STATE OF HAWAII DEPARTMENT OF TRANSPORTATION AIRPORTS DIVISION

ADDENDUM NO. 2

ТО

PLANS AND SPECIFICATIONS FOR AIR TRAFFIC CONTROL TOWER REPAIRS AT KALAELOA AIRPORT BARBERS POINT, OAHU, HAWAII

STATE PROJECT NO. AO5024-03

November 21, 2022

The following amendments shall be made to the Plans and Specifications:

A. SPECIFICATIONS:

- 1. <u>Table of Contents</u>
 - a. Revised to incorporate revisions to the specifications and additional sections.
- 2. <u>Proposal to the State of Hawaii DOTA (Page P-1)</u>
 - a. Revised project duration to 365 calendar days.
- 3. <u>Proposal Schedule (Page P-8)</u>
 - a. Revised Unforeseen Conditions allowance.
- 4. <u>Proposal Schedule (Page P-9)</u>
 - a. Added pay item 01010.17 for Additional Roof Equipment Repairs.
- 5. <u>Section 01010 Description of Work</u>
 - a. Revised Paragraph 1.09, Hours of Work.
 - b. Revised the payment section to reflect the changes made to the Proposal Schedule.

- 6. <u>Section 08710 Finish Hardware</u>
 - a. Panic hardware for Control Tower door added to schedule.
 - b. Removed miscellaneous hardware items not required for this project.
- 7. <u>Section 10260 Wall and Door Protection</u>
 - a. Removed Section in entirety.
- 8. <u>Section 15000 General Mechanical Requirements</u>
 - a. Added Section in entirety.
- 9. <u>Section 15400 Plumbing</u>
 - a. Added Section in entirety.
- 10. <u>Section 15650 Air Conditioning and Ventilation</u>
 - a. Added Section in entirety.
- 11. Section 15901 Testing, Adjusting, and Balancing (TAB)
 - a. Added Section in entirety.

B. DRAWINGS:

- 1. Sheet A002 Demolition Floor Plan & Renovated Floor Plan
 - a. Clarifying extent of acrylic top at Control Tower casework.
- 2. <u>Sheet A006 Renovated Ground Floor Plan</u>
 - a. Added signage details.
 - b. Added ACCU pads and typical detail.
 - c. Revised Flooring to callout VCT in lieu of LVT.
 - d. Revised background to include ramp at rear stair.
- 3. Sheet A007.1 Renovated Second Floor Reflected Ceiling Plan
 - a. Removed note for clarification.

- 4. <u>Sheet MD101 Air Traffic Control Tower 1st Level Mechanical Removal</u> <u>Plan</u>
 - a. Revised background to include ramp at rear stair.
- 5. <u>Sheet M101 Air Traffic Control Tower 1st Level Mechanical New Work</u> <u>Plan</u>
 - a. Revised background to include ramp at rear stair.
 - b. Revised ACCU locations.
- 6. <u>Sheet M102 Air Traffic Control Tower 1st Level Mechanical Piping &</u> <u>Instrumentation Plan</u>
 - a. Revised background to include ramp at rear stair.
 - b. Revised ACCU locations and associated piping/instruments.
- 7. <u>Sheet M103 Air Traffic Control Tower 2nd Level Mechanical New Work</u> <u>Plan</u>
 - a. Revised ACCU location.
- 8. <u>Sheet M104 Air Traffic Control Tower 2nd Level Refrigerant Piping &</u> <u>Instrumentation Plan</u>
 - a. Revised ACCU location.
- 9. <u>Sheet E202 Ground Floor Power Plan New Work</u>
 - a. Revised/Coordinating power for new ACCU locations.

C. REQUEST FOR INFORMATION (RFI)

- Q #01. Reference Section 01010, paragraph 1.04.A.1 that indicates no permits are anticipated. Please confirm that the Contractor is not responsible to include building permit processing and payment for this project.
- *R.* No building permit is required for this project therefore no cost required for building permit or building permit processing. Contractor shall follow all other applicable permitting requirements noted in the specifications.
- Q #02. Reference fluid applied roofing scope of work at roof shown on A008.
 - a. There are existing rooftop HVAC and electrical equipment, conduit, drain lines, ductwork sitting directly atop the roof. If the intent is for these items to remain in place, the new fluid applied roofing system

may not be able to be installed per Section 07560 and prescribed warranties may not be available. Please clarify intent.

- b. As unquantifiable at time of bid, please confirm that all repairs required to the existing roofing system and/or insulation discovered through the roof scans and surveys will be considered unforeseen conditions.
- R. The contractor is expected to provide a new roof coating with maximum warranty possible based on the current conditions and bid specs. Awarded bidder to coordinate with the State any potential scope adjustments necessary in order to maintain all maximum warranty available. Refer to Section 01010 Description of Work and the Proposal Schedule for the details about the new allowance established.
- Q #03. Reference A002, added note per Addendum No. 1. Please provide quantity and details for "EPOXY INJECTION REPAIR" to existing window.
- *R.* Repair is limited to one pane. The existing crack is approximately 18" in length starting from the bottom of the pane.
- Q #04. Reference sheet metal work and Section 07620.
 - a. Please clarify material; specifications call out SS, copper, aluminum. Upon material clarification, please note the 20-year finish warranty noted in paragraph 1.07.A.1 may not be applicable.
 - b. Debris screen and downspouts called out in specifications but not shown on drawings. If these items are applicable, please provide details.
 - c. If downspout is required, please clarify if the material is PVC or otherwise.
- *R.* All roof flashing shall be stainless steel. See revised roof gutter details on sheet A008 Roof Plan. All gutters/downspouts to be galvanized metal painted.
- Q #05. Please clarify extent of ½" acrylic. A002 Control Tower Renovated Floor Plan indicates '1/2" ACRYLIC TOP OVER ENTIRE WORK SURFACE." Detail 3/A005 indicates ½" acrylic panel at shroud area. Detail 4/A005 indicates "PANEL OVER ENTIRE WORK SURFACE" and "ACRYLIC PNL BEYOND."

- *R.* See revised Sheet A002 for clarifications. Added bold dashed line indicating limits of Acrylic top. All acrylic tops to be ½" thickness.
- Q #06. Please confirm that existing traffic control equipment at the Control Tower shall be removed and reinstalled by the State and to facilitate the cabinet replacement.
- *R.* Confirmed. All existing Traffic Control equipment shall be the responsibility of the state.
- Q #07. A007.1 INCLUDE TWO DIFFERENT NOTES AT HATCHED AREAS: "REPLACE CEILING TILE ONLY IN THESE AREAS. GRID TO REMAIN, TYP" AND "REPLACE ALL EXST. CEILING TILE/GRID IN HATCHED AREAS, TYP." Please clarify if intent is to replace ceiling tiles and grid, or ceiling tiles only. If existing grid is to remain, will it require new painting?
- *R.* Replace the existing ceiling grid in addition to ceiling tiles where indicated on the plan.
- Q #08. During the site visit, it was mentioned that the existing fire alarm system is currently inoperable. Please confirm that fire watch during construction is not required since the existing fire alarm system is inoperable.
 - b. There are US NAVY labels affixed to the existing FACP. Please identify the authority having jurisdiction on the fire alarm system for this project. If the Federal Government is the AHJ, please provide any additional requirements for their review and approval.
- R. FACP shall be replaced in similar location with new FACP compatible with the proposed devices schedule throughout. Existing FACP to be removed as well. The existing system is in operable. HFD responds to calls for this area, and the federal government is not the AHJ for this project. The Air Traffic Control Tower is wholly owned by the State of Hawaii.
- Q #09. Due to the extent of work at the Control Tower, with the State consider allowing removal at least one glazing pane to allow for material deliveries for the duration of construction, with replacement upon completion of significant materials that are not able to fit through spiral stairs and access door?
- R. At this time there is no consideration for removal of the existing Control Tower glazing. Material delivery and access shall be coordinated with the DOTA and end users after bid is awarded. The Control Tower must

remain operational. Schedule of work shall be approved by the DOTA/end users prior to commencing.

- Q #10. Please confirm that it will be acceptable to surface mount new conduit.
- *R.* Surface mounted conduit is acceptable and shall be painted where they occur.
- Q #11. Please confirm that, for bid purposes, the scope of work will not involve handling nor disposal of hazardous and/or regulated materials. If otherwise, please provide hazardous material survey.
- *R.* Confirmed. No anticipated hazardous materials are involved. Please see bid specs as an allowance shall be provided for any suspect, hazardous materials found during construction or prior.
- Q #12. The industry is currently experiencing fluctuating and extended lead times for material and equipment and it is unknown how this may affect the project upon award. Please confirm that delays for material procurement will be considered an unforeseen condition and the intent is not for the Contractor to consider expediting and air freight of any materials to meet the 240 calendar day duration within their bid proposals.
- R. At this time there will be no consideration for delays as a result of material procurement. Any delays as a result of materials procurement or long lead items shall be brought to the attention of the DOTA immediately after award. A schedule and listing of anticipated long lead materials at a minimum shall be furnished to the DOTA for consideration. The duration of the project has been increased to 365 calendar days.
- Q #13. With the extent of above ceiling work for the electrical and added HVAC scope of work, please clarify if replacement of existing ceiling systems shall encompass all of the affected rooms (as opposed to just the Control Tower, Ground Floor Office, and partial 2nd floor offices on A007.1) or is limited to removal and reinstallation as needed to facilitate the above-ceiling work.
- R. We acknowledge ceiling tiles and potentially some grids must be removed for access to the plenum. The intent is for the contractor to remove ceiling only as necessary to perform scheduled work. Where existing ceiling tiles and grid are called out to remain they shall be reinstalled to original conditions.
- Q #14. If new concrete pads are required for the new ACCUs, please provide details.

AIR TRAFFIC CONTROL TOWER REPAIRS KALAELOA AIRPORT PROJECT NO. A05024-03 AIP PROJECT NO. 3-15-0014-XXX

- *R.* Confirming concrete pads are required for the ACCU's.
- Q #15. Please provide specifications for plumbing fixtures P-1 through P-4.
- *R. Plumbing* Section added in entirety.
- Q #16. A006.1 indicates, "REPLACE ALL EXST. RR FIXTURES PARTITIONS, & ACCESSORIES." Please provide quantities and sizes of RR accessories scheduled for replacement with new.
- R. 42" S.S. Grab Bars 1 Unit 36" S.S. Grab Bar – 1 Unit Toilet Paper Dispenser – 3 Units Seat Cover Dispenser – 3 Units Paper Towel Dispenser – 3 Units Soap Dispenser – 3 units
- Q #17. Specifications include Section 10260 Wall and Door Protection. Please identify, locate and specify dimensions of wall and door protection.
- *R.* Section 10260 Wall and Door Protection has been removed from the specifications in its entirety.
- Q #18. Specifications include Section 10990 that includes specifications for room signs. Please provide room sign schedule.
- R. Sheet A006 Renovated Ground Floor Plan
 - a. Added Signage detail.
- Q #19. Addendum No. 1 Meeting Agenda/Memorandum Item I.5.B.v. lists "Restore existing fire hose cabinets" as part of the project scope of work. Drawings do not appear to indicate type of repairs/locations of existing fire hose cabinets, nor location of new fire extinguishers. Specifications include Section 10520 specifying new fire extinguishers and cabinets. Please clarify intent.
- R. The intent for the fire hose cabinet repair is to demolish and replace the existing cabinets where originally installed and provide new piping to the cabinets fed from the existing water domestic system. There are currently two existing fire hose cabinets provided on the first and second floor within the corridor. Please also provide and Install new Brass Landing valves, new fire hose (verify existing Hose length), and adjustable hose nozzle. Replace brass connectors as required. Provide for (12) new fire extinguishers and cabinets.

- Q #20. Please confirm that all furnishings, systems furniture, wall hangings, office equipment, computers, electronic equipment, personal effects, etc. will be removed by others prior to the start of construction.
- *R.* All furnishings, furniture, and miscellaneous items in question shall be relocated by users. Contractor to coordinate with State/end users.
- Q #21. Drawings indicate to install new layer of GWB atop existing panelized walls.
 - a. There are numerous locations throughout where there is existing surface mounted conduits and wiremold to power and telecommunication service outlets. If Contractor is responsible to remove and reinstall these outlets to accommodate the new GWB, please identify and locate counts of each type for bid purposes.
 - b. Where there are existing recessed electrical boxes, please clarify required remedial scope of work when providing new GWB layer and provide quantity for bid purposes. c. Is the intent to remove all paneling corner/ceiling/wall base trims, door trims, window trims, wall trims prior to installation of new GWB layer, and replace with new trims?
- R. Confirming intent is to remove all casings, trims and corner trims prior to installation of new gypsum board. We acknowledge there are varying conditions of which shall be identified by the contractor after bid award. Once quantified/identified the contractor shall provide a proposal to the State for review and acceptance prior to commencing with any gypsum board application.
- Q #22. Due to the critical nature of control tower and building operations, please provide specific work requirements during the course of the performance of work. For example: a. Will the Contractor's work at the Control Tower be limited to off hour work, or a specific duration? b. Are there any other areas throughout the building where work hours will be restricted? c. For work areas outside of the DOT-A areas, what are the access and work hour requirements? d. Will temporary air conditioning be required at any certain areas/offices? e. Please identify any specific phasing requirements; or for bid purposes, shall the Contractor allow for access throughout all work areas at the same time?
- *R.* Please follow requirements as indicated in bid specs Section 01010 -Description of Work, Paragraph 1.09 Hours of Work. Accessibility and outages to the air conditioning system will be generally allowed during the noted work periods.

- Q #23. Section 08710 lists hinges, locksets, wall stops and thresholds for the 2nd floor restroom door and all interior office/storage doors. Drawings appear to indicate replacement of locksets at DOT-A areas only. a. Please clarify if hardware replacement is inclusive of hardware per 08710 hardware schedule or limited to lockset replacement only. b. Please provide specifications for hardware schedule for the control tower access door scheduled for replacement.
- R. Clarifying no hinges, walls stops and thresholds are required for all interior doors and second floor Restroom door as the work shall be limited to lockset replacement only. Panic hardware specifics to be provided.
- Q #24. A006 indicates "LVT" replacement at Office and Conference Room. Specifications indicate VCT, 12" x 12". Please clarify intent.
- R. Please provide VCT per specifications.
- Q #25. Due to the varying existing conditions (wood frames, no intermediate mullion framing, aluminum framing, possibly previously installed awning type windows) where WAC units are scheduled for removal and replacement with glazing, please advise if for bid purposes, fixed window wood framed glazing pane replacement will be acceptable. If otherwise, please provide glazing details.
- *R.* Fixed wood window frame with ¼" min. tempered glazing will be acceptable. All wood shall be painted to match existing window frame color.

Please acknowledge the receipt of this Addendum No. 2 by recording the date of its receipt in the space provided on page P-4 of the Proposal.

