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DEPARTMENT OF HUMAN SERVICES
HAWAII PUBLIC HOUSING AUTHORITY
1002 NORTH SCHOOL STREET
POST OFFICE BOX 17907
HONOLULU, HAWAII 96817

IN REPLY PLEASE REFER TO:

ADDENDUM NO. 2

SITE & DWELLING IMPROVEMENTS TO KAHALE MUA (FEDERAL) HA 1088 AND SITE IMPROVEMENTS TO KAHALE MUA (STATE) HA 2205

Tax Map Key No.: (2) 5-1-002-039 & 040

HPHA JOB NO. 09-042-000-S

IFB-CMB-2016-11

May 20, 2014

NOTICE TO ALL PROSPECTIVE BIDDERS:

The Hawaii Public Housing Authority (HPHA) is issuing this Addendum No. 2 to the Invitation for Bid IFB-CMB-2016-11, HPHA Job No. 09-042-000-S for the Site & Dwelling Improvements to Kahale Mua (FEDERAL) HA 1088 and Site Improvements to Kahale Mua (STATE) HA 2205.

This Addendum modifies the original solicitation documents, as amended, for the project dated May, 2014. The item in this Addendum shall govern the work, taking precedence over previously issued specifications and drawings governing the items mentioned. Acknowledge receipt of this Addendum in the space provided on the sealed Bid Form.

1. **BID SCHEDULE**
   A. The deadline for submittal of REQUESTS FOR INFORMATION (RFI) has been **REVISED** to May 23, 2016 at 3:00pm.
   B. **NOTE**: Bid submittal deadline is June 9, 2016 at 2:00pm. Opening of bids will be held at 2:30pm.
2. **CHANGES TO SPECIFICATIONS**
   A. SECTION 08 14 16 – WOOD DOORS
      i. **DELETE** entire specification section and duplicate and **REPLACE** with attached revised Section 08 14 16 – Wood Doors.
   B. SECTION 22 00 00 – GENERAL MECHANICAL REQUIREMENTS
      i. **DELETE** entire specification section and duplicate and **REPLACE** with attached revised Section 22 00 00 – General Mechanical Requirements.

C. SECTION 22 40 00 – PLUMBING
   i. **DELETE** entire specification section and duplicate and **REPLACE** with attached revised Section 22 40 00 – Plumbing.

D. SECTION 22 80 00 – VENTILATION
   i. **NOTE** section is duplicated. Contents are same.

3. **REQUEST FOR INFORMATION**

A. **Question #5:**

Due to unforeseen circumstances it is possible that licenses on the bid form may not adequately represent or could over represent the licenses required for the project. If that occurs:

1. If a specialty license is not listed and it was not known it would be required, but their SOW is greater than 1%, are we able to add them to the bid form? Not listing them would be a violation of state law, yet the form indicates that if we add a license we will be found non-responsive.
2. If a required specialty license SOW is less than 1% are we able to write "under 1%" as per state law?
3. If dual listing a specialty license and it does not fit in 1 box, are we able to duplicate the license and add them to the page? Not listing them would violate state law if they are greater than 1%.
4. If a requested specialty license is required, but that work falls under another license (for example C-33b is covered by C-12) are we able to write "covered by C-12", do we write "N/A", or do we write in the subcontractor performing C-12 even though they do not have a C-33b?
5. If a requested specialty license is required but that work falls under another license that is not listed on the form (for example a C-31 who is performing C-31a, C-31b, C-31d, and C-31e work) do we write in "covered by C-31", "N/A", or do we write in the subcontractors information even though they do not have those specific licenses?

Answer #5:

5.1: Bidders must submit a Request For Information (RFI) to revise the Listing of General and Subcontractors form by the required RFI due date listed in this Invitation (Notice) For Bids (IFB).

5.2: HRS 103D-302(b) states: "If the invitation for bids is for construction, it shall specify that all bids include the name of each person or firm to be engaged by the bidder as a joint contractor or subcontractor in the performance of the contract and the nature and scope of the work to be performed by each. Construction bids that do not comply with this requirement may be accepted if acceptance is in the best interest of the State and the value of the work to be performed by the joint contractor or subcontractor is equal to or less than one per cent of the total bid amount."

5.3: Bidders must submit a RFI to revise the Listing of General and Subcontractors form by the required RFI due date listed in this IFB.

