome-plated brass. Fixture shall discharge not more than 1.28 gallons per flush. Water closet installation shall comply with ADAAG 604. Flush controls shall be on open-side per ADAAG 604.6.

<u>Item</u>	<u>Manufacturer</u>	<u>Model</u>
fixture	Kohler	K-96057
flush valve	Sloan	111-1.28-SG
seat	Beneke	523SS

2. Lavatory, Accessible (L-1) shall be vitreous china, wall hung type, approximate size 20-3/4 inches by 18-1/4 inches, with overflow. Faucet shall be fixed spout with grid drain, metering pillar tap type with automatic shutoff. Provide trap with arm to wall with flange, 1/4 turn compression angle ball stop, braided connector, and concealed carrier. Provide flow control to limit discharge to not more than 0.5 gallons per minute. All exposed metal parts shall be chrome plated. Lavatory installation shall comply with ADAAG 606.3 clear space. Lavatory faucet shall remain open for 10 seconds per ADAAG 606.4.

<u>Item</u>	<u>Manufacturer</u>	<u>Model</u>
fixture	Kohler	K-2032
faucet	American Standard	1340.119
supplies	Brasscraft	KT Series
carrier	Zurn	Z1231
covers	Truebro	102/105K

3. Shower, Accessible (SH-1) shall be trim only for stall shower. Shower valve shall be a pressure-balanced type with chrome plated trim. Provide personal shower with pause mode and non-positive shutoff features and chrome plated 28-inch slide bar. Provide concealed stops on hot and cold water supply. Provide flow control on shower arm to limit flow to not more than 2.5 gallons per minute. All exposed metal parts shall be chrome-plated brass.

<u>Item</u>	<u>Manufacturer</u>	<u>Model</u>
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valve	Kohler	K-8304-KS
trim	Kohler	K-TS6913-4
personal shower	Kohler	K-22178-G
vacuum breaker	Kohler	K-9660
elbow supply	Kohler	K-9664

4. Floor Drain, (FD-1) shall be cast iron with flashing ring and clamping device, flat round polished strainer fastened with screws, adjustable top, and no-hub outlet.

<u>Item</u>	<u>Manufacturer</u>	<u>Model</u>
floor drain	Jay R. Smith	2005Y(A)-PB

5. Trap Primer, (TP-1) shall be brass construction with vacuum breaker ports. Provide wall access panel for trap primer located in wall.

<u>Item</u>	<u>Manufacturer</u>	<u>Model</u>
trap primer	Precision Plumbing Products	PR-500

6. Interior Hose Bibb, (HB-1) shall be chrome-plated brass, wall mounted, 3/4-inch hose thread outlet, 3/4-inch flanged inlet, equipped with non-removal type vacuum breaker, and concealed loose key stop.

7. Mop Sink (MS-1) shall be floor mounted, 24 inches by 20 inches, 16-gauge type 304 stainless steel with stainless steel skirt, 2-inch grid strainer, 2-inch brass no-caulk drain and backsplash mounted rough chrome plated brass threaded hose faucet with stops, pail hook, and integral vacuum breaker.

<u>Item</u>	<u>Manufacturer</u>	<u>Model</u>
fixture	Elkay	FLR-1X
faucet	T&S	B-0665-BSTR

8. Residential electric water heaters (UL 174, ASHRAE 90.1) with double heating element, glass-lined steel tank, high efficiency type thermally insulated with insulation, corrosion-resistant steel jacket, baked on enamel finish, replaceable anodes, with adjustable range thermostat to allow hot water settings between 110 and 180 degrees F. Capacity shall be 55 gallons rated storage, 4,500 watt input 21 gallons per hour recovery at 90 degrees F temperature rise, and 150 psi maximum working pressure. Furnish with vacuum relief valve and temperature relief valve, Watts or approved equal. Provide drain pan with drain piped to exterior.

## 2.14 CLEANOUTS

- A. Floor cleanouts shall be cast iron floor cleanout with gasket seal bronze plug, polished bronze or nickel bronze rim and scoriated floor plate with "CO" cast in the plate. Secure floor plate with countersunk screws for installation flush with finished floor.
- B. Wall cleanouts shall have threaded brass countersunk cleanout plug. Cleanout shall be furnished with polished stainless steel or chromium plated bronze cover plate secured to cleanout plug with countersunk screw.
- C. Cleanouts exterior to buildings in paved and concrete areas shall be PVC cleanouts with round flanged housing, heavy duty secured scoriated cast iron cover with lifting device, and PVC plug. Provide 24 by 24 inch concrete slab with cleanout located in center of slab. Slab thickness indicated on drawings.

## 2.15 EXPANSION TANK

- A. Expansion tank shall be welded steel, constructed, tested and stamped in accordance with ASME BPV VIII Division 1 for a working pressure of 125 psig at 200 degrees F and precharged to the minimum operating pressure. Expansion tank shall have a replaceable heavy duty butyl compound bladder and be the captive air type. Tank shall accommodate expanded water of the system generated within the normal operating temperature range, limiting this pressure increase at all components in the system to the maximum allowable pressure at those components. Each tank air chamber shall be fitted with an air charging valve. Tank shall be supported by steel legs or bases for vertical installation. The only air in the system shall be the permanent sealed-in air cushion contained within the expansion tank. Furnish tank with sight glass and seismic restraints.

## 2.16 PIPING IDENTIFICATION AND WARNING

- A. Aboveground Piping: For pipes 3/4 inch OD and larger, provide printed legends to identify contents of pipes and arrows to show direction of flow. Color code label backgrounds to signify levels of hazard. Make labels of plastic sheet with pressure-sensitive adhesive suitable for the intended application. For pipes smaller than 3/4 inch OD, provide brass identification tags 1-1/2 inches in diameter with legends in depressed black-filled characters.
- B. Buried Piping: Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility line. Provide tape in rolls, 6-inches minimum width, color coded as stated below for the intended utility with warning and identification imprinted in bold black letters continuously and repeatedly over the entire tape length. Warning and identification to read, "CAUTION BURIED (intended service) LINE BELOW" or similar wording. Color and printing are to be permanent, unaffected by moisture or soil.

### Warning Tape Color Code [APWA Color Code]

Blue: Potable water.  
Green: Sewer and drain lines.

## 2.17 MISCELLANEOUS METALS

- A. Interior Installation: Preformed slotted channel system components used in supports and brackets shall be Unistrut Corporation P1000 or approved equal, with Unistrut Defender coating or approved equal.
- B. Exterior and Interior Exposed Installation: Preformed slotted channel system components used in supports and brackets shall be Type 316 stainless steel, Unistrut Corporation or approved equal.

## PART 3 - EXECUTION

### 3.01 WORKMANSHIP

- A. Comply with the latest applicable laws, codes, rules and regulations of the State of Hawaii and the City and County of Honolulu.
- B. Defective work or materials shall be removed by the Contractor and corrected without extra compensation.
- C. Field verify existing conditions by investigation and measurement at the project site before commencing with construction.

### 3.02 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside of piping and materials before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- D. Coordinate cutting or forming of roof or floor construction to receive drains to required invert elevations.
- E. Review millwork shop drawings. Verify location and size of fixtures and openings before rough-in and installation.
- F. Verify adjacent construction is ready to receive rough-in work of this Section.
- G. Locate existing water and sewer lines and proposed points of connection thereto, and verify that the lines can be connected to the existing piping. Connect new piping to existing laterals approximately where indicated.

### 3.03 INSTALLATION

- A. Install all plumbing work in accordance with the manufacturer's instructions and as indicated and as specified herein. Furnish delegated design services when recommended by manufacturer's instructions. Arrange for access to the site by written request submitted not less than seven (7) days prior to the time at which

access is requested. Coordinate installation with other trades so as to eliminate or avoid conflicts and delays to the progress of the work.

- B. Installation of plumbing systems including fixtures, equipment, materials and workmanship shall be in accordance with the Plumbing Code.
- C. Review manufacturer's rough-in sketches to verify pipe connection sizes and locations of all fixtures and equipment. Make final connection to all equipment furnished and/or installed under other sections.
- D. Provide traps, tailpieces, stops, escutcheons and all other items required to complete installation. Install items furnished under other sections but specified for installation under this Section.
- E. Completely encase buried copper water piping with polyethylene tube or sheet in accordance with AWWA C105.
- F. Provide non-conducting dielectric connections when joining dissimilar metals.
- G. Plastic piping shall not penetrate fire walls or fire floors and shall not be used closer than 6-inches to the penetration.
- H. Install piping to conserve building space and not interfere with use of space. Group piping whenever practical at common elevations.
- I. Install piping to allow for expansion and contraction without stressing pipes, joints, or connected equipment.
- J. Provide clearance for installation of insulation and access to valves and fittings.
- K. Slope water piping and arrange to drain at low points.
- L. Install bell and spigot pipe with bell end upstream.
- M. Install specialties in accordance with manufacturer's instructions.
- N. Extend cleanouts to be flush with finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- O. Install water hammer arrestors complete with accessible isolation valve.
- P. Install each fixture with chrome plated rigid or flexible supplies with screwdriver stops, reducers, and escutcheons.
- Q. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
- R. Install water heaters in accordance with manufacturer's instructions and to NSF and UL requirements. Coordinate with plumbing piping and related electrical work to achieve operating system.