JADE T. BUTAY Director of Transportation

Adobe Acrobat Sign Transaction Number: CBJCHBCAABAAiwODat4mBkoNgxQP6ogQe9MqXtl_sjkQ

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PROPOSAL TO THE

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS DIVISION

PROJECT:	AIR TRAFFIC CONTROL TOWER REPAIRS KALAELOA AIRPORT BARBERS POINT, OAHU, HAWAII
PROJECT NO:	AO5024-03
COMPLETION DATE:	SIXTY (60) calendars days for pre-construction activities followed by;
	THREE HUNDRED FIVE (305) additional calendar days for construction activities, whereby;
	All work under this contract shall be completed within THREE HUNDRED SIXTY FIVE (365) calendar days from the date indicated in the Notice to Proceed from the State.
DBE PROJECT GOAL:	<u>10.5%</u>
LIQUIDATED DAMAGES:	Refer to Section 8.8 of the Special Provisions in these specifications.
PROJECT MANAGER: Address:	Nathan Kaneshige Department of Transportation Airports Division 400 Rodgers Blvd, Suite 700 Honolulu, Hawaii 96819 Email: nathan.c.kaneshige@hawaii.gov Phone: (808) 838-8868 Fax: (808) 838-8751

AIR TRAFFIC CONTROL TOWER REPAIRS KALAELOA AIRPORT BARBERS POINT, OAHU, HAWAII STATE PROJECT NO. AO5024-03 AIP PROJECT NO. 3-15-0014-XX

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
I.	Basic Scope of Work	_			
01010.01	Wall Treatment	L.S.	L.S.	\$	\$
01010.02	Door & Door Hardware	L.S.	L.S.	\$	\$
01010.03	Window Treatment	L.S.	L.S.	\$	\$
01010.04	Casework	L.S.	L.S.	\$	\$
01010.05	Signage	L.S.	L.S.	\$	\$
01010.06	New Flooring	L.S.	L.S.	\$	\$
01010.07	Restroom Improvements	L.S.	L.S.	\$	\$
01010.08	Roofing	L.S.	L.S.	\$	\$
01010.09	Fire Protection	L.S.	L.S.	\$	\$
01010.10	Electrical Power & Lighting	L.S.	L.S.	\$	\$
01010.11	Air Conditioning & Ventilation	L.S.	L.S.	\$	\$
01010.12	Plumbing	L.S.	L.S.	\$	\$
II.	General Requirements	_			
01561.01	Construction Site Runoff Control Program	L.S.	L.S.	\$	\$
III.	Allowances	_			
01010.13	Unforeseen Conditions	Allow.	Allow.		\$ <u>130,000.00</u>
01010.14	Material Short Supply	Allow.	Allow.		\$ 25,000.00
01010.15	Air Conditioning Repair/ Replacement	Allow.	Allow.		\$ <u>100,000.00</u>

PROPOSAL SCHEDULE

Item No.	Description	Approx. Quantity	Unit	Unit Price	,	Total
01010.16	Fire Hose Cabinet Restoration	Allow.	Allow.		\$	25,000.00
01010.17	Additional Roof Equipment Repairs	Allow.	Allow.		\$	30,000.00
01562.01	Management of Contaminated Medias	Allow.	Allow.		\$	25,000.00
01565.01	Security Measures	Allow.	Allow.		\$	25,000.00
TOTAL	AMOUNT FOR COMPA	RISON OF B	IDS		\$	

The bid prices herein shall include all labor, materials, equipment, and incidentals necessary to construct all items in place, including installation and testing of equipment, complete and ready for operation, all in accordance with the plans and specifications.

Note 1:	Bid shall include all Federal, State, County and other applicable taxes.
Note 2:	The TOTAL AMOUNT FOR COMPARISON OF BIDS will be used to determine the lowest responsible bidder.
Note 3:	Bidders must complete all unit prices and amounts. Failure to do so may be grounds for rejection of bid.
Note 4:	If a discrepancy occurs between the unit price and the total, the unit price shall govern.
Note 5:	The State reserves the right to reject any or all Bids and to waive any defects in said Bids in the best interest of the State.
Note 6:	Submission of a Bid is a warranty that the bidder has made an examination of the project site and is fully aware of all conditions to be encountered in performing the work and the requirements of the plans and specifications.
Note 7:	The bidder's attention is directed to Section 2.11 – BID SECURITY and Section 2.24 – REQUIREMENTS OF CONTRACT BONDS of the "General Provisions", as amended by the Special Provisions.
Note 8:	Bidders shall be paid for actual work performed as directed by the Engineer for allowance items. Bidder will not be paid overhead and profit for unused allowance funds.
Note 9:	If the TOTAL AMOUNT FOR COMPARISON OF BIDS exceeds the funds available for the project, then the State reserves the right to negotiate with the lowest, responsive, responsible bidder as permitted under Section 103D-302, Hawaii Revised Statutes (HRS), to further reduce the scope of work and award a contract thereafter.
Note 10:	Proposal Sheets P-1 through P-23 shall be submitted at the time of bid. Failure to submit all pages shall result in rejection of bid.

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01010 - DESCRIPTION OF WORK

PART 1 – GENERAL

1.01 <u>RELATED DOCUMENTS</u>

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

1.02 <u>SUMMARY</u>

- A. Section Includes:
 - 1. Location of the work.
 - 2. Hours of work
 - 3. Safety
 - 4. Operation of airport facilities during construction
 - 5. Disposal of excess soil materials
 - 6. Construction stakes, lines and grades.
 - 7. Special project requirements

1.03 SCOPE OF WORK

- A. The work involves renovations to the Kalaleloa Airport Air Traffic Control Tower but not limited to the following:
 - 1. Air Traffic Control Tower:

Interior Improvements to include new flooring, paint, ceiling tile/grid, lighting, casework and utilities as required.

B. The work to be performed under this Contract shall also include preparing and obtaining all permits required to complete this project and other related works as called for on the plans and these specifications.

1.04 <u>PERMITS</u>

- A. The Contractor is responsible for any permits, if required, before starting the construction. DOTA anticipates that the following permits will be required for this project.
 - 1. None anticipated at this time.

If any of these permits are found to be unnecessary, the Contractor shall provide documentation from the appropriate permitting agency showing that the permit is not required for this project before any construction operations take place.

- B. The Contractor is responsible for the preparation and submittal of application document(s) to the appropriate permitting agency, payment of application fee(s), and all other work necessary to obtain all required permit(s) prior to starting construction operations at the project site. Construction operations shall not start until all required permits are approved by the appropriate permitting agencies and copies submitted to the Engineer for the record.
- C. Bidders are responsible for researching and confirming which permits are and are not necessary for this project. Bidders shall exercise due diligence in researching what permits, if any, are required beyond those mentioned in Part 1.3(A) above. If a permit beyond those mentioned in Part 1.3(A) above is found to be necessary for this project, then bidders shall factor the additional cost of obtaining this permit into their bid. Permits that are found to be required after bid opening shall be obtained at no additional cost to the State.
- D. All fines levied against this project as a result of failing to apply for a required permit prior to starting work shall be borne entirely by the Contractor.
- E. All work necessary for researching permits, determining their necessity for this project, preparation and submittal of permit application document(s), payment of application fee(s), etc. up to the issuance of the approved permit(s) are considered incidental to the Contract.

1.05 <u>ALLOWANCE</u>

- A. Allowance includes, but not limited to, works required for environmental measures, when required by the regulation(s); unforeseen conditions and other measures, such as temporary traffic controls, temporary safety measures, security measures, and material short supply when approved by the Engineer.
- B. Use the allowance only as directed by the Engineer for the airport's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

- C. Contractor's overhead, profit, and related costs for products and equipment ordered by the Airport under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- D. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- E. At project closeout, any unused amounts remaining in the Allowance will be credited back to the State.

1.06 VEHICLE PARKING

Subject to availability of space and approval by the Airport Manager, parking may be made available at a designated parking structure for vehicle parking. The General Contractor shall submit the parking request to the Airport Manager through the State Project Manager (SPM) for review. The SPM will verify the list against the General Contractor's approved subcontractor list and forward it to Airport Manager for approval. Upon approval by the Airport Manager, 2 temporary parking passes per subcontractor and 3 passes for the General Contractor will be issued at no charge. At the Airport Manager's discretion, the parking passes are good for either three (3) months or six (6) months and must be renewed before the passes expire.

All passes will be signed out and become the responsibility of the General Contractor. The General Contractor will distribute the parking passes among their subcontractors.

Additional parking passes beyond the temporary parking passes may be purchased at a monthly rate of \$100.00. These passes are subject to approval by the Airport Manager and availability of parking spaces. All costs associated with obtaining parking passes shall be the responsibility of the Contractor.

1.07 PROVISIONS FOR FIELD OFFICE/STORAGE SPACE

Pending the availability of space on airport property, the State will issue Revocable Permit(s) to the Contractor for the use of the space, assessed at a monthly fee of \$25 for each Revocable Permit issued. The space(s) may be used for a field office, staging of materials and equipment, vehicle parking or other uses subject to the approval of the State. All spaces shall be subject to the requirements of Section 01561 -CONSTRUCTION SITE RUNOFF CONTROL PROGRAM.

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

1.08 LOCATION OF THE WORK

A. The work to be performed under this contract is located at Kalaeloa Airport, Barbers Point, Oahu, Hawaii.

1.09 HOURS OF WORK

- A. Work hours for construction are subject to the following:
 - 1. Normal work hours for Kalaeloa Airport are between 8:00 AM to 5:00 PM Monday to Friday. Bidders shall not assume that they will be given work windows during these hours. The Airport reserves the right to adjust work hours in order to provide minimum interruption to Airport Operations with no additional cost to the State.
 - 2. Work hours shall be coordinated with the Airport Manager to provide minimum interruption to facility operations while performing work.
 - 3. The Contractor will be required to shift to night work hours, at no additional cost to the State, for any work that negatively impacts airport operations especially passenger movement and or comfort. Night work hours may be from Sunday night to Friday morning 10:00 PM to 6:00 AM the following day. However, starting and ending times as well as duration may be adjusted by the Airport Manager depending on the actual flight schedules and airport operational considerations. Contractor vehicles and equipment are not allowed on the aircraft apron fronting the terminal from midnight to 6:00 AM.
 - 4. Work on the exterior of the building will be generally allowed during the day.
 - 5. Work hours shall be coordinated with the Airport Manager in order to protect the general public and airport employees from excessive dust and noise levels unless protective measures are taken by the Contractor (e.g. noise and/or dust control) to reduce the impact to a level acceptable to the Airport Manager.
- B. The Contractor shall submit a proposed construction schedule to Engineer for review and approval within 14 calendar days prior to start of work. The Contractor shall coordinate their schedule with the Engineer if rescheduling of work or intermittent work is required, and such work shall be performed at no extra cost to the State. If the Contractor elects to work overtime, compensation for State employees and for construction management consultant as authorized by the State shall be the Contractor's obligation to pay in accordance with Section 7.6 of the General Provisions.
- C. Contractor shall clean work areas at the end of each working shift. Rubbish, loose materials, etc. shall be disposed of daily. Materials shall be safely secured and stored in an area designated by the Airport Manager.

1.10 SITE VISIT

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

1.11 <u>COORDINATION</u>

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

1.12 <u>SAFETY</u>

- A. The Contractor shall take the necessary precautions to protect his workers and other personnel from injuries. The rules and regulations promulgated by the Occupational Safety and Health Acts are applicable and made a part of these specifications.
- B. Barricades and warning signs shall be erected by the Contractor in the work area to properly protect all personnel in the area.
- C. During the progress of the work debris, empty crates, waste, material drippings, etc., shall be removed by the Contractor at the end of each work day, and the work area shall be left clean and orderly.

1.13 PROTECTION OF EXISTING STRUCTURES AND IMPROVEMENTS

- A. The Contractor shall preserve and protect all structures, equipment, and vegetations on/or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this Contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limb or branches of trees are broken during Contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Engineer.
- B. The Contractor shall protect from damage all existing improvements and utilities at/or near the work site.

1.14 <u>TEMPORARY CONSTRUCTION SIGNS</u>

A. The Contractor shall install temporary construction signs where the presence of planned construction areas will obstruct the existing signage or cause the closing of an existing method of egress or ingress and/or as directed by the State. Such signs shall be in accordance with the Department of Transportation – Airports Signage and Graphics Manual, highway standards for construction warning signs for background and text colors (white letters on fluorescent yellow background). Signs may be

mounted on suitable approved material other than aluminum panels. The Contractor will be responsible to fabricate and install such signs. Costs related to this activity will be considered as incidental to and included in the bid price for the various items of work in this project.

1.15 OPERATION OF AIRPORT FACILITIES DURING CONSTRUCTION

- A. The Contractor shall coordinate the phases of work under this contract with the Engineer to permit the continuing operation of existing Airport facilities and to minimize disruption to pedestrian and vehicular traffic.
- B. Utility Maintenance: During the construction of this contract, existing utility services serving occupied or used facilities shall not be disrupted except where authorized in writing by authorities having jurisdiction. Contractor shall provide temporary services during interruptions to existing utilities, as acceptable to the Engineer. Damages to the existing utility facilities by the Contractor will be repaired at the Contractors expense.
- C. Outages for water, power, communications, air conditioning or any other utility, if necessary, shall be kept to a minimum and scheduled for off-peak hours, generally from 12:00 a.m. to 6:00 a.m. The Contractor shall submit written requests to the Engineer for such outages no later than fourteen (14) calendar days in advance. The request shall include a description of work and the duration of the outage. The Contractor shall not proceed with such outages until written approval is received from the State.

1.16 DISPOSAL OF EXCESS SOIL MATERIALS

- A. At the Engineer's discretion, excess usable soil materials may be disposed of by filling areas within the Airport.
- B. Off-Site Disposal of Excess Soil Material

Any excess soil material and rubbish disposed of outside the Airport property shall be the responsibility of the Contractor. The Contractor shall make all arrangements and bear all costs involved therewith.

1.17 CONSTRUCTION STAKES, LINES AND GRADES

- A. The Contractor shall perform all construction layout and reference staking necessary for the proper control and satisfactory completion of all structures, grading, paving, drainage, sewer, water, and all other appurtenances required for the completion of the work.
- B. Existing horizontal and vertical survey control points for the project are shown on the plans. The Contractor shall verify the location of all control points prior to the

start of construction.

- C. The Department will not be responsible for delays in setting stakes and marks.
- D. All control points and stakes or marks which the Engineer may set shall be preserved by the Contractor. If such control points, stakes or marks are destroyed or disturbed by the Contractor, the cost of replacing such stakes or marks will be charged against the Contractor and deducted from payments due the Contractor.
- E. The Contractor shall be responsible for the placement and preservation of adequate ties to all control points whether established by the Contractor or by the Engineer.
- F. All original, additional or replacement stakes, marks, references and batter-boards which may be required for the construction operations, shall be furnished, set and properly referenced by the Contractor. The Contractor shall be solely and completely responsible for the accuracy of the line and grade of all features of the work. Any errors or apparent discrepancies found in previous surveys, the plans and specifications shall be called to the Engineer's attention by the Contractor for correction or interpretation prior to proceeding with the work.
- G. Before construction is started on any structure which is referenced to an existing structure or topographical feature, the Contractor shall check the pertinent locations and grades of the existing structures or topographical features to determine whether the locations and grades shown on the plans are correct.
- H. All construction staking shall be performed by qualified personnel under the direct supervision of a person with an engineering background who is experienced in the direction of such work and is acceptable to the Engineer.
- I. All stakes and markers used for control staking shall be of the same quality as used by the Department for this purpose. For slope limits, pavement edges, gutter lines, et cetera, where so called "working" stakes are commonly used, stakes of different quality may be acceptable.
- J. The Department may check the Contractor's control of the work at any times as the work progresses. The Contractor will be informed of the results of these checks, but the Department by doing so will in no way relieve the Contractor of his responsibility for the accuracy of the layout work. The Contractor shall at his expense correct or replace any deficient or inaccurate layout and construction work. If, as a result of these deficiencies or inaccuracies, the Department is required to make further studies, redesign, or both, all expenses incurred by the Department due to such deficiencies or inaccuracies, will be deducted from any payments due the Contractor.
- K. The Contractor shall furnish all necessary personnel, engineering equipment and supplies, materials, and transportation incidental to the accurate and satisfactory

completion of this work.

Unless otherwise provided, all requirements imposed by this section and performed by the Contractor shall be considered incidental to the various contract items and not separate or additional payment will be made thereof.

1.18 OPERATIONS AND STORAGE AREAS

- A. Storage and staging areas may be available on a limited basis. Due to the number of projects in progress or projected to be in progress, the State does not guarantee the availability of such areas on airport property. The Contractor may request storage & staging area(s) within AOA fence once the Notice to Proceed date is set.
- B. The Contractor shall confine all operations (including storage of material) on the Airport premises to areas authorized or approved by the Engineer. The Contractor shall hold and save the Airports Division free and harmless from liability of any nature occasioned by the Contractor's performance.
- C. The Contractor shall use only established roadways. When materials are transported in prosecuting the work, vehicle shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local laws or regulations. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, and roadways.

1.19 <u>CLEANING UP</u>

A. The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Airports Division. Upon completing the work, the Contractor shall leave the work area in clean, neat, and orderly condition satisfactory to the Engineer.

1.20 VERIFICATION OF DIMENSIONS

A. The Contractor shall be responsible for the coordination and proper relation of his work to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Owner's Representative of any discrepancy between the field measurements and the plan dimensions before performing any work.

1.21 STANDARDS AND CODES

- A. Wherever references are made in the contract to the respective standards, specifications and advisory circulars in accordance with which work is to be performed or tested, it is to be understood that the edition or revision of the standards, specifications and advisory circulars in effect on the date of the bidder's proposal shall apply unless otherwise expressly set forth in the contract. Unless otherwise specified, reference to such standards is solely for technical information.
- B. In case of conflict among any such referenced standards and codes or between any such standard(s) or code(s) and the requirements of the Contract, the stricter requirement shall govern.

1.22. SPECIAL PROJECT REQUIREMENTS

- A. Upon receipt of the Contract, the Contractor shall process and return the Contract to the State' Contract Office within five (5) calendar days.
- B. The State intends to issue the Notice to Proceed for the Project to the Contractor within 35 calendar days after bid opening. The Contractor shall be able to commence work on this date.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 – MEASUREMENT AND PAYMENT

4.01 <u>METHOD OF MEASUREMENT</u>

A. Work under this section will be measured for payment and paid for at the preapproved contract price.

4.02 BASIS OF PAYMENT

- A. All payments shall be full compensations for all work described under this Section, and all materials, labors, tools, equipment, and incidentals needed to complete the Contract.
- B. Payment will be made under:

<u>Item No.</u>	Item	<u>Unit</u>
01010.01	Wall Treatment	Lump Sum
	(Pay Item shall include Specification Section 09250 – GYPSUM BOARD, Section 09841 – FIXED SOUND ABSORBING PANELS, and other incidental specification sections).	

<u>Item No.</u>	Item	<u>Unit</u>
01010.02	Door & Door Hardware	Lump Sum
	(Pay Item shall include Specification Section 08111 – STEEL DOOR/FRAME, Section 08710 – FINISH HARDWARE, and other incidental specification sections).	
01010.03	Window Treatment	Lump Sum
	(Pay Item shall include Specification Section 08871 – SUN CONTROL WINDOW FILM, Section 12410 – ATCT TRANSPARENT PLASTIC WINDOW SHADES, and other incidental specification sections).	
01010.04	Casework	Lump Sum
	(Pay Item shall include Specification Section 06410 – CABINET WORK and other incidental specification sections).	
01010.05	Signage	Lump Sum
	(Pay Item shall include Specification Section 10990 – MISCELLANEOUS SPECIALTIES and other incidental specification sections).	
01010.06	<u>New Flooring</u>	Lump Sum
	(Pay Item shall include Specification Section 09652 – RESILIENT TILE FLOORING, Section 09681 – CARPET TILE, and other incidental specification sections).	
01010.07	Restroom Improvements	Lump Sum
	(Pay Item shall include Specification Section 08800 – GLAZING, Section 10280 – WASHROOM ACCESSORIES, Section 10211 – TOILET COMPARTMENTS, and other incidental specification sections).	
01010.08	Roofing	Lump Sum
	(Pay Item shall include Specification Section 07560 – FLUID APPLIED ROOFING SYSTEM, Section 07620 – SHEET METAL FLASHING AND TRIM, and other incidental specification sections).	

<u>Item No.</u>	Item	<u>Unit</u>
01010.09	Fire Protection	Lump Sum
	(Pay Item shall include Specification Section 10520 – FIRE EXTINGUISHERS AND CABINETS, Section 13852 – DIGITAL ADDRESSABLE FIRE ALARM SYSTEM, and other incidental specification sections).	
01010.10	Electrical Power & Lighting	Lump Sum
	(Pay Item shall include Specification Section 16010 – ELECTRICAL WORK and other incidental specification sections).	
01010.11	Air Conditioning & Ventilation	Lump Sum
	(Pay Item shall include Specification Section 15000 – GENERAL MECHANICAL REQUIREMENTS, Section 15650 – AIR CONDITIONING AND VENTILATION, Section 15901 – TESTING, ADJUSTING, AND BALANCING, and other incidental specification sections).	
01010.12	<u>Plumbing</u>	Lump Sum
	(Pay Item shall include Specification Section 15000 – GENERAL MECHANICAL REQUIREMENTS, Section 15400 – PLUMBING, and other incidental specification sections).	
01010.13	Unforeseen Conditions	Allowance (ALLOW)
01010.14	Material Short Supply	Allowance (ALLOW)
01010.15	Air Conditioning Repair/Replacement	Allowance (ALLOW)
01010.16	Fire Hose Cabinet Restoration	Allowance (ALLOW)
01010.17	Additional Roof Equipment Repairs	Allowance (ALLOW)

END OF SECTION

SECTION 08710 - FINISH HARDWARE

PART 1 – GENERAL

1.01 <u>RELATED DOCUMENTS</u>

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

1.02 <u>SUMMARY</u>

A. Provide all labor, materials, equipment, tools, etc. for installation of finish hardware as indicated on the drawings and/or specified herein.

1.03 GENERAL REQUIREMENTS

- A. Furnish and deliver to the building site, all finish hardware required for all doors, etc., complete as indicated on the drawings and as specified herein.
- B. It is the intent of these specifications to cover in general the class and character of all finish hardware required.
- C. The hardware list specified hereinafter has been made for the convenience of the Contractor and covers in general the necessary hardware for doors, casework, etc., but all other doors, etc., shown on the plan and not covered by the general characterization shall be fitted with appropriate hardware of the same standards as the hardware described throughout these specifications. Contractor shall furnish hardware schedule as hereinafter specified.
- D. Suppliers proposing substitutes of equivalent products of other than manufacturers named hereinafter shall submit schedules listing products and manufacture specified and product and manufacturer of proposed substitute. This schedule shall be submitted according to the general conditions of the project specifications.
- E. This project shall be keyed to the existing master system. Products which are not locally stocked or which must be special ordered are not acceptable.

1.04 <u>SUBMITTALS</u>

- A. SUBMITTALS: Submit six copies of schedule per Section 01300 SUBMITTALS. Organize vertically formatted schedule into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
 - 1. Type, style, function, size, quantity and finish of hardware items.

- 2. Use BHMA Finish codes per ANSI A156.18.
- 3. Name, part number and manufacturer of each item.
- 4. Fastenings and other pertinent information.
- 5. Location of hardware set coordinated with floor plans and door schedule.
- 6. Explanation of abbreviations, symbols, and codes contained in schedule.
- 7. Mounting locations for hardware.
- 8. Door and frame sizes, materials and degrees of swing.
- 9. List of manufacturers used and their nearest representative with address and phone number.
- 10. Catalog cuts and descriptive literature.
- 11. Date of jobsite visit.
- B. Bid and submit manufacturer's updated/improved item if scheduled hardware listed in schedule below is discontinued.
- C. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

1.05 <u>DELIVERY</u>

- A. Examine the plans, specifications, and details in order to check all items so they will be suitable and of perfect fit and delivered where and when required.
- B. All Hardware shall be delivered at the site, packed separately with all trimmings, screws, etc., for the particular door, all properly labeled and numbered so that they can be checked with the hardware list which shall be furnished with the goods when delivered.
- C. Upon delivery of the finishing hardware to the job site by the hardware supplier, the General Contractor shall have a responsible person check in the material at the place for storage. The hardware shall be protected from damage at all times, both prior to and after installation.

1.06 <u>REPRESENTATIVE</u>

Provide services of a competent hardware specialist who is familiar with installation and operation of all finishing hardware items furnished.

1.07 <u>WARRANTY</u>

- A. Provide manufacturer's standard written warranty (1 year minimum).
- B. Contractors Surety shall not be held liable beyond 2 years from project acceptance date.

PART 2 – PRODUCTS

2.01 <u>MATERIALS</u>

Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

2.02 <u>GENERAL CHARACTER</u>

- A. All hardware shall be of the best quality in construction, design and finish, and free from any defects. Any defective pieces shall be replaced by the Contractor at his own expense.
- B. Hardware shall be of the manufacture, type, weight, function and quality as shown by factory numbers on the hardware schedule. The products of Corbin/Russwin, CCL, Dorma, Hager, LCN Closers, Schlage, Stanley, Telkee, Trimco and Von Duprin, meeting or exceeding the quality and finish of the products specified are also acceptable. The products of other manufacturers are acceptable provided they meet or exceed the quality and finish of the products specified herein and are approved by the Engineer.
- C. Locksets: Mortise locksets shall be the product of a single manufacturer. Cylinders and the locks in which they are used shall be the product of the same manufacturer. All locks shall be classified as Grade I, "Heavy Duty" with six-pin tumblers.
- D. Hinges: Regular bearing and ball bearing types as indicated. hinges for reverse bevel doors with locks shall have pins that are nonremovable by a set screw in the barrel. All hinges shall be 4-1/2 X 4-1/2 unless otherwise noted.

E. Closers

1. Surface Closers:

- a. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
- b. ISO 2000 certified. Units stamped with date-of-manufacture code.
- c. Independent lab-tested 10,000,000 cycles.
- d. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
- e. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
- f. Mount closers on interior door and frame faces.
- g. Adjustable to open with not more than 8.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors.
- h. Separate adjusting valves for closing speed, latching speed and backcheck.
- i. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
- j. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
- k. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
- 1. Non-flaming fluid, will not fuel door or floor covering fires.
- m. Pressure Relief Valves (PRV) not permitted.
- F. Other Hardware:
 - 1. Door Stops: Provide stops to protect walls, casework or other hardware
 - a. Unless otherwise noted in Hardware Set, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
 - 2. Seals: Inelastic, rigid back, not subject to stretching. Self-compensating for warp, thermal bow, door settling, and out-of-plumb. Adhesive warranted for life of installation.

- 3. Thresholds: As scheduled and per details. Comply with ICC/ANSI A117.1 Section 404.2.4 & 303. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval, in accordance with the General Provisions and Special Provisions.
 - a. Saddle thresholds: 0.125 inches minimum thickness.
 - b. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Minimum 0.25 inch diameter fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
 - c. Fire-rated openings, 90-minutes or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Engineer.
 - d. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
 - e. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
- 4. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Leave no unfilled/uncovered pre-punched silencer holes. Intent: door bears against silencers, seals, make minimal contact with minimal compression- only enough to effect a seal.
- G. Finish: Except as otherwise indicated, finish of hardware shall be 626.
- H. ADA Compliance: All hardware for doors indicated on the drawings as ADA accessible shall conform to the requirements of the Americans With Disabilities Act Accessibility Guidelines (ADAAG), Sections 4.13.8, 4.13.9, 4.13.10, and 4.13.11.

2.03 KEYING

Locks shall have four (4) keys each. Locks for the same rooms shall be keyed alike. All locks shall be master keyed and Grandmaster keyed to the existing keying system. During period of construction, all locks shall be operated by a special master key. Regular day and master keys are to be retained by the Contractor so they cannot be obtained or duplicated by unauthorized persons. All keys shall be stamped "DO NOT DUPLICATE" at the point of manufacture. The special construction master key shall

become inoperative when regular keys are turned over to the Engineer. Proper certification of factory assembly of all locks and cylinders as well as factory master keying shall be furnished by the Contractor prior to final acceptance of this portion of the work. Certificate shall then be given to the Engineer. Provide ten (10) construction master keys, six (6) grand master keys, and six (6) master keys per set. Contractor shall coordinate keying system with that of the state.

2.04 <u>FASTENINGS</u>

- A. Furnish necessary screws, bolts, and other fastenings for proper application of hardware. Fastenings shall be of suitable size and type of securing hardware for heavy use. Fastenings must harmonize with the hardware as to material and finish.
- B. Furnish necessary expansion shields, toggle bolts, machine or wood screws or other suitable approved anchoring devices where hardware is to be installed on concrete, masonry or other type of backing.

2.05 TOOLS AND INSTRUCTIONS

All tools and maintenance or installation instruction packed with the closers and locksets shall be given to the State of Hawaii when the project is complete.

2.06 SPARE LOCKSETS

Furnish spare locksets to the Engineer, in quantities and functions as indicted in the Hardware Schedule. All spare locksets shall be furnished in manufacturer's packaged boxes, clearly marked, and complete with all parts, core, screws, etc., including four (4) blank keys.

PART 3 – EXECUTION

3.01 PRE-INSTALLATION MEETING

Prior to the start of installation of the finish hardware, the Contractor, hardware installer, hardware supplier and/or manufacturer's representative, and the Engineer, shall have a pre-installation meeting to review the hardware installation instructions and installation conditions.

3.02 HARDWARE SUPPLIER'S INSPECTION

Before final inspection of the work under this contract and acceptance of the project by the Engineer, the supplier of hardware and other items specified in this Section shall visit the site and carefully inspect all parts for conformance to this specification, adequacy for intended use, proper functioning, appearance, finish and successful operation, assuming joint responsibility with the General Contractor.