- S. Install valves with stems above horizontal.
- T. Have piping treated, inspected and approved before it is furred in, buried or otherwise hidden.
- U. Slope soil, waste and drain lines at 1/4-inch per foot unless otherwise indicated.
- V. Vent pipes shall be sloped to expel water.
- W. Escutcheons: Shall be installed around all exposed pipe passing through a finished floor, wall or ceiling. Escutcheons shall be of sufficient outside diameter to cover the sleeve opening, shall fit snugly around the pipe and shall be furnished with set screws.
- X. Excavation, Backfill and Concrete Work: All excavation and backfill in connection with plumbing work shall be accomplished in accordance with the Plumbing Code. Provide proper support along the pipe length and where rocks are encountered, provide a minimum of 3-inches of backfill properly tamped for pipe. Pipes shall be buried a minimum of 12-inches below and 3-feet horizontally from all footings.
- Y. Hose Bibbs: Hose bibbs shall be installed 18-inches above grade or floor unless otherwise indicated. Locate a service cock on the hose bibb supply, 6-inches above grade, on exterior hose bibbs only.
- Z. Identification of Piping:
  - 1. Buried Piping: Install warning tape a minimum of 6-inches above buried piping continuously along its entire length.

#### 3.04 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- C. Install ball valves for shut-off and to isolate equipment or part of systems.
- D. Install ball valves for throttling, bypass, or manual flow control services.
- E. Provide access panels for indirect waste receptors, trap primers and water hammer arrestors.
- F. Provide fire stop material for pipe thru fire rated walls and slabs.
- G. PVC and ABS pipe shall not be used in fire rated plenums.

#### 3.05 PIPE PENETRATIONS

- A. Provide not less than 0.25-inch space between exterior of pipe or pipe insulation and interior of penetration. Firmly pack space with an approved fire stop material in rated walls, floors and partitions, and install in accordance with the manufacturer's recommendations. Space between exterior of pipe or pipe insulation and interior of

penetration (both ends) shall be sealed in accordance with SECTION 07900 - JOINT SEALANTS.

- B. No cutting or drilling of any structural members will be permitted without the approval of the Contracting Officer.

### 3.06 PIPE INSULATION

- A. General: Install insulation, vapor barrier and jacketing per manufacturer's recommendations.
- B. All insulation shall be tightly butted and free of voids and gaps. Vapor barrier shall be continuous.
- C. Staples, rivets, screws and other fasteners capable of penetrating the vapor barrier shall not be used.
- D. Insulated pipe exposed to weather and open air shall be protected by an aluminum jacket and flashing sealant. Jacket shall have side and end laps at least 2-inches wide with the cut edge of the side lap turned under 1-inch to provide a smooth edge. Place laps to shed water. Seal lapped joints, insulation terminations and protrusions with flashing sealant. Secure jacket in place with aluminum or stainless-steel bands on 9-inch centers. Where pipes penetrate walls, continue insulation and the metal jacket through the penetration to a point 2-inches beyond the interior surface of the walls. Paint to match adjacent.
- E. Use high compressive strength insulation and insulation shields on bottom sections of pipe at supports.
- F. Insulate all hot water supply piping.

### 3.07 PLUMBING FIXTURES

- A. Furnish, install and properly connect all plumbing fixtures and fittings and/or trims herein specified.
- B. Setting of all fixtures shall be done in an approved workmanlike manner. Special attention shall be exercised to the fixture heights, especially for lavatories. See architectural drawings and elevations for mounting location and height. Joints between fixtures and wall shall be neatly pointed up with plaster of paris.
- C. Fastenings: Where trimmings and fixtures are secured to concrete, they shall be fastened with 1/4-inch minimum brass machine screw type expansion bolts sufficiently long to ensure that the shield shall be wholly within sound concrete. Where trimmings and fixtures are to be mounted on concrete block, each fixture shall have the proper cast iron fixture bracket set anchored to the masonry wall with 1/4-inch diameter toggle bolts. Where fixtures are mounted on metal stud walls, provide 1/4-inch x 5-inch steel backing plates, spot welded to at least 2 studs. All exposed bolt heads and nuts shall be chrome plated hexagon brass with round tops. All escutcheons on walls and floors shall be chrome plated cast brass with chrome plated set screws.

- D. No wood grounds shall be used for supports of plumbing fixtures.
- E. Accessible Fixture Installation: Fixture location and pipe installation shall maintain all heights and clearances in accordance ADAAG.

3.08 PIPE/EQUIPMENT SUPPORTS, HANGERS AND INSERTS

- A. Provide all necessary design, calculations, labor, materials, operations, equipment, tools and techniques required to furnish and install complete the pipe/equipment supports, hangers and inserts work.
- B. Install hangers and supports for all piping to provide for expansion and contraction, prevent vibration and maintain required grading by proper adjustment.
- C. Field verify type of construction from which piping and/or equipment is to be suspended/supported.
- D. Support horizontal overhead pipes with clevis hangers, adjustable turnbuckle, rods, inserts, clamps, on suspension suitable for type of building construction. Trapeze hangers may be used where multiple pipes are grouped. Pipe hangers and supports shall conform to MSS SP-58.
- E. Support horizontal pipes that are close to floor with pipe rest and floor flange or pipe roll stand on piers.
- F. Support horizontal pipes from walls with "J" hooks, hangers suspended from wall brackets or struts.
- G. Support vertical pipes at base of the pipe on every floor and at 10-foot intervals maximum. Pipes shall be supported at all elbows, branches and ends.
- H. Provide additional pipe supports at concentrated loads in piping between supports.
- I. Grind and smooth all sharp metal edges including struts and fabricated metal supports. Install rubber end caps on the ends of all exposed struts.
- J. Horizontal Piping Support Schedule:
  1. Support horizontal lines of copper tube per following schedule. Pipes shall be supported at all elbows, branches and risers. Support straps shall be copper, brass or copper plated. Copper pipe shall be insulated from contact with dissimilar metals outside of system by taping at point of contact with two (2) layers of 10 mil, PVC, UPC pipe tape.

Pipe Size ----- (Inch)	Rod Diameter ----- (Inch)	Maximum Spacing ----- (Feet)
1/4 to 3/4	3/8	5-0
1	3/8	6-0
1-1/4	3/8	7-0
1-1/2 and 2	3/8	8-0

2. Support spacing for horizontal PVC pipe with solvent cemented joints shall be no more than 4-feet center-to-center. Allow for expansion every 30-feet. Pipes shall be supported at all elbows, branches and risers.

### 3.09 DOMESTIC WATER LINES

- A. Domestic waterlines shall be disinfected by one of the methods prescribed in the Plumbing Code. Disinfection may be limited to new work only if existing piping is not contaminated during construction. Contractor shall submit certificate of disinfection completed by a licensed testing laboratory to the Contracting Officer.

### 3.10 PROTECTION

- A. Provide planking, plastic sheeting, or other protective covering as required to prevent damage during construction to roof, roofing, or other existing building elements and equipment. Damage to materials, equipment or building due to the Contractor's neglect shall be repaired or replaced to the satisfaction of the Contracting Officer by, and at the expense of, the Contractor. Be prepared to immediately repair any damage that does occur during any operations, so as to avoid damage to building or contents or interruption of State's operations.

### 3.11 INSPECTION

- A. Acceptance of the work will not take place until discrepancies noted by the Contracting Officer have been corrected to the satisfaction of the Contracting Officer.

### 3.12 PAINTING

- A. General: Painting of interior and exterior exposed surfaces shall be in accordance with SECTION 09990 - PAINTING AND FINISHING.

### 3.13 LOCAL TECHNICAL SUPPORT

- A. The plumbing equipment supplier shall have an office in the State of Hawaii, staffed with factory trained engineers fully capable of providing on-site instruction on routine and emergency maintenance service on all system components supplied for this project.

### 3.14 CLEANUP

- A. All equipment and piping shall be thoroughly cleaned in an approved manner and maintained until the final inspection.
- B. Upon completion of this work, remove all debris and excess materials, tools, etc., resulting from this work from the job site and leave the location of this work broom-clean in an acceptable manner as per the Contracting Officer. All plumbing work shall be thoroughly cleaned and ready for use.