3.03 KEYING OPERATION AND ORIENTATION

The General Contractor and/or hardware supplier shall together with the Engineer and/or representative(s) from the State, conduct an orientation of the operation of all hardware and locks

3.04 HARDWARE SCHEDULE

Furnish the following hardware groups in the amounts indicated on the drawings or required for a complete and proper installation.

Abbreviations:MCKMcKinney Products CompanySARSargent Manufacturing Co.TRITrimcoPEMPemkoSCHSchlage Lock CompanyLCNLCN ClosersVONVon Duprin

Hardware Group No. 1 For use on Door #(s): Second Floor Restroom Door

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CORRIDOR LOCK	ND73P6D RHO	626	SCH

Hardware Group No. 2 For use on Door #(s): All interior office/storage doors

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	ENTRANCE/OFFICE	ND50P6D RHO	626	SCH
		LOCK			

Hardware Group No. 3 For use on Door #(s): Control Tower Access Door (Verify Conditions)

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	98-L-06	US26DAM	VON
1	EA	RIM CYLINDER	20-057	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA SRI	689	LCN
1	EA	FLOOR STOP	FS439	630	IVE
1	EA	DOOR SWEEP	39A	А	ZER
1	EA	THRESHOLD	545A-223	А	ZER

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15000 - GENERAL MECHANICAL REQUIREMENTS

PART 1 – GENERAL

1.01 <u>RELATED DOCUMENTS</u>

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

1.02 <u>SUMMARY</u>

- A. The Contractor shall furnish all labor, materials, tools and equipment and perform all work and services necessary for a complete and properly operating mechanical work, equipment and systems, as shown in drawings and as specified in accordance with provisions of the Contract Documents and completely coordinated with work of all other trades.
- B. The Contractor shall completely examine the Contract Documents and shall report to the State any error, inconsistency or omission he discovers prior to submitting a bid.
- C. Furnish and install all supplementary or miscellaneous items, details, appurtenances and devices incidental to or necessary for a sound, secure and complete mechanical system where work required is not specifically indicated.
- D. Drawings and specifications shall be taken together. Provide work specified and not indicated or work indicated and not specified as though mentioned in both.
- E. The Contractor shall warrant that all materials and equipment furnished under this Contract will be new and that all work will be good quality, free from faults and defects and in conformance with Contract Documents for a guaranteed period of 1 year.
- F. The Contractor shall maintain at the site one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other modifications in good order and marked to record all changes made during construction. These shall be made available to the Engineer at all times.
- G. The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the work, he shall remove all his waste materials and rubbish from and about the project as well as all his tools, construction equipment, machinery and surplus materials and shall clean all new equipment and accessories.
H. The Contractor shall give the State timely notice of its readiness for testing any work including the data arranged so that the Engineer may observe such testing. The Contractor shall bear all cost of such tests.

1.03 <u>SUBMITTALS</u>

- A. Submit shop drawings, manufacturers' data and certificates for equipment, materials, finish and pertinent details for each system and have them approved before procurement, fabrication or delivery of the items to the job site. Partial submittals will not be acceptable and will be returned without review. Partial submittal for long lead equipment shall be accepted prior to complete submittal. Submittals shall include the manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable industry and technical society publication references and other information necessary to establish contract compliance of each item the Contractor proposes to furnish.
- B. Shop Drawings: Drawings shall be 24 inches by 36 inches in size, except as specified otherwise. Drawings shall include floor plans, sectional views, installation details of equipment; and equipment spaces identifying and indicating proposed location, layout and arrangement of items of equipment, accessories, piping and other items that must be shown to assure a coordinated installation. Drawings shall indicate adequate clearance for operation, maintenance and replacement of operating equipment devices. If equipment is disapproved, drawings shall be revised to show acceptable equipment and be resubmitted.

The Contractor shall review, stamp with his approval and submit, all Shop Drawings required by the Contract Documents or subsequently by the State as covered by modifications. At the time of submission, the Contractor shall inform the State in writing of any deviation in the Shop Drawings from the requirements of the Contract Documents. By approving and submitting Shop Drawings, the Contractor certifies that he has determined and verified all field measurements and obstructions, field construction criteria, materials, catalog numbers and similar data, that he has checked and coordinated each Shop Drawing with the requirements of the work and of the Contract Documents and that all equipment fits within designated spaces.

- C. Manufacturers' Data: Submittals for each manufactured item shall be manufacturers' descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves and catalog cuts. Submittals shall include equipment certification terms and conditions, applicable self-diagnostic testing and start-up procedures. Equipment submittals shall specifically indicate the specified equipment assembly configurations with all specified standard and optional features, above and beyond general catalog products technical literature.
- D. Standards Compliance: When materials or equipment must conform to the standards of organizations such as the American National Standards Institute (ANSI),

American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA) and Underwriters Laboratories (UL), American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) proof of such conformance shall be submitted to the State for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections. In lieu of the label or listing, the Contractor shall submit a certificate from an independent testing organization, which is competent to perform acceptable test and is approved by the State. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item conforms to the specified organization's standard. For materials and equipment whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance, a certificate of compliance from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product and the referenced standard and shall simply state that the manufacturer certifies that the product conforms to all requirements of the project specification and of the referenced standards listed.

- E. Certified Test Reports: Before delivery of materials and equipment, certified copies of all test reports specified in the individual section shall be submitted for approval. Furthermore, submit a written certificate, dated and signed by an authorized corporate officer of the Contractor who is either a full-time employee, principal, or a full-time partner delegated with the authority to bind the Contractor in all matters relating to its professional work of the Contractor, evidencing the performance of any portion of the work, or any testing; as a condition precedent to the acceptance of any work or the result of any test. Corporate credentials shall be furnished concurrently with applicable written certificates. Whenever a regulatory agency performs inspections or tests of any portion of the work, a written certificate shall be furnished by the Contractor to validate the results from the respective inspection test.
- Certificates of Conformance or Compliance: Submit all certificates applicable to all F. specified equipment assemblies and parts for the Engineer's approval prior to equipment delivery and commencement of equipment on-site installation. A certification from the manufacturer attesting that materials and equipment to be furnished for this project complies with the requirements of this specification and of the referenced publications. Preprinted certifications will not be acceptable; certifications shall be in the original. The certification shall not contain statements that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as"; "achieve the same end use and result as materials formulated in accordance with the referenced publication," "equal or exceed the service and performance of the specified material." The certification shall simply state that the product conforms to the requirements specified. Furthermore, submit a written certificate, dated and signed by an authorized corporate officer of the Contractor who is either a full-time employee, principal, or a full-time partner delegated with the authority to bind the Contractor in all matters relating to its professional work of the Contractor, evidencing the performance of any portion of

the work, or any testing; as a condition precedent to the acceptance of any work or the result of any test. Corporate credentials shall be furnished concurrently with applicable written certificates. Whenever a regulatory agency performs inspections or tests of any portion of the work, a written certificate shall be furnished by the Contractor to validate the results from the respective inspection test.

G. Manufacturers' Certified Full Standard Product Warranty: Submit the manufacturer's certified Full Standard Product Warranty terms and conditions applicable to all specified equipment assemblies and parts for the Engineer's approval prior to equipment delivery and commencement of equipment on-site installation, as approved by the Engineer. All manufacturers' Full Standard Product Warranty certificates are to be provided to the State at the time of equipment delivery and prior to the commencement of equipment on-site installation. The warranty and maintenance service shall extend for a period of 2 years commencing after 30 consecutive days of trouble-free operation after the Project Acceptance Date or as authorized by the Contractor, if earlier than the Project Acceptance Date.

Warranty shall cover all costs for parts, labor, associated travel, and expenses for a period of 1 year from project acceptance.

- H. Operation and Maintenance Manuals: Submit manuals on all equipment and the overall system upon successful completion of equipment on-site installation and start-up and prior to final inspection, as approved by the Engineer.
- I. Manufacturers' factory trained and certified service personnel: Prior to the equipment on-site installation, submit to the State documentation as evidence of the respective manufacturers' certification of all personnel responsible for installation, testing, and start-up of the equipment.

1.04 LAWS, REGULATIONS AND CODES

- A. All work shall be in accordance with government laws, ordinances, rules and regulations and orders.
- B. The following shall govern where applicable; the Uniform Plumbing Code, International Building Code, State of Hawaii Department of Health Regulations, Applicable National Fire Protection Association Standards, OSHA, Rules and Regulations and all other codes and standards referenced in these specifications. Where requirements differ in these codes and standards, the more stringent shall apply.

1.05 TRADE NAME

A. Mentioning of a trade name in the plans and specifications indicates that the manufacturer is acceptable to the State. However, certain specified construction and details may not be regularly included in the manufacturer's catalogued product. The

Mechanical Contractor shall provide the material or equipment complete as specified.

1.06 PERMITS AND INSPECTIONS

- A. Applications for permits will be done by the State. The Mechanical Contractor shall pay for all necessary permits and fees.
- B. The Mechanical Contractor shall apply and pay for all necessary inspections required by any public authority having jurisdiction.

1.07 DISCREPANCIES

- A. The Drawings and Specifications are intended to be cooperative. Any materials, equipment or system related to this section and exhibited on the Electrical or Mechanical Drawings but not mentioned in the Specifications are to be executed to the intent and meaning thereof, as if it were both mentioned in the Specifications and set forth on the Drawings.
- B. In case of differences between the Drawings and Specifications, the Specifications shall govern first, and then the Drawings. Large scale details shall take precedence over small scale Drawings as to the shape and details of construction. Specifications shall govern as to materials.
- C. Drawings and Specifications are intended to be fully cooperative and to agree but should any discrepancy or apparent difference occur between Drawings and Specifications or should error occur in the work of others affecting the work, the Contractors shall notify the Engineer at once. If the Contractor proceeds with the work affected without instructions from the State, he shall make good any resultant damage or defect. All interpretations of Drawings and specifications shall be clarified by the State.

1.08 WORKMANSHIP AND MATERIALS

- A. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. The Contractor shall furnish the services of an experienced superintendent, who will be constantly in charge of the erection of the work, until completed and accepted.
- B. Unless otherwise hereinafter specified, each article of its kind shall be the standard product of a single manufacturer.
- C. Whenever the words "or approved equal" or other words of similar intent or meaning are used, implying that judgment is to be exercised, it is understood that it is the judgment of the Engineer that is referred to.

- D. The Engineer shall have the right to accept or reject material, equipment and/or workmanship and determine when the Contractor has complied with the requirements herein specified.
- E. All manufactured materials shall be delivered and stored in their original containers. Equipment shall be clearly marked or stamped with the manufacturer's name and rating. Equipment and materials shall be carefully handled, properly stored and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the Engineer. Damaged or defective items, in the opinion of the Engineer, shall be replaced.
- F. Reference to standards are intended to be the latest revision of the standard specified.

1.09 MANUFACTURER'S RECOMMENDATIONS

A. Equipment installed under this Division of the Specifications shall be installed according to manufacturer's recommendations, unless otherwise shown on the drawings or herein specified. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Engineer, prior to the installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can cause rejection of the material.

1.10 INSPECTION OF SITE

A. This Contractor shall visit the site and examine the conditions affecting his work before submitting his proposal. The submission of the proposal shall be considered evidence that the Contractor has visited the site and no extra payments will be allowed to the Contractor on account of extra work made necessary by his failure to visit the site. If there are any questions or discrepancies in the design, the Contractor shall bring it to the attention of the Engineer before submitting his proposal.

1.11 CONTINUITY OF SERVICES, PHASING

- A. Examine site and become familiar with existing local conditions affecting work.
- B. Examine all Drawings and Specifications (i.e. work from other trades) and become familiar with the types and systems of construction to be used. Determine how such types and systems will affect the installation of mechanical work.
- C. Investigate, determine and verify locations of any overhead utilities on or near the site. Determine such locations in conjunction with all public and private utility companies and with all authorities having jurisdiction.

1.12 OPENINGS, CUTTING AND REPAIRING

- A. The Mechanical Contractor shall cooperate with the work to be done under other sections in providing information as to openings required in walls and slabs for all piping including sleeves where required.
- B. Any drilling or cutting required for the performance of work under this Section shall be the responsibility of this Contractor and the cost shall be borne by him.
- C. Holes in Concrete: The Mechanical Contractor shall pay all costs for cutting holes. All holes through existing concrete shall be either core drilled or saw cut. All holes required shall have the approval of the Engineer prior to cutting and drilling.
- D. It shall be the responsibility of this Contractor to ascertain that all openings are properly located.

PART 2 – PRODUCTS

2.01 <u>MATERIALS</u>

- A. As specified in all sections of DIVISION 15 -MECHANICAL.
- B. Materials and equipment shall be cataloged products of manufacturers regularly engaged in production of such materials or equipment and shall be the manufacturer's latest design that complies with the specifications requirements. Materials and equipment shall be duplicate items that have been in satisfactory commercial or industrial use at least 2 years prior to bid opening. Where two or more items of the same class of equipment are required these items shall be products of a single manufacturer; however, the component parts of the items need not be the products of the same manufacturer. Each item of equipment shall have the manufacturer's name, address, model number and serial number on the nameplate.
- C. The mechanical contractor shall provide all necessary options and/or accessories to comply with the applicable equipment specification requirements. Installation of the options and/or accessories shall be in accordance with the manufacturer's requirements and the complete assembly shall be warranted by the respective equipment manufacturer.
- D. The Mechanical contractor shall provide certified manufacturer's representatives and/or service technicians for any field modification to mechanical equipment. The Contractor shall ensure that any modification to the equipment will not invalidate the manufacturer's warranty

2.02 <u>SUBSTITUTIONS</u>

- A. The materials, products, and equipment described in these specifications establish a standard of required function, quality, dimension, capacity, performance and appearance to be met by any proposed substitution.
- B. Specific product listings in these specifications shall not preclude alternative product selections of equivalent or superior quality. Contractor may make reasonable substitutions, provided that these are submitted to the Engineer for acceptance in accordance with the SPECIAL PROVISIONS and the INTERIM GENERAL CONDITIONS. The Contractor shall be responsible for design changes to accommodate the substituted product, at no additional cost to the State.

PART 3 – EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

- A. Provide competent and qualified manufacturer's factory trained and certified field service personnel on-site to be responsible for execution of all diagnostic testing in accordance with equipment manufacturer's installation and start-up certification requirements and warranty terms and conditions. Perform work using adequate numbers of personnel skilled in the appropriate trades, and provide adequate supervision and management of the work.
- B. All workmanship shall be of the highest standard. The piping systems shall be laid out to insure a neat, systematic and orderly arrangement of all work. Vertical piping lines shall be plumb and lines that are grouped shall be parallel and as direct as possible. Exposed pipe where indicated, shall be run parallel with walls.

3.02 PROTECTION OF MATERIALS AND EQUIPMENT

A. Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical injury. Upon completion of all work the fixtures, materials and equipment shall be thoroughly cleaned, repainted as required, adjusted and operated.