END OF SECTION

## SECTION 15653

### VENTILATING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. This Section covers the following items:

1. Furnishing, installing and testing of ventilating systems.

##### 1.02 GENERAL REQUIREMENTS

- A. Existing conditions, materials, sizes and dimensions shown on these drawings represent information obtained from existing drawings and field investigations. Prospective bidders shall visit the premises and familiarize themselves with all work details and conditions before submitting a bid. Reasonable modifications to indicated arrangements to suit actual conditions shall not constitute a basis for requesting additional funds from the State.
- B. Provide all necessary labor, delegated design, materials, operations, equipment, tools and techniques required to furnish and install complete the ventilating work as and within the limits indicated.
- C. Prior to ordering materials and equipment, the Contractor shall field verify all existing conditions, materials, sizes and dimensions that affect their work, and shall coordinate their work with all trades involved.
- D. Obtain all permits and pay the costs thereof. Arrange for inspections in sufficient time to avoid delay to the project. Provide copies of inspection and test reports.
- E. Inform Contracting Officer of testing date a minimum of seven (7) days prior to testing system.

##### 1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. SECTION 01300 - SUBMITTALS.
- B. SECTION 07900 - JOINT SEALANTS.
- C. SECTION 09990 - PAINTING AND FINISHING.
- D. SECTION 15011 - GENERAL MECHANICAL PROVISIONS.
- E. SECTION 15400 - PLUMBING.
- F. SECTION 15950 - HVAC TESTING, ADJUSTING AND BALANCING.
- G. DIVISION 16 - ELECTRICAL.

#### 1.04 LAWS, RULES, REGULATIONS AND REFERENCES

A. The entire installation shall comply with the latest applicable laws, codes, rules and regulations of the State of Hawaii, the City and County of Honolulu, and any other applicable laws, codes, rules and regulations whether or not specifically mentioned hereinafter.

B. Codes:

1. Building Code, State of Hawaii and City and County of Honolulu.
2. Energy Code, State of Hawaii and City and County of Honolulu.
3. Plumbing Code, State of Hawaii and City and County of Honolulu.
4. Electrical Code, State of Hawaii and City and County of Honolulu.
5. Fire Code, State of Hawaii and City and County of Honolulu.
6. Hawaii Administrative Rules, Title 11, Chapter 39, Air Conditioning and Ventilating.
7. Americans With Disabilities Act Accessibility Guidelines (ADAAG), 36 CFR Part 1191.

C. References:

1. Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Publications:
  - a. 885-08(Add 1) Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets
2. Air Movement and Control Association (AMCA) Publications:
  - a. 99-25 Standards Handbook
  - b. 210-25 Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating
  - c. 211-22 R23 Certified Ratings Program - Product Rating Manual for Fan Air Performance
  - d. 300-24 Reverberation Room Methods of Sound Testing of Fans
  - e. 311-16 Certified Ratings Program - Product Rating Manual for Fan Sound Performance
3. American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) Publications:
  - a. 70-23 Method of Testing the Performance of Air Outlets and Air Inlets

4. Institute of Electrical and Electronics Engineers (IEEE) Publications:
  - a. 841-21 Petroleum and Chemical Industry--Premium-Efficiency, Severe-Duty, Totally Enclosed Squirrel Cage Induction Motors from 0.75 kW to 370 kW (1 hp to 500 hp)
5. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Publications:
  - a. HVAC Duct Construction Standards - Metal and Flexible, 2020

#### 1.05 SUBMITTALS

- A. General: The Contractor shall submit submittals in accordance with SECTION 01300 - SUBMITTALS and SECTION 15011 - GENERAL MECHANICAL PROVISIONS.
- B. Submit three (3) sets of color schedule and sample chart for all exposed air distribution devices.
- C. Submit catalog cuts along with equipment submittals or piping shop drawings, showing vibration isolators selected for each location.
- D. Submit the following:
  1. Manufacturer's product data.
  2. Shop drawings.
  3. SDS.
  4. Test reports.
  5. As-Built drawings.
  6. Certificates.
  7. One-Year Guarantee and Maintenance Service Contract.
  8. Operation and Maintenance Manual.
  9. Corrosion protection coating repair applicator's name and qualifications.
  10. Warranty: Submit warranty as noted under item entitled "WARRANTY" hereinbelow.

#### 1.06 VENTILATING UNIT MANUFACTURER'S REPRESENTATIVE AND SERVICE CAPABILITIES

- A. Furnish the services of a manufacturer's representative who is factory authorized and trained to perform the services specified. Manufacturer's representative shall have an

office in the State of Hawaii unless Manufacturer has no representatives with an office in the State of Hawaii. The manufacturer's representative shall furnish recommendations and shall be on-site to provide assistance on the following matters:

1. Technical direction of the erection including disassembly and reassembly if required, alignment, testing, and dehydrating.
2. Testing hermetic equipment under pressure for leaks, and evacuation and dehydration of machine to 35 degrees F wet bulb or an absolute pressure of not over 0.204-inch of mercury.
3. Charging equipment with refrigerant and oil.
4. Starting equipment and furnishing instructions as to its proper care, operation and maintenance.

#### 1.07 ELECTRICAL WORK

- A. Contractor shall supply and mount all motors and provide all wiring, conduits, controls, and disconnects for equipment. Contractor is responsible for coordination of size, voltage, phase, auxiliary contacts, etc. For 1/2 HP and smaller motors, the control shall include thermal overload protection consisting of an external thermal trip switch mounted in an easily accessible location. Should any equipment require electrical service or wiring other than as shown on the electrical drawings, inform the Contracting Officer and advise the Electrical Contractor of such changes. All control devices must be installed to operate within the manufacturer's rated current and voltage. All control circuits must be through the respective equipment's disconnect to insure the control circuit being off when equipment disconnect is off. All switches, starters, wiring devices and controls mounted where exposed to weather or open air shall have Type 316 stainless steel NEMA 4X enclosures unless specified otherwise. Wiring materials and methods shall conform to DIVISION 16 - ELECTRICAL, applicable National Electrical Codes, and NEMA standards.
- B. Motor Characteristics and Drives: Electrical motor voltages shall be as indicated and to be verified with the electrical drawings and Contractor. Motors shall be furnished in accordance with the IEEE-841 and the NEMA Premium Efficiency Standard, service factor of 1.15 not to exceed 1,800 RPM, unless otherwise indicated. Non-contacting bearing isolators conforming to IP 55 shall be supplied for all motor ball bearings.
- C. Voltage Protection: Voltage protection shall be an in-line monitor made for use with HVAC equipment that protects high and low voltage conditions. Three-phase monitors shall also protect against voltage unbalance, phase loss, phase reversal and incorrect sequencing. Equipment voltage range shall fall within the monitor's specified input voltage. Voltage protection may be integral to the equipment or external and furnished as indicated on the drawings.

#### 1.08 WARRANTY

- A. Corrosion Protection Coating Applicator's Warranty 3-year.

- B. Warranty Provisions: The warranty provisions and number of years for the warranties required in this Section shall take precedence over SECTION 15011 - GENERAL MECHANICAL PROVISIONS. The Surety and the Contractor shall not be held liable beyond 2 years from Project Acceptance Date. Manufacturer's warranties shall commence no earlier than the respective equipment's startup date.

## PART 2 - PRODUCTS

### 2.01 MATERIALS AND EQUIPMENT

- A. Ventilating equipment to be considered for bid purposes shall be from a manufacturer that has locally stocked spare parts, representation, and support of a factory authorized service organization within 500 miles of the site of installation who has serviced manufacturer's units of comparable type, size and capacity as those specified herein. The manufacturer must have other units of comparable type, size and capacity installed and operating satisfactorily in the State of Hawaii for a minimum of two (2) years prior to bid opening.

### 2.02 FANS

- A. General: Fans, AMCA 99, statically and dynamically balanced, with air capacities, fan types, fan arrangement and pressure ratings as indicated. Fans shall be air performance rated in accordance with AMCA 210. Fans shall be sound rated in accordance with AMCA 300. Fans shall be tested and rated in accordance with AMCA 211/311 in an AMCA accredited laboratory and certified for air and sound performance. Provide Type 316 stainless steel bird screens for outdoor outlets. Equip with automatic backdraft dampers. Provide thermal overload protection and disconnect switches. Housing and fan wheels shall be aluminum, except as specified otherwise. Exterior of fans shall be painted to resist corrosion as specified in the CORROSION PROTECTION paragraph.
- B. In-Line Centrifugal Fans (Direct Driven) – Direct driven in-line fans shall be centrifugal type. Fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone matched to the inlet cone. Fan housing shall be constructed of heavy gage galvanized steel and shall include duct mounting collars and access panels. Motors shall be permanently lubricated and shall be readily accessible for maintenance. Motors shall have TEFC enclosures. Fans shall be UL listed and shall have published ratings based on tests performed in accordance with AMCA.

### 2.03 CORROSION PROTECTION

- A. Cabinet and Exterior Surfaces:
1. Unit cabinet shall be coated with Ameron PSX 700 Engineered Siloxane. Surface preparation shall include degreasing and etching.
  2. The coating shall be applied to all interior and exterior surfaces until a total of 6-8 mils D.F.T. is achieved. Coating shall be applied in strict accordance with the coating manufacturer's recommendations.