3.03 <u>CUTTING AND PATCHING</u>

A. The Contractor shall arrange for all cutting, fitting and patching necessary to accommodate the plumbing work as the job progresses and such cutting and patching shall be done by that trade experienced in the particular type of work required.

3.04 **<u>PIPING IDENTIFICATION</u>**

- A. Identification of all new pipelines shall be by means of colored, waterproof, all temperature, self-adhering labels and directional arrow.
- B. All exposed pipes, whether insulated or not shall be identified. Labels may be omitted from piping where the use is obvious, due to its connection to equipment and where the appearance would be objectionable in finished rooms, as approved by direction.
- C. Identification labels shall be placed as follows:

Near each valve and branch connection. Wherever piping merges or disappears from view from the floor of the room in which it is installed.

Labels shall not be more than 50 feet apart.

3.05 EQUIPMENT IDENTIFICATION

A. Identify all equipment with symbol and service conforming to that indicated on the drawings. Identification shall be on 1-1/4 inch by 3 inch laminated plastic nameplates securely fastened to the equipment. Leave manufacturer's nameplate clean, legible, and unpainted.

3.06 COORDINATION OF WORK AS SPECIFIED IN OTHER SECTIONS

A. The Mechanical Contractor is responsible for coordination with the General Contractor to assure proper layout, size, and location of mechanical equipment. Mechanical Contractor shall ensure that power and control wiring are provided and installed.

3.07 **INSPECTIONS**

- A. All work and materials are subject to field observation at any and all times by the Engineer.
- B. Contractor shall notify the Engineer a minimum of two days prior to testing any piping which must be witnessed and approved before they are covered up or enclosed. Should the Contractor fail to notify the Engineer at the times prescribed, it shall then be the Contractor's responsibility to make accessible any concealed lines or demonstrate the acceptability of any part of the system. Any extra cost caused by the removal of such work shall be borne by the Contractor.

C. If observer finds any material or work not conforming to these Specifications, Contractor within three days of being notified shall remove said materials from the premises and replace with approved material, at no cost to the State.

3.08 OPERATIONAL ACCEPTANCE TESTS

A. The Mechanical Contractor shall perform all tests of the installed work and shall provide all services, labor, equipment, materials and instruments needed for the tests. During pressure tests all items in the system to be tested, not designed for test pressures, shall be removed or isolated from the system and shall be reconnected or unblocked after tests are completed. Should operating tests require the presence of manufacturers' representatives, the Mechanical Contractor shall cooperate with them and shall place at their disposal all assistance, materials and services required to perform such test. The Mechanical Contractor shall certify in writing that all work has passed all required tests and shall complete the attached Operational Performance Tests form.

3.09 INSTRUCTION TO STATE PERSONNEL

A. The Contractor shall furnish the services of competent instructors who will give full instruction to the designated personnel in the adjustment, operation and maintenance, including pertinent safety requirements, of the equipment or system specified. Each instructor shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work.

Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the State for regular operation. The number of man-days (8 hours) of instruction furnished shall be as specified in other sections. When more than 4 man-days of instruction are specified, approximately half of the time shall be used for classroom instruction. All other time shall be used for instruction with the equipment or system. When significant changes or modifications in the equipment or systems are made under the term of the contract, additional instruction shall be provided to acquaint the operating personnel with the changes or modifications.

3.10 LOCAL TECHNICAL SUPPORT

- A. The mechanical equipment supplier shall have a Hawaii office within 500 miles of the project site, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components.
- B. The control system supplier shall have a Hawaii office within 500 miles of the project site, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components.

3.11 SAFETY REQUIREMENTS

A. Belts, pulleys, chains, gears, couplings, projecting setscrews, keys and other rotating parts located so that any person can come in close proximity thereto shall be fully enclosed or properly guarded. High temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation of a type as specified herein.

Items such as catwalks, ladders and guardrails shall be provided where required for safe operation and maintenance of equipment.

3.12 CLEANUP AND REPAIRS

- A. Debris shall not be allowed to accumulate as a result of this work. Upon completion of this work, remove all debris and excess materials, tools, etc. resulting from this work from the jobsite and leave the location of this work broom-clean in a manner acceptable to the Contracting Officer.
- B. This Contractor shall clean all fixtures and equipment set by him of oil, grease, stains, etc. All plates, trim, etc. shall be polished. Traps and drains shall be clean and unobstructed.
- C. All fixture piping and lines shall be thoroughly cleaned before leaving the work.

3.13 FINAL INSPECTION

A. Final inspection shall be requested by the Mechanical Contractor only after submittal of all required certificates. No final inspection will be made until all moving parts of equipment are properly guarded, all controls and safety devices tested and operative, all painting required done and the site cleaned up.

3.14 <u>GUARANTEE</u>

A. The Mechanical Contractor shall guarantee the installation for a period of 1 year after 30 consecutive days of trouble-free operation after the date of acceptance of the project by the State against any defects due to faulty materials, equipment, workmanship or installation. Upon notice of defect, the Mechanical Contractor shall correct; replace defective item at no additional cost to the State.

3.15 <u>TWO-YEAR GUARANTEE AND MAINTENANCE SERVICE CONTRACT</u>

A. In addition to the Guaranty on materials and workmanship, the Installer shall submit seven (7) copies of the Maintenance Service Contract, countersigned by the Contractor, that will validate the Guaranty.

B. The Guarantee and maintenance service shall extend for a period of 2 years after 30 consecutive days of trouble-free operation after the Project Acceptance Date, or the Air Conditioning Equipment Acceptance Date if earlier than the Project Acceptance Date, and shall include all labor, materials, equipment and parts necessary to service the complete system, in accordance with the subsection 3.16 E. Maintenance Schedule, 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 State. This maintenance period and the Guaranty period shall run concurrently (same start and end dates).

Trouble-free operation is defined as a non-disabling condition or a non-recurring failure or disruption and the following:

- 1. The system shall be free of all discrepancies, contamination and debris which require correction in excess to those described for the monthly service which is included in the Schedule of Maintenance.
- 2. The system is maintaining operational conditions and other parameter as measured during acceptance tests.
- C. The Installer shall include a listing of the following items along with the Maintenance Service Contract:
 - 1. Names of the servicing contractor.
 - 2. Air conditioning system acceptance date.
 - 3. Service contract expiration date.
 - 4. Monthly inspection schedule for the maintenance period.
 - 5. Itemized listing of the equipment covered under the service contract, including a description of the equipment identified, its model and serial number(s) and manufacturer's name(s).

Maintenance service contractor shall have a local office, staffed with competent and qualified manufacturer's factory 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 technical assistance instruction, routine maintenance and emergency maintenance service on all system equipment components.

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

Distribution of submittal:
1 copy: DAGS HDO
2 copies: User
2 copies: User's Facility Maintenance Agency
1 copy: DAGS, Technical Services Office

- E. Schedule of Maintenance Service: All service performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance task:
 - 1. AIR HANDLING UNIT/FAN COIL UNIT
 - a. Monthly Service
 - (1) Clean and clear all drip pans and flush all related condensate drain lines with nitrogen. Install pan tablets if necessary to control algae growth. (Note: Contractor may be liable for water damage due to clogged drains.)
 - (2) Change all disposable air filters at least once a month; use Farr 30/30 or equal.
 - (3) Wash permanent type filters with an approved detergent and spray coat with an approved filter treatment solution. Replace deteriorated permanent type filters which cannot be cleaned.
 - (4) Lubricate and oil all fan and motor bearings and connections of dampers and vanes.
 - (5) Check all drives for wear; adjust belt tension. Replace belt as required.
 - (6) Operate equipment to check for proper operation, unusual noise and vibration; adjust or repair all equipment and controls as required; clean-up all equipment.
 - (7) Check time clock for proper operation and time settings.
 - (8) Certify performance of monthly services and that all discrepancies are reported and corrected.
 - b. Annual Service
 - (1) Adjust alignment of bearings and sheaves; lubricate fan and motor bearings. Replace worn or noisy bearings or sheaves.

- (2) Clean cooling coils of dirt accumulation using nitrogen, high pressure air/water, steam or chemical coil cleaner solution.
- (3) Check pressure and temperature differential across cooling coils and log readings. Clean strainers, check vents and drains on refrigerant lines.
- (4) Clean supply and return air grilles, registers and diffusers and fresh air intake grilles and dampers and repair or replace deteriorated bird screens.
- (5) Clean all fan wheels and interior and exterior of equipment housings.
- (6) Secure all loose housing, seal leaks and touch-up paint after cleaning all rust.
- (7) Check and calibrate all pneumatic and/or electric temperature controls.
- (8) Certify performance of annual service and that all discrepancies are reported and corrected.

2. TEMPERATURE CONTROLS

- a. Quarterly Service
 - (1) Check control devices for proper operation, sticking stems, and calibration; repair/replace weak or broken springs and all other parts.
 - (2) Adjust thermostat to maintain 55F supply air temperature.
 - (3) Certify performance of quarterly maintenance service and that all discrepancies are reported and corrected.

3. SPLIT DX AIR-COOLED AIR CONDITIONER

- a. Monthly Service
 - (1) Perform the tasks of Item a. Air Handling Unit/Fan Coil Unit.
 - (2) Check compressor oil level and refrigerant sight glass; add oil as needed and change filter/drier if moisture indicated.
 - (3) Check refrigerant system for leaks, unusual noise and vibration and record suction, discharge and oil pressures and maintenance log book and correct and report all deficiencies.

- b. Annual Service
 - (1) Perform the tasks of item a. Air Handling Unit/Fan Coil Unit.
 - (2) Check compressor coupling alignment; lubricate or replace noisy bearings.
 - (3) Clean cooling and condenser coils of dirt accumulation using nitrogen, high pressure air/water, steam or chemical coil cleaner solution.
 - (4) Test compressor crankcase oil and replace if contaminated or submit oil test results. clean or replace strainer and oil filter (open compressor).
 - (5) Test and check system response at various cooling load conditions for proper operation, record settings, adjust as required. Recalibrate all safeties, capacity, and temperature controls to proper settings.
 - (6) Check and clean all unit housing (inside and outside and components), seal leaks and remove rust from exterior components and touch-up paint.
 - (7) Megger (electrical test to measure wire insulation resistance, i.e. condition) compressor motor and submit report and recommendation; check starter, relays, and control contacts and electrical connections for tightness and clean as required.

F. WORK SCHEDULE

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

G. TROUBLE CALLS

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

H. MAINTENANCE REPORT/CHECKLIST:

The Contractor shall prepare and maintain a maintenance service report/checklist which shall include the following:

- 1. Date maintenance service was performed.
- 2. The name of the mechanic who performed said maintenance.
- 3. The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.

4. Documents and other data pertaining to the maintenance performed.

It will be the responsibility of the Contractor to maintain the report/checklist by recording the above noted data after each scheduled maintenance and emergency repairs 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. See attached service maintenance report form.

Reports shall be certified by a representative of the facility being served and shall be submitted at the completion of the service contract.

I. CLEANUP AND WORK PRACTICES

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. The Contractor shall exercise caution during the progress of his maintenance and repair work to prevent damage to the ceilings, roofing and other building structure. The Contractor shall restore all damages, caused by his negligence, to its original condition at his own expense.

All costs for periodic maintenance services and for emergency calls shall be included in the lump sum bid price.

J. The Maintenance Service Contract does not include repairs resulting from vandalism, negligent use or misuse of equipment.

3.16 OPERATION AND MAINTENANCE MANUAL

- A. Submit three (3) hard bound copies of the Operating and Maintenance Manual on all equipment and the system as a whole. The manual shall identify project name and number, Contractor, consultant, date and all equipment provided, It shall include the equipment manufacturer's name, model and serial number, tag no., capacity, quantity of units, their location and area (room) served and shall include the manufacturer's operation and maintenance manuals including control and wiring diagrams and source of service and replacement parts. When standard manufactures' brochures are used, adequately indicate (highlight, arrow, etc.) the project related information and delete (X or cross-out) the non-applicable information.
- B. Distribution of submittal:

1 copy: User

2 copies: User's Facility Maintenance Agency

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

END OF SECTION

SECTION 15400 - PLUMBING

PART 1 – GENERAL

1.01 <u>RELATED DOCUMENTS</u>

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

1.01 <u>SUMMARY</u>

A. Provide all labor, materials, equipment, services, and related work to complete all plumbing work as shown on the drawings and as specified. The work shall include the following:

Removal of existing equipment and piping, as indicated on drawings.

Plumbing equipment and connections thereto.

Domestic hot and cold-water piping and insulation.

Connection to existing utilities.

Disinfection of water supply lines.

Testing and adjusting.

Manufacturer's literature, shop drawings, and record drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Line voltage wiring and conduit shall be performed under DIVISION 16 – ELECTRICAL WORK.

1.03 <u>GENERAL REQUIREMENTS</u>

A. It is the intent of the plans and specifications to provide a complete installation. Should there be omissions or discrepancies in the plans and specifications, the Contractor shall call the attention of the Engineer to such omissions and discrepancies in advance of the date of bid opening so that the necessary corrections can be made. Otherwise, the Contractor shall furnish and install the omissions or discrepancies as if the same were specified and provided for.

- 1. Standards:
 - a. All work shall be done in accordance with UPC 2018 and applicable ordinances of the City and County of Honolulu.
 - b. Work shall comply with applicable regulations of the State of Hawaii Health Department.
 - c. Contractor shall obtain all permits, licenses, and certificates and pay for all fees.
 - d. ASHRAE/IESNA 90.1
- 2. Product Standards: Specified materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products.
- 3. Project/Site Conditions: The Contractor shall become familiar with details of the work, verify dimensions in the field and advise the Contractor of any discrepancy before performing any work.

1.04 <u>SUBMITTALS</u>

- A. Drawings: The drawings and specifications are intended to cover the complete installation of systems to function as described. The omission of reference to any necessary item of labor or material shall not relieve the Contractor from providing such labor or material. Drawings do not attempt to show exact details of piping and ductwork. Provide offsets as necessary to avoid local obstructions or interferences with other trades.
 - 1. Contract Drawings: Mechanical plans are essentially diagrammatic, showing locations of pipes and other mechanical equipment. Where locations are not dimensioned, they are approximate, and before installing, Contractor shall study existing conditions and make installation in most logical manner.
 - 2. Shop Drawings: The Contractor shall submit 6 copies of shop drawings and brochures or catalog cuts of equipment for review and reply prior to start of work. Drawings shall show complete dimensioned installation, including all piping in building, equipment installation, elevation, inverts, supports and foundations.
 - 3. Record Drawings: The Contractor shall keep at the job site a complete, neat, and accurate record of all approved deviations from the contract drawings, shop drawings and specifications, indicating the work as actually installed. These changes shall be recorded on prints of the drawings affected and the shop drawings. As-builts shall be submitted to the Contractor after final acceptance.