3. After the coating has totally cured, the equipment shall be assembled using care not to damage the coating during assembly. Fasteners shall be stainless steel with bonderized rubber washer attached. Any touch up required shall be performed in accordance with the manufacturers recommendations.
4. The coating shall be performed by a qualified and experienced applicator such as International A/C Coatings, Honolulu, Hawaii or approved applicator.

2.04 DUCTWORK

- A. Ductwork shall be constructed from Type 316 stainless steel sheets. Gages, details of construction, and supports shall be in accordance with SMACNA's "HVAC Duct Construction Standards", referred to hereinafter as "Duct Manual". Sizes indicated are net clear inside; increase dimensions as required for duct lining.
- B. Provide turning vanes at changes in direction of flow. Provide external stiffening at cross breaking as indicated in the Duct Manual.
- C. All exterior ductwork shall have tops sloped to drain water.
- D. Seal all ducts in accordance with the following seal classifications. See Duct Manual for seal classification definitions:

<u>Duct Location</u>	<u>Duct Type</u>			
	<u>Supply</u> <u>&lt;=2-inch</u>	<u>Supply</u> <u>&gt;2-inch</u>	<u>Exhaust</u>	<u>Return /</u> <u>Outside</u>
Outdoors	A	A	C	A
Unconditioned Spaces	B	A	A	B

- E. Ductwork:
  1. Rectangular Duct: Construct in accordance with the requirements of the Duct Manual. Ductboard duct construction system will not be allowed.
  2. Ductwork Design Pressures:

$$\frac{\text{Ductwork Design Pressure (In. W.G.)}}{\text{Exhaust} = (+/-) 1\text{-inch}}$$

- F. Flexible Duct Connectors: Flexible connectors of neoprene-coated 30-oz. glass fabric to prevent the transmission of vibration through the ducts, shall be installed on both the supply and return sides of all fans, ventilating units, and approximately where shown on drawings. Cloth used for flexible connectors shall be UL approved, of proper weight and strength for the service required, and shall be properly fitted to render it relatively tight. Fabric shall be of sufficient width to provide a minimum space of 3-inches between connected items and shall be fabricated with two (2) 3-inch wide stainless steel metal strips. Glass fabric connectors shall be Ventfabrics, Inc. "Metaledge Ventglas", Elgen "Silent Duct-Neoprene", or approved equal.

2.05 AIR DISTRIBUTION DEVICES

- A. Registers:

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 Annex Facility Improvements–Phase 1A (Building Improvements)  
 Job No. C00BO91B

Ventilating  
 15653-6

1. Material and Finishes: Construct registers and grilles of aluminum. Exterior and exposed edges shall be rolled, or otherwise stiffened and rounded. Registers and grilles shall be finished to match surrounding ceiling or wall. Submit color schedule and sample chart with all diffusers, registers and grilles identified and colors indicated. Total pressure loss of each air distribution device shall not exceed 0.15-inch w.g. at the indicated airflows unless otherwise specified herein. Air distribution device mounting system shall be compatible with type of ceiling/surface installed. Provide tool for adjustment of volume control damper.
2. Sound Pressure Level: Diffusers and registers shall be sound rated in accordance with ASHRAE 70 and AHRI 885, in dB of noise criterion (NC) based on sound power octave band. Conform with the following permissible room sound pressure levels:

<u>Maximum NC, dB</u>	<u>Typical Application</u>
45	Storage

3. Performance: Air devices shall be tested in accordance with ASHRAE 70.
4. Device Types:
  - a. Exhaust Registers, Surface Mount (ER): Surface mounted exhaust registers shall have surface mount border type, opposed blade damper and fixed blades. Damper shall be operable from the face of the register. Blades shall be parallel to the short dimension, spaced 1/2-inch on center and have a deflection angle of 35 degrees. Titus Model 355 FS or approved equal.
  - b. Transfer Grilles, Surface Mount (TG): Surface mounted transfer grilles shall have surface mount border type and fixed blades. Blades shall be parallel to the short dimension, spaced 1/2-inch on center and have a deflection angle of 35 degrees. Titus Model 355 FS or approved equal.
  - c. Provide dampers, turning vanes, other directional and volume control devices as indicated and as required to balance the system to the air quantities indicated without objectionable noise.

B. Volumetric Dampers:

1. Furnish and install volumetric damper, with indicating quadrant in an accessible location and a locking device. Damper shall be galvanized steel and rated for the specified ductwork design pressure. Ruskin Model MD 25 or approved equal.
2. Furnish and install opposed-blade type volumetric damper constructed of aluminum or galvanized steel, and equipped with a remote cable operator. Cable operator shall have a rack and pinion controller mounted on a cup and concealed with a 3-inch diameter chrome finished wall cover plate. Operator shall be labeled to identify the damper being controlled and the range of operation. Remote operator shall be Young Regulator Model 270, or approved equal.

- C. Counterbalanced Backdraft Dampers (Rectangular): Frame shall be a minimum of 0.090-inch thick extruded aluminum. Blades shall be aluminum with extruded vinyl blade edge seals mechanically locked into place. Bearings shall be corrosion resistant, synthetic type. Dampers shall be designed for maximum 1,500 fpm spot velocities and up to 4-inch w.g. back pressure. Pressure drop through damper shall be a maximum of 0.01 inches w.g. at design airflow rate. Ruskin Model CBD2 or approved equal.

## 2.06 ACCESS DOORS

- A. Hinged gasketed duct access doors shall be provided at all backdraft dampers and other apparatuses requiring service and inspection in the duct system. Access doors shall be made as large as practical. Doors shall be provided with galvanized hinges having bronze pins and two approved brass fasteners. Access doors in insulated ducts shall be of the insulated type. Doors shall swing so that fan pressure or suction holds the door closed, unless otherwise indicated.

## 2.07 TURNING VANES

- A. Turning vanes shall be installed at each rectangular elbow and tee.

## 2.08 MISCELLANEOUS METALS

- A. Exterior and Interior Exposed Installation: Preformed slotted channel system components used in supports and brackets shall be Type 316 stainless steel, Unistrut Corporation or approved equal.

## 2.09 MISCELLANEOUS SUPPORTS

- A. Recycled Rubber Pipe Supports: Curb base shall be manufactured from 100 percent recycled rubber with metal struts. Rubber shall be UV resistant and shall have a uniform load capacity of 500 pounds per linear foot of support or the minimum required to support the intended load with a factor of safety of 3.

## PART 3 - EXECUTION

### 3.01 WORKMANSHIP

- A. Comply with the latest applicable laws, codes, rules and regulations of the State of Hawaii and the City and County of Honolulu.
- B. Defective work or materials shall be removed by the Contractor and corrected without extra compensation.
- C. Field verify existing conditions by investigation and measurement at the project site before commencing with construction.

### 3.02 INSTALLATION

- A. Install ventilating work in accordance with the manufacturer's instructions and as indicated and as specified herein. Furnish delegated design services when recommended by manufacturer's instructions. Arrange for access to the site by

written request submitted not less than seven (7) days prior to the time at which access is requested. Install registers and grilles after installation of ceiling surfaces in which they are installed. Coordinate installation with other trades so as to eliminate or avoid conflicts and delays to the progress of the work.

- B. Each unit shall be adjusted to deliver the air quantities indicated.
- C. Air Balancing, Operation and Completion: Measure total air exhausted and adjust fan speed and balancing dampers to deliver indicated quantity. Proportion air at existing inlets and outlets, positioning dampers therein to deliver air quantities indicated and face bars for uniform distribution and temperature in the space. Test all controls for proper operation. Provide clean new filters in each unit at the time of air balance. Touch up paint on units where and if damaged, using prime and finish paint to match material and color of factory finish. Submit written report of balancing work, which shall be in accordance with SECTION 15950 – HVAC TESTING, ADJUSTING AND BALANCING.
- D. Provide non-conducting dielectric connections when joining dissimilar metals.

#### 3.04 VIBRATION ISOLATION

- A. Provide vibration isolation where indicated. Isolators shall be selected to limit transmitted vibration to not more than 1 percent of the vibration produced by any one rotating element at its operating speed. Temporarily block or rigidly support equipment during construction, after completion of the installation but prior to operation. Remove temporary supports and adjust isolator leveling bolts so as to provide design deflection of each isolator, effective isolation and no strain on pipe, duct or electrical connection to equipment.

#### 3.05 NOISE CONTROL

- A. It shall be the equipment manufacturer's responsibility to ensure that the operating noise level of the unit is not objectionable. The equipment supplier shall evaluate the installation and application and shall submit any noise control measures as part of the substitution request.
- B. Submit fan curves, discharge and casing sound data, NC data and sound power data, descriptive of each unit's noise level.

#### 3.06 FANS

- A. Install fans on vibration isolators.
- B. Do not operate units for any purpose until ductwork is clean, bearings lubricated, and units have been test run under observation.
- C. Install flexible connectors specified between fan inlet and discharge ductwork. Flexible connectors shall not be in tension while running.
- D. Provide counterbalanced backdraft dampers on discharge of exhaust fans and as indicated.

### 3.07 DUCTWORK

- A. Provide openings in ductwork where required to accommodate thermometers, sensors and controllers. Provide pitot tube openings where required for testing of systems, complete with metal cap with spring device or screw to ensure against air leakage.
- B. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- C. Coordinate with other trades in installing air distribution ducts. Field verify and review structural design and reference drawings to determine possible interferences and make all necessary revisions to avoid interferences. Cutting of any structural member will not be allowed.
- D. Touch-up raw edges of galvanized steel or exposed ferrous metal equipment with zinc-rich primer and touch-up paint. Clean up all equipment before final inspection.
- E. During construction, provide airtight temporary closures on open ductwork to prevent construction dust from entering ductwork system.
- F. Provide duct access doors for inspection and cleaning as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access.
- G. Check location of air outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.
- H. Provide balancing dampers on duct takeoff to registers, regardless of whether dampers are specified as part of the register assembly.

### 3.08 PIPE/EQUIPMENT SUPPORTS, HANGERS AND INSERTS

- A. Provide all necessary design, calculations, labor, materials, operations, equipment, tools and techniques required to furnish and install complete the pipe/equipment supports, hangers and inserts work.
- B. Install hangers and supports for all piping to provide for expansion and contraction, prevent vibration and maintain required grading by proper adjustment.
- C. Field verify and refer to structural design and reference drawings for type of construction from which equipment is to be suspended/supported.
- D. Hanger Supports: Grinnell welded beam attachment, Fig. 66 for structural steel supports with all pipe sizes. Grinnell side beam bracket, Fig. 202 for all pipe sizes to 3,500 lbs. Wall supports shall be Grinnell Fig. 195 steel bracket. All hanger supports shall be set in the ceiling beams or other adequate structural members of the building.
- E. Grind and smooth all sharp metal edges including struts and fabricated metal supports. Install rubber end caps on the ends of all exposed struts.

### 3.09 PROTECTION

- A. Provide planking, plastic sheeting, or other protective covering as required to prevent damage during construction to roof, roofing, or other existing building elements and equipment. Be prepared to immediately repair any damage that does occur during any operations, so as to avoid damage to building or contents or interruption of State's operations.
- 3.10 INITIAL OPERATION AND COMPLETION
- A. Test all controls for proper operation. Touch up paint on units where and if damaged, using primer and finish paint to match materials and color of factory finish.
- 3.11 INSPECTION
- A. Acceptance of the work will not take place until discrepancies noted by the Contracting Officer have been corrected to the satisfaction of the Contracting Officer.
- 3.12 PAINTING
- A. General: Painting of interior and exterior exposed metal surfaces shall be in accordance with SECTION 09990 - PAINTING AND FINISHING.
    - 1. All ducts, hangers and supports, and mechanical equipment installed under this specification shall be prime coated and also have one finish coat by Contractor providing the equipment.
- 3.13 LOCAL TECHNICAL SUPPORT
- A. The mechanical equipment supplier shall have an office in the State of Hawaii, staffed with factory trained representatives fully capable of providing on-site instruction on routine and emergency maintenance service on all system components supplied for this project.
- 3.14 CLEANUP
- A. All equipment and ducts shall be thoroughly cleaned in an approved manner and maintained until the final inspection.
  - B. Upon completion of this work, remove all debris and excess materials, tools, etc., resulting from this work from the job site and leave the location of this work broom-clean in an acceptable manner as per the Contracting Officer. All ventilating work shall be thoroughly cleaned and ready for use.

END OF SECTION

## SECTION 15950

### HVAC TESTING, ADJUSTING AND BALANCING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. This Section covers the testing, adjusting and balancing (TAB) of heating, ventilating and air conditioning systems. TAB is a means to measure, adjust and verify that an HVAC system is operating as intended.

##### 1.02 GENERAL REQUIREMENTS

- A. Provide all labor, materials, operations, engineering, test equipment, tools and techniques required to test, adjust and balance all HVAC systems as shown on the Drawings.
- B. The TAB agency shall have a direct contractual relationship with the General Contractor and shall not be affiliated with any other company participating in work on this project, including design, furnishing equipment or construction.

##### 1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. SECTION 01300 - SUBMITTALS.
- B. SECTION 15011 - GENERAL MECHANICAL PROVISIONS.

##### 1.04 LAWS, RULES, REGULATIONS AND REFERENCES

- A. The entire installation shall comply with the latest applicable laws, codes, rules and regulations of the State of Hawaii, the City and County of Honolulu, and any other applicable laws, codes, rules and regulations whether or not specifically mentioned hereinafter.
- B. Codes: Energy Code, State of Hawaii and City and County of Honolulu.
- C. References:
  - 1. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE) Publications:
    - a. Handbook - 2019, HVAC Applications
    - b. 111 - 2008 (RA 2017), ASHRAE Standard, Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
  - 2. Associated Air Balance Council (AABC) Publications:
    - a. MN-1, AABC National Standards for Total System Balance, 7th Edition

3. National Environmental Balancing Bureau (NEBB) Publications:
  - a. NEBB Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems (Eighth Edition - 2015)
4. Sheet Metal & Air Conditioning Contractor's National Association, Inc. (SMACNA) Publications:
  - a. HVAC Air Duct Leakage Test Manual, 2012
  - b. HVAC Systems, Testing, Adjusting & Balancing, 2002

#### 1.05 SUBMITTALS

A. General: The Contractor shall submit submittals in accordance with SECTION 01300 - SUBMITTALS and SECTION 15011 - GENERAL MECHANICAL PROVISIONS.

B. TAB Agency Personnel Qualifications:

1. Certificates: Registrations and certifications shall be current and valid for the duration of this project. Certifications, which expire prior to completion of the TAB work, shall be renewed in a timely manner so that there is no lapse in registration or certification. TAB agency or TAB team personnel without a current registration or current certification shall not perform TAB work on this project.
2. TAB Agency: AABC registration number and expiration date of current certification; or NEBB certification number and expiration date of current certification.
3. TAB Team Supervisor: Name and copy of AABC or NEBB TAB supervisor certificate and expiration date of current certification.
4. TAB Team Field Leader: Name and documented evidence that the team field leader shall have satisfactorily performed full-time supervision of TAB work in the field for not less than three (3) years immediately preceding this project's bid opening date.
5. TAB Team Field Technicians: Names and documented evidence that each field technician shall have satisfactorily assisted a TAB team field leader in performance of TAB work in the field for not less than one (1) year immediately preceding this project's bid opening date.

C. Design Review Report:

1. Submit a typed report describing omissions and deficiencies in the ventilating system's design that would preclude the TAB team from accomplishing the duct leakage testing work and the TAB work requirements of this Section. Provide a complete explanation including supporting documentation detailing the design deficiency. State that no deficiencies are evident if that is the case.

D. Submit the following:

1. Design Review Report.
2. Prerequisite HVAC work checkout list.
3. TAB Report.
4. As-Built drawings.

#### 1.06 QUALITY ASSURANCE

A. Modifications of References: Accomplish work in accordance with referenced standard publications of AABC or NEBB except as modified by this Section. In the references referred to herein, consider the advisory or recommended provisions to be mandatory, as though the word "shall" had been substituted for the words "should" or "could" or "may" wherever they appear. Interpret references to the "Authority Having Jurisdiction", the "Administrative Authority", the "Owner", or the "Design Engineer" to mean "Engineer".

B. Responsibilities: The Contractor shall be responsible for ensuring compliance with the requirements of this Section. The following delineation of specific work responsibilities is specified to facilitate execution of the various work effort by personnel from separate organizations. This breakdown of specific duties is specified to facilitate adherence to the schedule.

1. Contractor Responsibilities:

- a. HVAC Documentation: Furnish one (1) complete set of the following HVAC-related documentation to the TAB agency:
  - 1) Contract drawings and specifications.
  - 2) Approved submittal data for equipment.
  - 3) Approved shop drawings.
  - 4) Construction work schedule.
  - 5) Up-to-date revisions and change orders for the previously listed items.
- b. Submittal and Work Schedules: Ensure that the schedule for submittals and work required by this Section are met.
- c. Coordination of Supporting Personnel:
  - 1) Provide technical personnel such as factory representatives or HVAC controls installer required by the TAB field team to support the TAB field measurement work.