B. Product Data: As soon as practicable and within 30 days after award of contract and before commencement of installation of any materials and equipment, a complete schedule of the materials and equipment proposed for installation shall be submitted for the approval of the Contractor. No consideration will be given to partial lists submitted from time to time. Any scheduled materials, fixtures and equipment not conforming to the specifications may be rejected.

For each type of plumbing equipment, include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment and supports.

- C. Warranty: All work and materials executed under this section shall be under warranty to be free from defects of materials and workmanship for one (1) year from date of final acceptance of project as a whole by the Contractor. All work of repair and replacement required, including other work damaged by this work's defects shall be performed without cost to the State.
- D. Certificates: Furnish certificates for evidence of proper performance or compliance with code for the following:
 - 1. Sterilization of domestic water piping.
 - 2. Water leak testing of domestic water piping.

PART 2 – PRODUCTS

2.01 <u>MATERIALS</u>

- A. All materials shall be new and of the best quality available in their respective kinds, free from all defects and shall be of the make and types specified or approved equal.
- B. Domestic Water Piping:
 - 1. Copper tubing, ASTM B88, Type L for above ground piping, with ANSI B16.18 pressure fittings or B16.22 solder joint fittings.
- C. Water Valves:
 - 1. General
 - a. Ball valves, pressure regulating valves, gate valves, globe valves, and plug valves used to supply potable water shall meet the requirements of NSF 61.
 - b. Valves in insulated piping shall have 2 inch stem extensions and extended handles of non-thermal conductive material that allows operating the valve

without breaking the vapor seal or disturbing the insulation. Memory stops shall be fully adjustable after insulation is applied

- 2. Shut off valves for Cold and Hot Water:
 - a. 2 inches and smaller: Ball, MSS SP-72, SP-110, Ball valve shall be full port three piece or two-piece with a union design with adjustable stem package. Threaded stem designs are not allowed. The ball valve shall have a SWP rating of 150 psig and a CWP rating of 600 psig. The body material shall be Bronze ASTM B584, Alloy C844. The ends shall be solder.
- D. Insulation: Provide insulation on all hot water piping. Provide nested insulation segments on fittings, valves, and flanges. Seal ends with vapor barrier mastic. Vapor barrier shall be greater than 3 ply self-adhesive laminate white vapor barrier jacket superior performance. Vapor barrier shall meet UL 723 or ASTM E 84, 25 flame and 50 smoke requirements and UV resistant. Provide aluminum jacket on piping exposed to the weather.
- E. Miscellaneous Materials:
 - 1. Nipples: Nipples shall be the same material as the piping in which installed.
 - 2. Unions: Unions shall be brass or bronze, either threaded or with solder joint ends, for use in copper tubing.
 - 3. Wall and Ceiling Escutcheon Plates: Provide split hinged, locked type, or onepiece escutcheon plates of pressed steel with heavy coating of copper, nickel or chromium.
 - 4. Solder: Solder metal shall conform to ASTM B32, flux shall be liquid form, non-corrosible and conform to ASTM B 813, standard Test I, solder shall be lead-free.
 - Supports: MSS SP-58 and SP-69, types 1,6,9 or 11 for suspended piping. Provide turnbuckles Type 13 and 15 where required for vertical adjustment. Carbon steel with pre-galvanized or hot dipped galvanized metallic coating. Maximum spacing shall be as specified in SP-69, see table below.

	Copper	
NPS	Max Spacing	Rod Diameter
3/4"	5'	3/8"
1 & 1-1/4"	6'	3/8"
1-1/2 & 2"	8'	3/8"
2-1/2"	9'	1/2"
3-5"	10'	1/2"

	Copper	
NPS	Max Spacing	Rod Diameter
6"	10'	5/8"
8"	10'	3/4"

Install supports for vertical copper tubing every 10'. Install supports for vertical steel piping every 15'.

	Copper	
NPS	Max Spacing	Rod Diameter
3/4"	5'	3/8"
1 & 1-1/4"	6'	3/8"
1-1/2 & 2"	8'	3/8"
2-1/2"	9'	1/2"
3-5"	10'	1/2"
6"	10'	5/8"
8"	10'	3/4"

Install supports for vertical copper tubing every 10'. Install supports for vertical steel piping every 15'.

- 6. Piping Isolators: Standard commercial products, consisting of metal-clad hair felt manufactured specifically for isolating pipe from hangers.
- 7. Dielectric Fittings: Dielectric union with galvanized or plated steel female pipe threaded end and copper solder-joint end. Union shall have a water-impervious insulation barrier capable of limiting galvanic current to one percent of the short-circuit current in a corresponding bimetallic joint and, when dry, shall also be able to withstand a 600-volt breakdown test. Provide dielectric couplings or unions between all ferrous and non-ferrous pipe.
- 8. Strainers: Provide on high pressure side of pressure reducing valves, on suction side of pumps, on inlet side of indicating and control instruments and equipment subject to sediment damage and where shown on drawings. Strainer element shall be removable without disconnection of piping. Basket or "Y" type with easily removable cover and brass strainer basket. Body smaller than 3", shall be brass or bronze; 3" and larger shall be cast iron.

2.02 PLUMBING FIXTURES

- A. P-1 Water Closet, Flush Valve Type (Accessible): ASME A112.19.2, white, vitreous china, siphon jet, elongated bowl, anti-microbial surface, pressure assisted, floor mounted, floor outlet.
 - 1. Nominal Dimensions: 28-1/4 inches by 14-inches by 16-1/2 inches.

- 2. Mounting Height: 17 to 19 inches to comply with ADA standards
- 3. Flushing Capacity: 1.1 gallons per flush.
- 4. Toilet Seat: Heavy-duty, white solid polypropylene plastic, open front toilet seat less cover.
- 5. Flush Valve Manual, self-cleaning brass piston flush valve including one inch I.P.S. angle stop with backflow prevention, vandal-resistant cap, high back pressure vacuum breaker. Components exposed to view shall be chromium plated. Mount not less than 11 inches above the fixture. Mount height shall not interfere with ADA handrails if in ADA stall.
- B. P-2 Urinal, Wall Mounted (Accessible): ASME A112.19.2, white vitreous china, elongated 14-inch rim from finished wall, extended sides for privacy.
 - 1. Mounting Height: Mount urinal with the height of the rim being no more than 17 inches above the floor.
 - 2. Nominal Dimensions: 14-1/8 inches by 18-7/8 inches by 26-1/8 inches.
 - 3. Flow Rate: 1 gallon per flush.
 - 4. Manual Flush Valve (Accessible): American Standard 6045.101.002 or accepted equivalent. self-cleaning brass piston with integral wiper spring, non-hold open handle, double chrome -plated cast brass construction.
- C. P-3 Lavatory, Wall Mounted (Accessible): Kohler K-2031 or accepted equivalent. ASME A112.19.2, white vitreous china, straight back, concealed arm carrier installation.
 - 1. Mounting Height: Mount lavatory with the top surface 34 inches above floor and with 29 inches minimum clearance from bottom of the counter face to floor.
 - 2. Nominal Dimensions: 20-3/4" by 18-1/4"
 - 3. Flow Rate: Restrictor to be installed to limit flow to 0.5 gallons per minute.
 - 4. Faucet (Accessible): Kohler K-97060-4 or accepted equivalent. Singlehole installation, metal construction, resistance to corrosion and tarnishing. The force required to activate the faucet shall be 5 lbs. maximum.
- D. P-4 Nozzle: Spray Systems CO. Floodjet Nozzle No. 3/8K 30 or accepted equivalent. Brass, wide flat spray pattern with uniform distribution.
 - 1. Adjustable Ball Fitting: Spraying Systems Co. Adjustable Ball Fittings No. 36275 3/8x3/8 or accepted equivalent. Brass, 45-degree angle of adjustment.

PART 3 – EXECUTION

3.01 <u>DEMOLITION</u>

- A. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to State.
 - 6. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.02 INSTALLATION AND WORKMANSHIP

- A. All workmanship shall be of the highest standard. Vertical piping lines shall be plumbed and lines that are grouped shall be parallel and as direct as possible. Exposed pipe, where indicated, shall be run parallel with walls.
- B. The installation shall comply with the latest accepted edition of the Plumbing Code, the Fire Marshal's regulations of the State of Hawaii, the regulations of the Department of Health of the State of Hawaii and all other applicable codes.
- C. The Contractor shall obtain and pay for all permits and licenses for the work. At completion, transmit to the State, applicable certificates of inspections.

3.03 CROSS CONNECTIONS AND INTERCONNECTIONS

A. No plumbing fixtures, device, or piping shall provide a cross connection or interconnection between a distributing supply for drinking or domestic purposes and a polluted supply such as a drainage system or a soil or waste pipe, so as to make

possible the backflow of sewage, polluted water, or waste into the water supply system.

3.04 <u>CUTTING AND REPAIRING</u>

A. The work shall be carefully laid out in advance providing sleeves, templates or details for chases and openings to be left in the walls, floors, structural members or partitions. Any access cutting of construction will not be permitted. Cutting shall be carefully done, and damage to buildings, piping, wiring or equipment as a result of cutting for installation shall be repaired by skilled mechanics of the trade involved at no additional expense to the State. Written permission from the State shall be obtained before any cutting is done.

3.05 PROTECTION TO FIXTURES, MATERIALS AND EQUIPMENT

A. Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury. Upon completion of all work the fixtures, materials and equipment shall be thoroughly cleaned, repainted as required, adjusted and operated.

3.06 <u>CHLORINATION</u>

A. Domestic hot and cold-water lines shall be sterilized with chlorine before acceptance of the work. Dosage of chlorine shall be not less than 50 ppm. Chlorinating material shall be introduced into the water lines in a manner approved by the Contractor. After a contact period of not less than twenty-four (24) hours the system shall be flushed with clean water until the residual chlorine content is not greater than 0.2 ppm. All valves in the lines being sterilized shall be opened and closed several times during the contact period. A certificate shall be furnished to the Contractor evidencing proper performance of sterilizations.

3.07 <u>PIPE INSTALLATION</u>

- A. No pipe shall be closed up, furred in, buried or otherwise hidden until it has been inspected, tested and approved by the Contracting Officer.
 - 1. All piping shall be inspected inside and out before installation and no obstructions shall be allowed. Pipe ends shall be taper reamed to full I.D. and all burrs removed.
 - 2. All exposed piping shall be carefully handled to avoid excessive tool marking and polished fittings shall be handled with extra care so that tool marks do not show. All exposed piping shall be in one length, where possible, fittings shall be in walls under counter cabinet or in furred space.

- 3. 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 and shall fit snugly around the pipe.
- 4. Anchor piping in building with approved clamps or adjustable hangers spaced in accordance with the Plumbing Code. Straps for copper tubing shall be copper or brass, or copper plated. Where copper contacts ferrous material, wrap with two layers of plastic tape.
- 5. Provide dielectric unions where copper piping is connected to ferrous pipe.
- 6. Install union and shut-off valve on pressure piping at connections to equipment.

3.08 VALVE INSTALLATION

- A. NPS 1/2 or NPS 3/4 inlet hose-end drain valves may be adequate for application in first paragraph below.
- B. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

Hose-End Drain Valves: At low points in water mains, risers, and branches.

Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.

C. Valves shall be located for easy access and shall be provide with separate support. Valves shall be accessible with access doors when installed inside partitions or above hard ceilings.

3.09 <u>PIPE INSULATION</u>

A. Provide insulation on all hot water piping. Insulation through wall penetrations shall be a continuous single piece through the entire penetration. All edges, flaps, corners, and exposed insulation shall be neatly tucked or secured.

3.10 TESTING AND INSPECTION

- A. Contractor shall furnish all equipment for tests and any required retests and pay for all cost of repairing any damage resulting from such tests. Contractor shall adjust systems until they are approved. Tests shall be performed in the presence of, and to the satisfaction of, the Engineer and inspector of the official agency involved.
- B. Water piping shall be tested in accordance with the Plumbing Code. Water piping shall be tested at 150 psi.

3.11 <u>CLEAN UP</u>

A. Debris shall not be allowed as a result of this work. 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-cleaned in an acceptable manner as approved by the Engineer. All work including plumbing fixtures, traps and mechanical equipment shall be thoroughly cleaned and ready for use.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

END OF SECTION

SECTION 15650 - AIR CONDITIONING AND VENTILATION

PART 1 – GENERAL

1.01 <u>RELATED DOCUMENTS</u>

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

1.02 <u>SUMMARY</u>

- A. Provide complete and operating air conditioning and ventilation systems. "Provide" shall mean "Furnish and Install" when used herein. The air conditioning and ventilation systems shall include all equipment and all related items necessary to complete the work as shown on the drawings and herein specified. The work shall include the following:
 - 1. Removal of existing materials and equipment.
 - 2. Refrigerant piping and accessories.
 - 3. Condensate drain piping.
 - 4. Ductwork and accessories.
 - 5. Insulation
 - 6. Air cooled condensing unit.
 - 7. Air handling units/Fan Coil Units.
 - 8. Controls and control wiring.
 - 9. Corrosion protection.
 - 10. Adjusting, balancing and testing.
 - 11. Painting and finishing.
 - 12. Operating and maintenance instructions.
 - 13. Manufacturer's literature, shop drawings, record drawings.

1.03 <u>RELATED WORK SPECIFIED ELSEWHERE</u>

- A. Section 15400 PLUMBING.
- B. Line voltage wiring and conduit is specified in Division 16 ELECTRICAL.

1.04 GENERAL REQUIREMENTS

- A. It is the intent of the plans and specifications to provide a complete installation. Should there be omissions or discrepancies in the plans and specifications, the Contractor shall call the attention to such omissions and discrepancies in advance of the date of bid opening so that the necessary corrections can be made. Otherwise the Contractor shall furnish and install the omissions or discrepancies as if the same were specified and provided for.
 - 1. Standards:
 - a. All work shall be done in accordance with applicable ordinances and codes of the County of Hawaii and in accordance with State Department of Health regulations.
 - b. Work shall comply with applicable regulations of the State of Hawaii, National Fire Protection Association (NFPA) Pamphlet No. 90A, and American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 15-1978.
 - c. Contractor shall obtain all permits, licenses and certificates and pay for all fees.
 - 2. Drawings and Specifications: The drawings and specifications are intended to cover the complete installation of systems to function as described. The omission of reference to any necessary item of labor or material shall not relieve the Contractor from providing such labor or material. Drawings do not attempt to show exact details of piping and ductwork. Provide offsets as necessary to avoid local obstructions or interferences with other trades.
 - a. Contract Drawings: Mechanical plans are essentially diagrammatic, showing locations of ducts, and other mechanical equipment. Where locations are not dimensioned, they are approximate, and before installing, Contractor shall study existing conditions and make installation in most logical manner.
 - b. Shop Drawings: As soon as practical, and within 30 days after award of contract and before commencement of installation of any materials and equipment, six sets of shop drawings shall be submitted. Submittals shall consist of a complete list of equipment and materials, including

manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, and installation instructions. Incomplete and partial submittals will be returned unreviewed. Shop drawings shall also be submitted which contain layout drawings of ductwork and piping showing locations of hangers and supports, capacity curves or ratings to assure balanced refrigeration at the design conditions, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Where piping and equipment are to be supported other than as indicated, the details shall include loadings and types of frames, brackets, stanchions, or other supports. Control diagrams shall be submitted which identify each component and show all interconnected or interlocked components and the control sequence.

c. Record Drawings: Contractor shall keep a record set of drawings available at the jobsite on which all changes and additions in the Mechanical Work are shown. Contractor shall furnish the reproducible drawings of each installation showing the exact location of all items which are different from the original drawings.