- 2) Provide equipment mechanics to operate HVAC equipment to enable TAB field team to accomplish the TAB field measurement work. Ensure these support personnel are present at the times required by the TAB team and cause no delay in the TAB field work.
  - 3) Conversely, ensure that the HVAC controls installer has the required support from the TAB team field leader to complete the controls check out.
- d. Deficiencies: Ensure that equipment defects and deficiencies reported by the TAB team field leader are brought to the attention of the Contracting Officer. Ensure deficiencies reported by the TAB field leader, or the TAB team supervisor, are transmitted to the Contracting Officer within seven (7) days from date of receipt from the TAB agency.
  - e. Prerequisite HVAC Work: Complete check out and debugging of HVAC equipment, ducts, pipes and controls affected by this project prior to the TAB agency arriving at the project site to begin the TAB work. Debugging includes searching for and eliminating malfunctioning elements in the HVAC system installation, and verifying all adjustable devices are functioning as designed. Include as prerequisite HVAC work checkout list items, the deficiencies pointed out by the TAB team supervisor in the design review report.
  - f. Prior to the TAB field team's arrival, ensure completion of the applicable inspections and work items listed in the TAB team supervisor's prerequisite HVAC work checkout list. Do not allow the TAB team to commence TAB field work until all of the following are completed:
    - 1) HVAC system installations are fully complete.
    - 2) Prerequisite HVAC work checkout list has been completed, submitted, and approved. Ensure that the TAB agency gets a copy of the approved prerequisite HVAC work checkout list.
2. TAB Agency Responsibilities:
- a. General: The work to be performed by the TAB agency shall be limited to testing, adjusting, and balancing of HVAC air and water systems to satisfy the requirements of this Section.
  - b. TAB Team Supervisor:
    - 1) Overall Management: Supervise and manage the overall TAB team work effort, including preliminary and technical TAB procedures and TAB team field work.
    - 2) Design Review Report: Review project specifications and accompanying drawings to verify that the air and water systems are designed in such a way that the TAB agency can accomplish the work in compliance with the requirements of this Section. Verify the presence and location of permanently installed test ports and other devices needed, including

gauge cocks, thermometer wells, flow control devices, circuit setters, balancing valves, and manual volume dampers.

- 3) Support Required: Specify the technical support personnel required from the Contractor other than the TAB agency; such as factory representatives for temperature controls or for complex equipment. Inform the Contractor in writing of support personnel needed and when they are needed. Furnish the notice as soon as the need is anticipated, either with the design review report or during the TAB field work.
  - 4) Prerequisite HVAC Work Checkout List: Utilizing the following HVAC-related documentation; contract drawings and specifications, approved submittal data for equipment, up-to-date revisions and change orders; prepare this checklist. Ensure the Contractor gets a copy of this checklist in a timely manner.
  - 5) Technical Assistance for TAB Work: Provide immediate technical assistance to the TAB field team for the TAB work.
  - 6) Certified TAB Report: Certify the TAB report. This certification includes the following work:
    - a) Review: Review the TAB field data report. Prepare the certified TAB report from this field report.
    - b) Verification: Verify adherence, by the TAB field team, to the procedures specified in this Section.
  - 7) Deficiencies: Submit in writing as soon as possible, to the Contractor and the Contracting Officer, each deficiency reported by the TAB field team. Provide, in this submittal, a complete explanation including supporting documentation detailing the deficiency.
- c. TAB Team Field Leader:
- 1) Field Manager: Manage, in the field, the accomplishment of the work specified in PART 3 - EXECUTION.
  - 2) Full Time: Be present at the project site when TAB field work is being performed by the TAB team; ensure day-to-day TAB team work accomplishments are in compliance with this Section.
  - 3) Prerequisite HVAC Work: Do not bring the TAB team to the project site until a copy of the prerequisite HVAC work checkout list, with all work items certified by the Contractor to be working as designed, reaches the office of the TAB agency.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

### 3.01 TAB REPORT

#### A. TAB Procedures:

1. TAB Field Work: Test, adjust and balance the listed HVAC systems to the state of operation indicated on and specified in the project design documents. Air and water systems shall be proportionately balanced and reported in the certified TAB report. Provide instruments and consumables required to accomplish the TAB work. Conduct TAB work on the listed HVAC systems in conformance with the AABC or NEBB Standards, except as modified by this Section:
  - a. Maintenance and calibration of instruments.
  - b. Accuracy of measurements.
  - c. Preliminary Procedures: Test ports required for testing by the TAB agency shall be located in the field by the TAB engineer during TAB field work. It shall be the responsibility of the sheet metal contractor to provide and install test ports as required by the TAB supervisor.
  - d. Air Distribution Systems TAB Work: Ventilating systems including fans, ducts, registers, and grilles for exhaust air.
  - e. Ventilating systems shall be adjusted to within plus or minus 10 percent of design values.

#### B. Data From TAB Field Work: After completion of the TAB work, prepare a TAB report. Except as approved otherwise in writing by the Contracting Officer, the TAB work and the TAB report shall be considered incomplete until the TAB work is accomplished to within the accuracy range specified. Prepare the report neatly and legibly.

#### C. Quality Assurance for TAB Field Work:

1. Field Check: Tests shall be made to demonstrate that capacities and general performance of air and water systems comply with the project requirements.
2. Procedures: Measurement and test procedures shall be the same as approved for work for forming basis of the certified report.

#### D. Marking of Settings: Permanently mark the settings of HVAC adjustment devices including valves, splitters, dampers and fan speed controllers so that adjustment can be restored if disturbed at any time. The permanent markings shall indicate the settings on the adjustment devices which result in the data reported on the submitted certified TAB report.

#### E. Marking of Test Ports: The TAB team shall permanently and legibly mark and identify the location points of the duct test ports. The location of test ports shall be shown on the as-built mechanical drawings.

END OF SECTION

## DIVISION 16 - ELECTRICAL

### SECTION 16011

#### GENERAL ELECTRICAL REQUIREMENTS

##### PART 1 – GENERAL

###### 1.01 SUMMARY

- A. This section 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

- A. Work specified in this Division shall include, but not be limited to the following:
  - 1. Disconnect and remove existing light fixtures in large storage area.
  - 2. Disconnect and remove existing light fixtures and wiring in areas to be renovated.
  - 3. Complete new light fixtures, controls and wiring in new restrooms and shower room.
  - 4. Complete new receptacles and wiring in renovated areas.
  - 5. Complete new power wiring to new exhaust fans and connection to lighting circuits in new restrooms and shower room.
  - 6. Complete new light fixtures, emergency light fixtures and wiring in large storage area and exterior walls.

7. Complete new fire sprinkler panel system, including connections to existing fire sprinkler flow and tamper switch and monitoring of panel.
8. Complete power connection for new water heater, including circuit breaker and wiring.

#### 1.04 REFERENCES

- A. 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, UL, and IPCEA; and regulations of the City and County of Honolulu and the State of Hawaii.
  2. Comply with TIA/EIA-569-B Commercial Building Telecommunications Cabling Standard: "Pathways and Spaces" and TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard.
  3. 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

- A. Division 1 - General Requirements.

#### 1.06 PERMITS AND INSPECTION

- A. All permits required by local ordinances shall be obtained and paid for by the Contractor.
- B. After completion of the work, the Contracting Officer shall be furnished a certificate of final inspection and approval from the electrical inspection department of the reviewing Building Department.

#### 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 building 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 Contracting Officer

## 1.08 SUBMITTALS

- A. 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.
- C. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Contracting Officer and at no additional cost to the State.

## 1.10 WARRANTY

- A. Installation shall be complete in every detail as specified and ready for use. Furnish a one (1) year warranty against defects resulting from the use of defective or inferior materials, equipment, or workmanship. Such items 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. The warranty period shall commence from the project acceptance date.
- B. The warranty shall be countersigned by the Contractor.

## 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 Contracting Officer 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. Neat appearances in the finished work will be required. Only experienced electrical workers shall be employed for the electrical installation.

- D. 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 with manufacturer's recommendations and as approved by the Contracting Officer.
- 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 on site to avoid conflicts.

#### 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 may be relocated within 10 feet before installation at direction of the Contracting Officer without additional cost to the State.
- B. Before installing, verify all dimensions and sizes of equipment.
- C. Verify that electrical system may be installed in strict accordance with the original design, the Drawings and Specifications and the manufacturer's recommendations.
- D. In the event of discrepancy, immediately notify the Contracting Officer. 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 Contracting Officer.
- C. The Contractor shall perform start-up and all tests as required to obtain final field acceptance from the State. All tests shall be conducted in the presence of the Contracting Officer 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 or wiring and connection, proper grounding, matching nameplate charts with specification, etc., shall be made prior to actual testing.

END OF SECTION

## SECTION 16400

### ELECTRICAL WORK

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Furnish all labor and materials required to complete all electrical work indicated on the drawings and/or as specified.
- B. In general, the following work is included:
  - 1. Disconnect and remove existing light fixtures in large storage area.
  - 2. Disconnect and remove existing light fixtures and wiring in areas to be renovated.
  - 3. Complete new light fixtures, controls and wiring in new restrooms and shower room.
  - 4. Complete new receptacles and wiring in renovated areas.
  - 5. Complete new power wiring to new exhaust fans and connection to lighting circuits in new restrooms and shower room.
  - 6. Complete new light fixtures, emergency light fixtures and wiring in large storage area and exterior walls.
  - 7. Complete new fire sprinkler panel system, including connections to existing fire sprinkler flow and tamper switch and monitoring of panel.
  - 8. Complete power connection for new water heater, including circuit breaker and wiring.
- C. The term "wiring" shall include raceway, conductors, equipment, and wiring.
- D. The term provide shall mean furnish and install.
- E. Test complete installation and correct all defects and malfunctions of material and workmanship at no additional charge to the State.