1.05 <u>WARRANTY</u>

- A. All work in this Section shall be under warranty for a period of 1 year from the date of acceptance of the work as a whole by DAGS, through the contracting officer. Should any equipment or material fall within this period, the Contractor shall replace or repair that item at no cost for material and/or services, if such is due to faulty workmanship or quality of material furnished.
- B. The Contractor shall be responsible for all damage to any part of the premises caused by failure in the equipment furnished under this section for a period of 1 year after the final acceptance of the work as a whole.

PART 2 – PRODUCTS

2.01 <u>MATERIALS</u>

- A. All materials delivered to the job site and installed shall be new, best of their respective grades and as specified on the drawings. Materials shall be of the same brand or manufacturer throughout for each class of material or equipment.
 - 1. Refrigerant Piping and Accessories:
 - a. Copper tubing, ASTM B280, soft-annealed where bending is required and hard drawn where no bending is required. Soft annealed shall not be used larger than 1-3/8 inches. Joints shall be brazed.

- b. Fittings: Wrought copper or forged brass sweat fittings, ANSI B16.22 and ASTM B75.
- c. Solder: Silver solder conforming to AWS A5.8. Melting point not less than 1145 degrees F.
- d. Refrigerant Shut-Off Valves: Valves shall be designed for use with the refrigerant used and shall have pressure ratings compatible with system working pressures encountered. Valves for copper tubing shall be all-brass, hand wheel operated, diaphragm packless type globe or angle valves in sizes up to and including 5/8 inch. In sizes over 5/8 inch the valves shall be brass or bronze globe or angle type, wrench operated with ground-finish stems, packed especially for refrigerant service, back-seated, and provided with seal caps.
- e. Supports: MSS-SP-58 and SP-69, types 1, 5, 6, 7, 9, 10, or 11 for suspended piping. Provide turnbuckles type 13 and 15 where required for vertical adjustment. Maximum spacing shall be specified in SP-69.
- f. Strainers: Brass or cast-iron body, Y-pattern, cleanable, minimum 60-mesh non-corrodible screen with net free area not less than 10 times the pipe area, with pressure rating compatible with refrigerant service.
- g. Solenoid Valves: The valves shall be of the 2 position, direct acting or pilot operated types, opened or closed, electrically as specified for use with liquid or gas refrigerant. The valves shall be designed for the required pressure drop and shall conform to ARI 760 and shall be listed by the Underwriters' Laboratories, Inc. for the service.
- h. Thermostatic Expansion Valves: The expansion valves shall be of the diaphragm and spring-loaded type with external equalizers, bulb and tubing, and external superheat adjustment with seal cap. The valve size and superheat adjustment shall be as recommended by the valve manufacturer. Valves shall be tested and rated in accordance with ANSI B60.1 and 750 for capacities up to 135,000 Btu per hour. Valves shall have brass, bronze or semi-steel bodies with stainless steel or non-corrosive non-ferrous internal parts. Valves shall have brazing connections. Thermostatic expansion valve bulb shall be stable, and non-migrating and shall be suitable for the refrigerant valve capacity and evaporator temperature and shall be as recommended by the valve manufacturer.
- i. Liquid Line Driers: The liquid line drier shall be the solid desiccant type. Flow rate capacity shall be within the maximum allowable pressure drop, and safety shall conform to the requirements of ARI Standard 710. Drier body shall be of brass or steel and shall be provided with means for holding the desiccant securely in place and distributing the liquid refrigerant evenly

throughout the desiccant. Driers shall be capable of withstanding a pressure of 350 psi. Driers may be of the combination drier-indicator type.

- j. Moisture Indicators: The moisture indicators in the liquid line of refrigerant systems shall contain indicating material that will indicate moisture by varying degrees of color change, based on 100 degrees F and a moisture content in the range of 45 to 180 particles per million in R22 refrigerant. Indicators shall be a brass or bronze or heavily copper plated steel fitting with the indicator material located under a bulls-eye. Indicators shall be capable of withstanding a test pressure of 350 psig without damage.
- k. Liquid Refrigerant Sight Glass: The sight glass shall be of the double-port see-through type with two bulls-eyes and part of the moisture indicator. Sight glass indicators shall be capable of withstanding a test pressure of 350 psig without damage. Sight glass body shall be forged brass or bronze with fittings as specified hereinbefore for refrigerant piping.
- Liquid Receiver: Liquid receiver shall be the vertical or horizontal type, designed, fitted and rated in conformity with ARI 495, except as modified herein. The receiver shall be constructed and tested in conformity with Section VIII of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Each receiver shall have a storage capacity not less than 20 percent in excess of that required for fully charged system. Each receiver shall be equipped with inlet, outlet drop pipes, drain plug, purging valve, relief valves of capacity and setting required by ANSI B9.1, and two bulls-eye liquid level sight glasses. Sight glasses shall be in same vertical plane, 90 degrees apart, perpendicular to axis of receiver.
- 2. Condensate Drain Piping:
 - Pipe and Fittings: Standard weight galvanized steel pipe, ASTM A120 or A53, with galvanized malleable iron threaded fittings.
 OR
 - b. Pipe and Fittings: Schedule 40 PVC socket joint pipe and fittings, ASTM D1785, with solvent cement joints.
 - *OR*
 - c. Pipe and Fittings: Copper tubing, Type L, ASTM B88, with solder joint fittings, type 50/50 solder.
 - d. Supports: As specified for refrigerant piping.

- 3. Ductwork and Accessories:
 - a. Sheet Metal Ductwork: Galvanized steel sheets, ASTM A527. Construction, gages, and reinforcement shall comply with SMACNA HVAC Duct Construction Standards, 1985 Edition.
 - b. Exhaust Air and Unconditioned Outside Air Ductwork: Stainless Steel Type 316. Construction, gages, and reinforcement shall comply with SMACNA HVAC Duct Construction Standards, 1985 Edition.
 - c. Fittings: Vaned elbows, take-offs, branch connections, transitions, volume dampers, and flexible connections shall comply with SMACNA standards. Dampers shall be opposed blade type with locking quadrant. Provide turning vanes in all elbows and where indicated.
 - d. Supports: Galvanized steel straps or hanger rods in accordance with SMACNA Duct Construction Standards.
 - e. Flexible Connections: Neoprene coated glass fabric weighing approximately 30 ounces per square yard.
 - f. Fire Dampers: Provide where indicated and where required by NFPA 90A. Dampers shall comply with UL 555 and installation shall comply with SMACNA Fire Damper Guide for Air Handling Systems. Provide duct access panel at each fire damper for accessibility.
 - g. Birdscreens: Two by two mesh, 0.063 inch diameter aluminum wire or .031 inch diameter stainless steel wire, with frame.
 - h. Air Filters: Disposable type, 2 inches thick conforming to Underwriter's Laboratories (UL) Publication 900, Class 1 or Class 2, filter efficiency shall be 30% based atmospheric dust spot efficiency based on ASHRAE test method 52-92.
- 4. Air Devices:
 - a. Security Supply Air Registers: Provide supply air registers that are steel with perforated faceplate, flat surface margin, extension sleeve, opposed blade damper and back mounting flanges. Provide 14 gage (minimum) faceplate with 1/2 by 1/2 inch holes on 3/16 inch spacing and a minimum free area of 45 percent. Provide a 14 gage (minimum) wall sleeve.
 - b. Security Exhaust Air Registers: Provide steel exhaust air registers with perforated faceplate, flat surface margin, wall sleeve, opposed blade damper and back mounting flanges. Provide 14 gage (minimum) faceplate

with 1/2 by 1/2 inch holes on 3/16 inch spacing and a minimum free area of 45 percent. Provide a 14 gage (minimum) wall sleeve.

- 5. Insulation: Insulation, adhesives, coatings and accessories shall have surface burning characteristics as determined by ASTM E84, NFPA 255 and UL 723, not to exceed 25 for flame spread and 50 for smoke developed.
 - a. Refrigerant Suction Piping:
 - (1) Flexible Unicellular: ASTM C534, Type 2.
 - (2) Polystyrene: Closed cell type, for outdoor use only.
 - b. Pipe Insulation Finishes:
 - (1) All Purpose Jacket: Provide factory applied all purpose jacket with integral vapor barrier. Jackets in exposed locations shall have smooth, white surface suitable for painting. Jacket may be omitted on flexible unicellular insulation only.
 - (2) Vapor Barrier Material: Fed. Spec. HH-B-100, Type I.
 - (3) Aluminum Jackets: ASTM C921, Type II, 0.016 inch thick, smooth.
 - (4) Vinyl Lacquer: Provide two coats of vinyl lacquer finish or equal on flexible unicellular insulation located outdoors.
 - c. Duct Insulation: Flexible fiberglass blanket, ASTM C 553, Type 1, class B-4, 1-1/2 pcf.
 - d. Duct Insulation Finishes:
 - (1) Multi-Purpose Jacket:: Provide factory applied jacket with integral vapor barrier.

OR

- (1) Vinyl Vapor Retarder Jacket: Provide factory applied jacket with integral vapor barrier.
- (2) Vapor Barrier Material: Fed. Spec. HH-B-100B, Type I or II.
- e. Equipment Insulation:
 - (1) Flexible Fiberglass, ASTM C 553, Type 1, Class B-3, with vapor barrier.

(2) Rigid Fiberglass, ASTM C 612, Class 2 with vapor barrier.

2.02 <u>EQUIPMENT</u>

A. Provide a complete air source, cooling only type Variable Refrigerant Flow (VRF) System consisting of one or more outdoor compressor units and multiple indoor fan coil units, or a Direct Expansion Split System unit (DX)consisting of one outdoor compressor unit and one indoor fan coil unit as specified in the mechanical schedule.

2.03 <u>CONTROLS</u>

- A. General: Controls shall be electric, electronic, or solid-state electronic, or a combination that will provide the required sequence of operation control. Schematic control diagrams shall be submitted. All control work shall be performed by an experienced and licensed controls sub-contractor, and only the following manufacturers/installers shall do the work: Johnson Controls, Honeywell, Barber-Colman, Hawaii Instrumentation and Controls.
- B. Thermostats: Full proportioning or two-positioning type, as indicated. Thermostats shall respond to a change of not over 1-1/2 degrees.
 - 1. Space thermostats shall have concealed setpoint and exposed indicator.
 - 2. Remote thermostats shall be duct, or immersion type, as required, with set point and throttling range adjustment in a remote metal case. Sensing elements, shall be secured in the duct or pipe to respond to the overall temperature.
- C. Humidistats: Space type, with accuracy of plus or minus 5 percent, set point range of 20 to 80 percent relative humidity.
- D. Control Relays: General purpose type, with plug in socket screw terminal connections, with 2 normally open and 2 normally closed sets of contacts unless otherwise indicated, and coil voltage as indicated.
- E. Timeclocks: Seven-day type, with independently adjustable set points at increments not greater than 15 minutes, minimum of 4 on-off cycles per day, 10 hour reserve power. Intermatic, Paragon, or equal.
- F. Wiring and Accessories: Provide all required interconnecting wiring to complete the system. Provide transformers as required. Electrical work shall comply with local codes and the electrical section of this specification.
- G. Motor Starters: Horsepower rated manual or magnetic starters shall be provided, as indicated. Starters shall conform to NEMA ICS and shall have thermal overload protection and other appurtenances necessary and as indicated.

2.04 CORROSION PROTECTION

- A. The finned coils shall be coated by an experienced and approved applicator who has developed the coating techniques necessary to apply uniform coating to all surfaces, avoiding excessive buildup on fin edges and other areas that would impair heat exchange. Coating shall be applied under shop conditions utilizing a clean, dry under-roof area with specialized equipment. Such an experienced and approved applicator with proper facilities is International A/C Coatings, Honolulu, Hawaii or approved applicator.
- B. The entire apparatus being coated shall be dismantled to the maximum degree without disturbing piping or wiring. Upon completion of the coating, the apparatus shall be reassembled with care so that the coating surface is not damaged.
- C. Surface preparation and application shall be in strict accordance with the coating manufacturer's instructions.
- D. Coating System for Finned Coils: Heresite P-413, baked phenolic with plasticizer or approved equal shall be properly modified and applied by the approved applicator not to exceed 6 mils DFT in a 4 to 5 coat system. The coating shall withstand dry heat up to 205 degrees C (400 F), and show no signs of attack after 3000 hours of salt spray test to ASTM Specification B117.
- E. Coating System for Other Surfaces: Ameron PSX 700 Engineered Siloxane shall be properly modified and applied by the approved applicator until a total of 6-8 mils DFT is achieved.
- F. Primers: Apply a base primer of Heresite P-700.
- G. Workmanship: Application of coating materials shall be done by skilled applicators. Criteria of good workmanship desired and neat appearance of the finished surfaces are: absence of sags, runs, and unnecessary brush marks. Other criteria are: thorough mixing of coatings, limited use of thinners, uniformity of film thickness, proper drying time between coats, and protection of surfaces not to be coated.

PART 3 – EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Necessary supports and vibration isolators shall be provided for equipment and appurtenances as required. Equipment shall be installed in accordance with manufacturer's instructions.

3.02 REFRIGERANT PIPING INSTALLATION

A. Unless otherwise specified, pipe and fitting installation shall conform to requirements of ASHRAE Standard 15 and ANSI B31.5. Pipe shall be cut accurately to measurement established at the jobsite and worked into place without springing or forcing. Pipes shall be cut square, shall have burrs removed by reaming, and shall be so installed as to permit free expansion and contraction. Filings, dust, or dirt shall be wiped from interior of pipe before connections are made. Changes in direction shall be made with fittings. Piping shall be installed with sufficient pitch to insure adequate oil drainage. Open ends of refrigerant lines or equipment shall be capped or plugged during installation to keep moisture, dirt or other foreign material out of the system.