##### 1.02 SUBMITTALS

- A. Submit in accordance with SECTION 01330 - SUBMITTAL PROCEDURES.
- B. Product Data: Submit six (6) sets of manufacturer's product data of the following equipment and resubmit until approval is received before placing order:
  - 1. Light fixtures.

2. Electrical devices.
  3. Lighting Controls.
  4. Raceways.
  5. Cables and wires.
  6. Junction boxes, cabinets, and outlet boxes.
  7. Fire Sprinkler Panel.
  8. Circuit breakers.
  9. Any built-to-order equipment.
- C. Substitute Materials: Submit shop drawings and catalog cuts for substitute materials. 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 Contracting Officer.
- D. Guarantee: Submit guarantee as noted under item entitled “GUARANTEE” hereinbelow.
- E. As-Built Drawings: Submit as-built drawings as noted under item entitled “DRAWINGS” hereinbelow.

#### 1.03 RULES AND PERMITS

- A. The entire installation to be made in strict accordance with applicable provisions of 2020 edition of the National Electrical Code, Local Ordinances, and rules and regulations of the City and County of Honolulu and the State of Hawaii.
- B. Contractor shall obtain and pay for electrical permit(s) as required by local rules and regulations. Contractor shall arrange for periodic inspections by local authorities as work progresses so that certificates of completion and inspections may be turned over to the Contracting Officer as stipulated in GENERAL CONDITIONS.

#### 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 a project as a whole. 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. LED fixtures shall include warranted for 5 years.

#### 1.05 DRAWINGS

- A. Specifications are accompanied by drawings of site plans, and diagrammatic electrical plans showing locations of feeders, pullboxes, switchboards, panelboards, and other electrical equipment. Locations are approximate. Before installing, study applicable 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 Contracting Officer without additional charge to the State.
- B. Before installing, verify all dimensions and sizes of equipment and devices at the jobsite. Circuit and conduit routing is typical and may be field altered in a logical manner; however, all alterations to the design shall be approved by the Contracting Officer and shown on "field posted as-built" drawings. See Section 01770 - CLOSEOUT PROCEDURES for "Field Posted As-Built" drawing requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. All materials shall be new and of the best quality available in their respective kinds, free from all defects and shall conform to standards of Underwriters' Laboratories, Inc., NEMA, ANSI, ASTM, and IEEE. Materials and equipment listed by Underwriters' Laboratories shall bear "UL" label of approval. Brand names, manufacturer's names, and catalog numbers indicate standards of design and quality required. Substitute materials other than those listed in each paragraph will not be solicited unless indicated with "or approved equal". Substitute materials may be used by written permission from the Contracting Officer. List of substitute material together with qualifying data shall be submitted for approval and acceptance as provided in Section 00700 - GENERAL CONDITIONS.

Example:

<u>Item</u>	<u>Manufacturer and Catalog No. Specified</u>	<u>Substitute Manufacturer and Catalog Number</u>
Cable	Joe Doe - No. 3200	King - No. 2200

Qualifying data shall include cuts, drawings, and specifications to show equality with materials specified herein and in drawings.

- B. Raceways:
  1. Rigid Steel: Hot dipped galvanized inside and outside, round bore, 3/4 inch diameter, except as noted. Exterior use and interior use below 8'-0".
  2. Electrical Metallic Tubing (EMT): Thin walled steel tubing, zinc-coated, 3/4 inch minimum diameter. Interior use concealed in walls and exposed above 8'-0".
  3. Flexible Conduits: Flexible steel, zinc-coated, 1/2 inch minimum, and used with factory approved fittings. In wet locations, use liquied-tight type jacketed with polyethylene.

C. Outlet Boxes: Surface boxes shall be from die-cast aluminum with threaded hubs for conduit connections.

D. Wires and Cables:

1. Conductors in interior locations shall be copper, 600 volts, No 12 AWG minimum (No. 14 minimum, fire alarm system). Conductors in wet, damp moist or exterior locations shall be NEC Type XHHW, RHW or THWN. Conductors No. 10 and smaller, solid and round. Conductors No. 8 and larger, 7 or 19 strands. Conductors No. 8 and smaller shall be NEC Type THHN and THWN. Conductors No. 6 and larger shall be NEC Type THHN or XHHW. Wiring fixtures and fixture wiring channels shall be Type RHH or THHN.

2. Color Coding

208Y/120V

Black	insulation material - Phase "A"
Red	insulation material - Phase "B"
Blue	insulation material - Phase "C"
White	insulation material - Neutral
Green	insulation material - Ground

480Y/277V

Brown	insulation material - Phase "A"
Orange	insulation material - Phase "B"
Yellow	insulation material - Phase "C"
White	insulation material - Neutral
Green	insulation material - Ground

Color coding shall be maintained throughout entire system.

E. Wiring Devices:

1. Duplex Receptacle, GFI Type: White 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 exceeds 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 Articles No. 210 and 406. Hubbell No. GF-5362-W.

2. Equal devices by Arrow Hart, Bryant, Leviton or Pass & Seymour are approved.

F. Conduit Accessories: Couplings, spacers, plugs, and accessories shall be as recommended by the manufacturer of conduits.

- G. Outdoor Exposed Raceways: Raceways shall be hot dipped galvanized inside and outside, round bore, 3/4" diameter, except as noted.
- H. Junction Boxes: Junction boxes, unless otherwise specified, shall be NEMA 1 for interior locations and NEMA 4X for exterior locations exposed to rain and splashing water. NEMA 1 junction boxes shall be fabricated from galvanized steel. NEMA 4X junction boxes shall be fabricated from a fiberglass reinforced material with latches and hinges made of the same material. Prime paint and enamel finish according to NEMA specifications. Manufacture and install according to NEC Article 370.
- I. Equipment Connection: Power connection to equipment from nearest box, disconnect or controller with watertight flexible conduit and locknut type or threaded connector.
- J. Lighting: Provide Luminaires as indicated in Fixture Schedule. Provide Luminaire complete with light source of quantity, type, and wattage indicated. Provide all luminaires of the same type by the same manufacturer. Luminaire shall be specifically designed for use with the driver, voltage and light source provided.
1. LED Luminaries: Complete with power supplies (drivers) and light sources. Shall have 5 year minimum manufacturer's warranty. Shall have minimum L70 lumen maintenance value of 50,000 hours and shall be tested to IES-LM79 and IES LM-80 standards.
  2. Light source shall have correlated color temperature (CCT) of 4000° K; minimum color rendering index (CRI) R9 value of 80; high power, white light output utilizing phosphor conversion (PC) proven and be RoHS compliant.
  3. Drivers: LED drivers shall be electronic. UL Class 1, constant current type with watts and lumens as indicated. 90% power factor; total Harmonic distortion (THb) of less than 20 percent; Class A sound rating; 120-277 volt, 60 hertz operating input voltage and with integral thermal protection.
  4. Exterior light fixtures shall have corrosion resistant metallic finish.
- K. Hardware, Support, Backing, etc.: Provide all hardware, supports, backing, and other accessories necessary to install electrical equipment. Wood materials shall be termite treated, iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be brass or bronze. All wood screws shall be brass or galvanized steel.
- L. 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 and NEMA 3R enclosures for exterior 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 3 spare fuses of each ampere rating. Siemens, Schneider, General Electric and Eaton equals.
- M. Conduit and Duct Accessories: Couplings, spacers, plugs, and accessories shall be as recommended by the manufacturer of conduits and ducts.

- N. Ground Rods: Copper clad steel, 3/4" x 10 feet long.
- O. Time Switch: Fully automatic, motor driven movement, 120/277 volt, 2 circuit type. Unit shall be 7 days, have 10 hour reserve power; be capable of being set for seven different day types per week; have automatic holiday "shut off" feature; have an override switch; 20 amperes, 125 volts contacts, and enclosed in NEMA 1 steel enclosure. Intermatic #ET2715C.
- P. Photo Electric Control: Rated for 1800 watts, 15 amperes at 120 volts. Operating levels, "ON" at 1.0 to 5.0 footcandles; "OFF" at 3 times turn-On. Enclosed in vandal resistant Lexan enclosure and gasketed. Load to remain "ON" in case of photocell failure. NSi Company No. 2021. Paragon, Intermatic or approved equal.
- Q. Cable Markers:
1. Rectangular, commercially available polyethylene cable tags with pre-punched holes at each corner for the attachment with self-locking ties.
  2. Minimum 0.0035-inch thick.
  3. Average Tensile Strength: 4500 pounds p.s.i.
  4. Non-corrosive, non-conductive, resistant to acids, alkalis, organic solvents, salt water and distortion-resistant in temperatures up to 300 degrees F.
  5. White or yellow and machine printed with the phase Building Feeder Building “\_\_”, in black block letters 1/8 inch or larger in vertical height. Handwritten markers are not acceptable.
    - a. The preprinting shall be permanent and shall not fade or dissolve.
    - b. The tags shall be suitable for marking with black permanent markers. There shall also be space available for additional notes (for Maintenance/Service Contractor use only).

## PART 3 - EXECUTION

### 3.01 CONSTRUCTION METHODS

- A. Comply with local ordinances and regulations of the County of Maui. Workmanship subject to the approval of the Contracting Officer who shall be afforded every opportunity to determine skill and competency. Concealed work reopened at random during formal inspection by the Contracting Officer without additional charge to the State.
- B. Construction shall conform to construction practices as recommended by American Electricians Handbook by Croft (latest edition), National Electrical Code, National Electrical Safety Code, and applicable instructions of manufacturers of equipment and

materials for this project.

### 3.02 OUTLET BOXES

- A. Provide outlet boxes where called for in drawings.

### 3.03 CONDUIT FILL IN RACEWAY

- A. Conform to NEC Appendix C unless otherwise indicated on the drawings.

### 3.04 WIRE PULLING

- A. Mechanical means for pulling shall be torque-limiting type and not used for No. 2 AWG and smaller wires. Pulling tension shall not exceed wire manufacturer's recommendations. Where necessary, soapstone may be used as a lubricant for drawing wires through conduit. Other means of lubricating allowed with written approval of the Contracting Officer.

### 3.05 WIRE SPLICING AND TERMINATION

- A. Form wires neatly in enclosures and boxes.
- B. Splice in accordance with NEC Article 110.
- C. Conductors No. 10 and smaller with solderless-tapeless connectors, "Ideal Wire Nuts" or equal. Splice conductors No. 8 through No. 4/0 with high pressure compression (indent) copper sleeve connectors. Do not use bolt-on connectors. Reinsulate splices and make waterproof.
- D. Reinsulate splices according to wire manufacturer's instructions. Splice insulation shall be 150 percent in thickness of original wire insulation and of same electrical and mechanical characteristics.

### 3.06 RACEWAYS

- A. All conduits within building line shall be surface metal raceway (for existing buildings only) or electrical metallic tubing. Electrical metallic tubing may be used only above ground level slab. Rigid steel raceways shall be used in exposed locations below 8'-0" indoors. All conduits below exterior finished grade shall be encased in minimum 3 inches thick concrete. Provide No. 14 galvanized steel pull wire or nylon cord in all empty conduits.
- B. Cut raceways square and ream inner edges. Butt together evenly in couplings.
- C. Make bends and offsets with hickey or conduit bending machine; do not use vise or pipe tee. Make bends so that interior cross-sectional area will not be reduced. Radius of curve of inner edge of field bend not less than 10 times internal diameter of raceway. Use of running threads not permitted. Where raceways cannot be joined by standard threaded couplings, use approved watertight raceway unions.

- D. Provide raceway expansion joints for exposed and concealed raceways and underground ducts with necessary bonding conductor at building expansion joints and between buildings or structures and where required to compensate for raceway or building thermal expansion and contraction. Provide expansion fittings every 200 feet on outdoor underground ducts. Verify locations of expansion joints and other critical locations with Structural drawings.
- E. Cap raceways during construction with plastic or metal-capped bushings to prevent entrance of dirt or moisture. Swab all raceways out and dry before wires or cables are pulled in.
- F. Mount raceways free from other piping, valves or mechanical equipment.
- G. Fish wires, cords, strings, chains, or the like shall not be placed or inserted in the conduit system during installation.
- H. Install insulating bushings and 2 locknuts on each end of every run of conduit at enclosures and boxes. Provide grounding bushings as required to grounding receptacles and connect conduits to service ground, per NEC Article 250.
- I. Project adequate number of conduit threads through box for bushings.
- J. Run exposed conduit or raceway parallel with, or at right angles to, structural or architectural elements.
- K. Securely fasten conduits with galvanized pipe straps with screws or bolts spaced not more than 7 feet apart, or with approved beam clamps, or approved single or gang pipe hangers spaced not more than 7 feet apart, as conditions require. Vertical runs supported at intervals not exceeding 5 feet by approved clamp hangers. Conduit runs with one 90 degree bend or equivalent, 150 feet maximum without pullbox. Conduit runs with two 90 degree bends or equivalent, 100 feet maximum without pullbox.

### 3.07 GROUNDING

- A. Conform to applicable requirements in National Electrical Code, National Electrical Safety Code, and to requirements herein.
- B. Provide grounding for entire electrical installation as indicated and specified herein. Following are included as requiring grounding:
  - 1. Conduits, other conductor enclosures, electric panels, disconnect switches and loadcenters.
  - 2. Neutral or identified conductor of interior wiring system.
  - 3. Non-current carrying metal parts of fixed equipment, such as motors, starter and controller cabinets, lighting fixtures, etc.
  - 4. Grounding conductor in non-metallic conduits as required by NEC.

- C. Grounding Electrodes: Where underground water piping is available, ground connection shall be made to it at a point which will be accessible for future inspection, it shall serve as grounding electrode. Make connection to such water piping inside buildings on street side of main shut-off valve. In addition, connection to copper clad ground rods. Resistance to ground shall be 25 ohms maximum. Ground rods shall be 3/4" x 10 feet minimum. Bond ground rods with #1/0 bare copper wires.
- D. Manner of Grounding: Sizes and types of ground conductors, ground clamps, bonding jumpers, conduit, fittings, also methods of securing same to obtain electric continuity and effective grounding, when not indicated; as per NEC Article 250.

### 3.08 RECEPTACLE WIRING

- A. Receptacles shall be wired to using side screw terminals. Wiring to back spring tension terminals shall be unacceptable.

### 3.09 CONDUCTOR IDENTIFICATION SYSTEM

- A. Underground conductor markers:
  - 1. Provide markers at both ends of the conductors and at all intermediate locations where the conductors are accessible and visible.
  - 2. Each marker shall be secured with 2 nylon ties.

### 3.10 INSTALLATION OF LIGHTING FIXTURES

- A. Support fixtures securely and safely by means of fixture studs in outlet boxes or other approved means. Provide accessories, such as straps, mounting plates, stems, nipples, or brackets for proper installation.

### 3.11 CLEANING AND REPAIRING

- A. During the process of work, all rubbish, waste lumber, displaced materials, etc. shall be removed as soon as possible and upon completion of work, Contractor shall remove from State's property and from all public and private property, at his own expense, all temporary structures, rubbish, and waste material resulting from his operations.
- B. The Contractor shall restore all removed or damaged pavement, gutters, curbs, sidewalks, sign posts, trees, and landscape damaged by his operations to their original condition or better and to the acceptance of the Contracting Officer.

### 3.12 FINISHING

- A. Patch, repair, and restore all structural and architectural elements cut or drilled for installation of electrical system. Drilling, cutting, patching, repairing, and restoring shall be subject to approval of the Contracting Officer.

- B. Attach electrical equipment to wood by wood screws, and attach to concrete by embedded or expansion inserts and bolts. Use powder-driven charge with approval only. Close unused knockouts on boxes or enclosures with metal cap.
- C. Wipe clean all exposed raceways and enclosures with rag and approved solvent. Prime paint and finish all exposed raceways and enclosures to match adjoining wall finish. Factory finished enclosures shall not be painted unless called for in drawings.
- D. Identify electric panels and loadcenters by nameplates on door, including voltage and designation. Provide nameplates on front of disconnect switches and junction boxes where wires are terminated for connection to equipment. Designate equipment served, voltage, and phase.
- E. Complete all panel directories with typewriter or computer. Handwritten panel directories are not acceptable.
- F. Nameplates: Laminated plastic, black/white, engraved with 3/16-inch high commercial letters to expose white. Screw mounted. Impression type adhesive tapes not acceptable.

### 3.13 TESTS

- A. Operating Test: After installation has been completed, and at such time as the Contracting Officer may direct, Contractor shall conduct an operating test for approval. Equipment shall be demonstrated to operate in accordance with requirements of this section of specifications. Test shall be performed in the presence of the Contracting Officer. Contractor shall furnish necessary instruments and personnel required for test. Balance loading on each feeder and test ground fault circuit breakers. The ground fault setting of the main and branch circuit breakers shall be set to 5mA.
- B. Ground Resistance Measurements: Take ground resistance measurements of each ground rod and certify results to Engineer. Contractor shall submit in writing to Engineer upon completion of project, measured ground resistance of each ground rod and grounding system, as well resistance and soil conditions at time measurements were made. Ground resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with ground under test isolated from other grounds.

END OF SECTION