B. Joints:

- 1. Joints in copper tubing shall be brazed with silver solder. Surplus brazing material shall be removed at all joints in lines not insulated. Tubing shall be protected against oxidation during brazing by using nitrogen in the tubes.
- 2. Threaded joints shall be made with tapered threads and made tight with a stiff mixture of graphite and oil or with polytetrafluoroethylene tape or other equivalent thread-joint compound applied to the male threads only.
- C. Valves: Valves shall be installed with stems horizontal.
- D. Hangers and Supports: Hangers, inserts, and supports shall conform to MSS SP-58 and SP-69. Hangers and other supports for insulated pipe shall be of sufficient size to accommodate the insulation and protection shield.
- E. Returning Oil From Refrigerant System: Refrigerant lines shall be installed so that the gas velocity in the evaporator suction line is sufficient to move the oil along with the gas to the compressor. Except as indicated otherwise where equipment location requires vertical riser, the line size shall be such as to allow sufficient velocity to lift the oil at minimum system loading pressure and corresponding reduction of gas volume. A double riser shall be installed when excess velocity and pressure drop would result from full system loading. The larger riser shall have a trap, of minimum volume, obtained by use of 90 degree and 45 degree ells. The smaller riser shall be arranged with inlet close to end of lower horizontal line, and the larger riser shall connect from end of lower horizontal line to top of upper horizontal line. Valves shall not be installed in risers.
- F. Charging Valves: Except as indicated otherwise provide charging valves for refrigerant system located on the receiver side or in the liquid line between the shut-off valve to the receiver or condenser-receiver and the liquid line sight glass. Valve shall be connected by full size liquid line tee.
G. Pipe Penetrations Thru Walls: Pack annular space between pipe and wall with a fire seal of asbestos rope, mineral wool or similar non-combustible material. Seal with silicone sealant or calking.

3.03 DUCTWORK INSTALLATION

- A. Ductwork installation shall be in accordance with SMACNA Duct Construction Standards, 1985 Edition. Ducts shall be installed leaktight so that no leakage of air can be detected. Adjust dampers, diffusers, registers, and accessories to deliver air quantities indicated and so that draft and objectionable noise are eliminated. Provide turning vanes at all elbows and tees and extractors at all branch connections.
 - 1. Sizes, runs, and connections of ducts shall be as indicated. Adhere to drawings as closely as possible. Install ductwork in adherence to heights permitted by the structure and consult with other trades, and in conjunction with them, establish necessary space requirements for each trade. Duct sizes shown on drawings are net size.
 - 2. Openings through construction required for ductwork shall be provided; prepare shop drawings locating such duct openings, and obtain approval in ample time to meet building construction schedule. Ductwork specified herein shall have rectangular cross section unless otherwise indicated.
 - 3. Details of construction, metal gauges, reinforcement and materials not specified herein shall be in accordance with SMACNA Low Velocity Duct Construction Standards, NFPA 90A or as approved. Fabricate ductwork in first class manner with airtight joints, presenting smooth surface on the inside, neatly finished on the outside.
 - 4. Where square elbows are used, provide fixed double radius turning vanes. Construct, brace and support ducts in such a manner that they will not sag or vibrate when fans are operating.
 - 5. Ductwork connections to air conditioning unit and exhaust fan shall be flexible duct connector material with 4" of free space between collars connected.
 - a. Install a sheet metal band completely around collar at each end of connections and fasten to collars with screws through the band and glass fabric. Screws shall be placed no more than 3" on centers.
- B. During construction, keep openings in ductwork closed with sheet metal to prevent injury and take all possible precautions to keep interior of ducts, air intake chambers and fan housings free from dirt or dust.
- C. Support galvanized horizontal ducts and at changes of direction with hangers in accordance with SMACNA Duct Construction Standards.

D. All duct openings to exterior shall be weatherproofed with sheet metal blocking. Thoroughly seal all exterior duct openings and joints with silicone sealant.

3.04 INSULATION

- A. Insulation shall be installed by an experienced licensed insulation contractor in accordance with best trade practices. Insulation shall be continuous through hangers and penetrations. Insulation shall be sealed to maintain integrity of vapor barrier. Insulate fittings, flanges, valves, etc., with premolded or precut insulation segments, same thickness as adjoining pipe.
 - 1. Pipe Insulation: Insulate all refrigerant suction piping.
 - a. Provide protective galvanized shields on pipes passing through hangers, MSS SP-69, Type 40.
 - b. Thickness of pipe insulation shall be as follows:
 - (1) Refrigerant Suction Piping:
 - (a) Flexible Unicellular: 3/4 inch thick on pipes up to 2 inches and 1 inch thick on pipes over 2 inches.
 - (b) Polystyrene: 1-1/2 inches thick on pipes up to 2 inches and 2 inches thick on pipes over 2 inches.
 - 2. Vapor Barrier Jacket: Insulation shall be covered with vapor barrier jackets.
 - 3. Pipe: Insulation shall be applied with joints tightly butted and ends sealed with vapor barrier coating. Jackets shall overlap and be sealed. Factory self-sealing lap systems may be used. All breaks and punctures in jackets shall be sealed.
 - 4. Fittings, Flanges, Valves: Insulation of the same thickness and type shall be placed around the item, either premolded or segmented. Voids shall be filled with loose insulation or cement. Insulation shall be coated with glass tape embedded in two coats of vapor barrier coating or with premolded PVC fitting covers applied over a layer of vapor barrier coating.
 - 5. Piping Exposed to Weather: Provide aluminum jacketing with overlapped joints over the above specified insulation and vapor barrier jacket.
- B. Duct Insulation: Insulate all indoor ducts in strict accordance with the manufacturer's written instructions.

1. Thickness of duct insulation shall be 2" for all indoor ducts and 3" for exterior ducts.

3.05 ADJUSTING, BALANCING, AND TESTING

- A. Cleaning and Adjusting: Pipes, strainers, valves and pumps shall be cleaned free of scale and thoroughly flushed of all foreign matter. Strainers and valves shall be thoroughly cleaned. Inside of air-cooled condensers shall be thoroughly cleaned of all debris and blown free of all small particles of rubbish and dust. Equipment shall be wiped clean with all traces of oil, dust, dirt, or paint spots removed. Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer. Belts shall be tightened to proper tension. Control valves and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions.
- B. Tests:
 - Refrigerant Piping: The system shall be subjected to a pneumatic test. 1. Pneumatic leak testing shall be done with dry nitrogen before any refrigerant pipe is covered. High and low side of the refrigerant system shall be tested for the minimum refrigerant leak field test pressure specified in ASHRAE 15, for the refrigerant employed in the system. System shall be proved tight under pneumatic test pressure by checking each joint with soap solution and after charging with refrigerant system shall be checked with a halide torch or by electronic leak detection. To repair leaks, the joint shall be taken apart, thoroughly cleaned, and remade as a new joint. System shall be proven tight and free of leaks by successfully completing the soap solution test and by allowing the pneumatic leak-test pressure to remain on the system for 24 hours with no drop in pressure. Correction of 0.3 psi will be allowed for each degree change in the initial and final temperature of the surrounding air, plus for an increase and minus for a decrease. After the foregoing tests have been satisfactorily completed and the pressure relieved, entire system shall be evacuated to an absolute pressure of 300 microns. Vacuum line shall be closed, and the system shall stand for 1 hour. After this period the absolute pressure shall not exceed 500 microns. Upon completion of the vacuum test, the system shall be completely charged with dry refrigerant. Provide a complete charge of lubricating oil, type as recommended by the manufacturer.
- C. Performance Tests: Testing and balancing of the systems shall be performed by an independent testing agency, by personnel who are not employees of the installing contractor. After cleaning and testing are completed as specified, each system shall be tested as a whole to see that all items perform as integral parts of the system. Corrections and adjustments shall be made as necessary.

- D. Balancing:
 - 1. Duct systems shall be balanced as follows:
 - a. System (or air moving device) to not less than design cfm.
 - b. Diffusers, registers, and grilles.
- E. Test Reports:
 - 1. Typewritten schedules of readings taken during the balancing and testing operations indicating the required or specified reading, and the final balanced reading shall be provided for the following items:
 - a. Fans: Size, type, speed in rpm, outlet velocity in fpm, static pressure in inches water gage, air quantity in cfm, and motor load in amperes.
 - b. Air Handling Units: Size, type, fan speed in rpm, outlet velocity in fpm, external static pressure in inches water gage, total static pressure in inches water gage, air quantity in cfm, and motor load in amperes.
 - c. Air Balance:
 - (1) Air Outlets and Inlets: Size, velocity in fpm, and air quantity in cfm.
 - (2) Coils: Size, face velocity in fpm; air temperature entering coil and air temperature leaving coil, wet-bulb and dry-bulb in degrees F.
 - (3) Ducts: Size, velocity in fpm, and air quantity in cfm.

3.06 ELECTRICAL WORK

A. Electric motor driven equipment specified herein shall be provided complete with motors, motor starters, control wiring and controls. Electrical equipment and wiring shall be in accordance with ELECTRICAL Section. Motor starters shall be provided by Mechanical Contractor complete with properly sized thermal overload protection and other appurtenances necessary for the motor control specified. Manual or automatic control and protective devices required for the operation herein specified and any control wiring required for controls and devices but not shown on the electrical plan shall be provided. Electrical work shall conform to NFPA 70.

3.07 PAINTING AND FINISHING

A. Field painting of mechanical systems shall be as follows:

- B. Provide touch-up painting on equipment whose factory finish has been damaged and on all walls, ceilings and other finished surfaces affected by this work. Touch up painting shall match adjacent surfaces.
- C. Clean up all areas around the work installed under this section and remove all debris, dust, and dirt caused by the work.

3.08 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Bound Instructions: Six complete sets of instructions containing the manufacturer's operating and maintenance instructions for each piece of equipment shall be furnished. Flysheet shall be placed before instructions covering each subject. The instruction sheets shall be approximately 8-1/2 by 11 inches, with large sheets of drawings folded in. The instructions shall include, but shall not be limited to, the following:
 - 1. Wiring and control diagrams, with data to explain the detailed operation and control of each component.
 - 2. A control sequence describing startup, operation and shutdown.
 - 3. Operating and maintenance instructions for each piece of equipment, including lubrication instructions.
 - 4. Manufacturer's bulletins, cuts and descriptive data.
 - 5. Parts lists and recommended spare parts.
- B. Field Instructions: Upon completion of the work and at a time designated, the services of one or more project engineers shall be provided by the Contractor for a period of not less than one day to instruct the State in the operation and maintenance of the system. These field instructions shall cover all the items contained in the bound instructions.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

END OF SECTION

SECTION 15901 - TESTING, ADJUSTING AND BALANCING (TAB)

PART 1 – GENERAL

1.01 <u>RELATED DOCUMENTS</u>

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

1.02 SUMMARY

- A. Procure the services of an independent Contractor qualified in TAB as defined in Chapter 34 of the 1995 ASHRAE Handbook HVAC Application. The TAB work shall include the following:
 - 1. Air conditioning equipment.
 - 2. Ducts, duct outlets and duct inlets.
 - 3. Transfer ducts, openings, grilles and registers.
 - 4. Pipes, coils, valves.
 - 5. Electrical measurements.
 - 6. Controls and control components.

1.03 <u>RELATED WORK SPECIFIED ELSEWHERE</u>

- A. Section 15400 PLUMBING.
- B. Division 16 ELECTRICAL.
- C. Section 15650 AIR CONDITIONING AND VENTILATION.
- D. Other mechanical sections as applicable.

1.04 GENERAL REQUIREMENTS

A. It is the intent of the plans and specifications to provide a complete installation. Should there be omissions or discrepancies in the plans and specifications such as dampers, gauges, and sensors that will inhibit the proper TAB process, the Contractor shall call the attention to such omissions and discrepancies in advance of the date of bid opening so that the necessary corrections can be made. Otherwise the Contractor shall furnish and install the omissions or discrepancies as if the same were specified and provided for.

- 1. Standards:
 - a. All work shall be done in accordance with applicable ordinances and codes of the County of Hawaii and in accordance with State Department of Health regulations.
 - b. Work shall comply with applicable regulations of the State of Hawaii, National Fire Protection association (NFPA) Pamphlet No. 90A, and American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 111-1988.
 - c. Applicable standard published by the National Environmental Balancing Bureau (NEBB) and/or the Associated Air Balance Council (AABC).
 - d. Contractor shall obtain all permits, licenses and certificates and pay for all fees.
- 2. Drawings and Specifications: The drawings and specifications are intended to cover the complete installation of systems to function as described. The omission of reference to any necessary item of labor or material shall not relieve the Contractor from providing such labor or material. Drawings do not attempt to show exact de-tails of piping and ductwork.
 - a. Contract Drawings: Mechanical plans are essentially diagrammatic, showing locations of ducts, and other mechanical equipment. Where locations are not dimensioned, they are approximate, Contractor shall study existing conditions and plan his work in the most logical manner.
 - b. Shop Drawings: As soon as practical, obtain a set of shop drawings and data submittals including the automatic control diagrams that have been reviewed by the Contracting Office. Refer to Section 15650 AIR CONDITIONING AND VENTILATION, Paragraph WARRANTY, and coordinate with the Contractor to obtain all pertinent information on the mechanical systems.

1.05 <u>SUBMITTALS</u>

- A. Within 15 days after the "Notice to Proceed", the independent air balance agency shall submit 3 copies of documentation to confirm compliance with the following:
 - 1. The completion of five(s) project of similar size and scope of this project.
 - 2. The agency is a certified firm by the NEBB or the AABC and employs one or more qualified supervisor(s) as defined by the NEBB or AABC.
 - 3. All instruments and equipment used by the agency is accurately calibrated in accordance with the requirements of NEBB or AABC.
 - 4. Specimen copies of each of the report forms proposed for use on this project.

- B. At least 60 days prior to starting field work, submit 3 copies of:
 - 1. Shop drawings clearly showing the equipment, air devices and associated apparatus related to the report forms. Limit one entry to one line of the report form.
 - 2. A set of report forms filled out as to the design values and the installed equipment pressure drops, the required CFM for air terminals, and design parameters to be used in the TAB process.
 - 3. A complete list of instruments proposed to be used organized in appropriate categories, with data sheets for each. Show:
 - a. Manufacturer and model number.
 - b. Description and use when needed to further identify the instrument.
 - c. Size or capacity range.
 - d. Latest calibration date.
 - 4. Contractor will review submittals for compliance with contract documents, and will return one set marked to indicate:
 - a. Discrepancies noted between data shown and contract documents.
 - b. Additional, or more accurate, instruments required.
 - c. Requests for re-calibration of specific instruments.

1.06 GUARANTEE

Testing agency shall include an extended warranty of 90 days, after completion of test and balance work, during which time the Contractor at his discretion may request a recheck, or resetting of any outlet or supply air fan, as listed in test report. the testing agency shall provide technicians to assist the Contractor in making tests he may require during this period of time.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 JOB CONDITIONS & COORDINATION

- A. Prior to start of testing, adjusting and balancing, verify that the required "Job Conditions" are met:
 - 1. Systems installation is complete and in full operation.
 - 2. Outside conditions are within a reasonable range relative to design conditions.
 - 3. Lights are turned "on" when lighting is included in the cooling load.

- 4. Special equipment such as computers, laboratory equipment, and electronic equipment are in full operation.
- 5. Contractor to perform a pre-tab of the existing FC-1 and all that FC-1 is serving prior to construction to confirm existing supply, return and outside air cfm and temperatures.
- B. Coordination:
 - 1. Coordinate services with the work of the various trades to ensure rapid completion of the services.
 - 2. Promptly report to the Contractor any deficiencies noted during performance of services to allow immediate corrective action.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

END OF SECTION