5.4: Bidders must write the name of company and their license with a note indicating that it is covered by another license. Example:

	SCOPE OF WORK	NAME OF CONTRACTOR	LIC. NO.
C-12	DRYWALL	XYZ Contractor	**C-12345**
C-33b	TAPING	XYZ Contractor (covered by C-12)	**C-12345**

5.5: Bidders must write the name of company and their license with a note indicating that it is covered by another license. Example:

	SCOPE OF WORK	NAME OF CONTRACTOR	LIC. NO.
C-31a	CEMENT CONCRETE	XYZ Contractor (covered by C-31	C-12345
C-31b	STONE MASONRY	XYZ Contractor (covered by C-31)	C-12345

APPROVED BY:

Rick T. Sogawa
Procurement Officer

EQUAL HOUSING OPPORTUNITY

SECTION 08 14 16

WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Solid- lumber or plywood cores doors with hardwood veneer faces.
2. Shop priming flush wood doors.
3. Factory fitting flush wood doors to wood frames and factory machining for hardware.
4. Wood louver doors.
5. Field application of Termite Control Material to wood Jambs.

B. Related Requirements:
1. Section 099123 "Interior Painting".
2. Section 099113 "Exterior Painting".
3. Section 087100 "Door Hardware".

1.3 ACTION SUBMITTALS

A. Submit under provision of Section 01330 SUBMITTAL PROCEDURES

B. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Doors to be factory finished and finish requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

B. Quality Standard Compliance Certificates: WI Certified Compliance Program certificates.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

A. Doors designated to be replaced shall be new solid core doors. Exterior doors to be 1-3/4" thick. Interior doors to be 1-3/8" thick of similar height and width size to door being replaced.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

C. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry.

1.7 WARRANTY

A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
      b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

   2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Manufacturers listed are representative only; many others make flush wood doors. See WDMA's and AWI's Web sites for listings of door manufacturers. Available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Ampco.
   2. Chappell Door Co.
   3. Eggers Industries.
   4. General Veneer Manufacturing Co.
   5. Graham Wood Doors; an Assa Abloy Group company.
   6. Marlite.
   7. Marshfield Door Systems, Inc.
   8. Mohawk Doors; a Masonite company.
   9. Oshkosh Door Company.
   10. Vancouver Door Company.
   11. JELD-WEN, Inc.

B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."

B. WDMA I.S.1-A Performance Grade: Heavy Duty.

C. Louver doors; basis of design Jeld-Wen Authentic wood louver door.

D. Structural-Composite-Lumber-Core Doors:
   1. Structural Composite Lumber: WDMA I.S.10.
      a. Screw Withdrawal, Face: 700 lbf.
      b. Screw Withdrawal, Edge: 400 lbf.
   2. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
      a. Screw-Holding Capability: 550 lbf per WDMA T.M.-10.

E. Field treat all jambs for termites with borate solution according to AWPA UC1

2.3 DOORS & JAMBS FOR OPAQUE FINISH

A. Exterior Solid-Core Doors: New doors at Entries and water heater enclosures.
   1. Grade: Custom. 1-3/4" in thickness.
   2. Faces: Any closed-grain hardwood of mill option.
   3. Exposed Vertical and Top Edges: Any closed-grain hardwood.
   4. Core: Either glued wood stave lumber.
   5. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
   6. Adhesives: Type I per WDMA T.M.-6.
   7. WDMA I.S.1-A Performance Grade: Heavy Duty.
   8. On Units 17, 18A & B and 23 A & B install top and bottom vents in door per plan.

B. Interior Solid-Core Doors: Refer to plan notes for interior units to be replaced.
   1. Grade: Custom. 1-3/8" in thickness.
   2. Faces: Any closed-grain hardwood of mill option.
   3. Exposed Vertical and Top Edges: Any closed-grain hardwood.
   4. Core: Either glued wood stave or structural composite lumber.
   5. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
   6. WDMA I.S.1-A Performance Grade: Heavy Duty.

C. Door Jambs & Stops
   General: All Lumber shall be solid stock wood, kiln dry intended for Opaque finishes. Finger joints are permissible. Field treat all jambs for termites with borate solution according to AWPA UC1.
   1. Interior Jambs & Applied stops:
      a. Frames shall be minimum 3/4" thick
      b. Stops shall be 3/8" in thickness.
   2. Exterior Jambs:
      a. Rabbeted Frames shall be a minimum 1-1/16" in thickness.

2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

C. Exterior Doors: Factory treat exterior doors with water repellent after fabrication has been completed but before shop priming or factory finishing.

1. Flash top of out swinging doors with manufacturer's standard metal flashing.

2.5 SHOP PRIMING

A. Doors for Opaque Finish: Shop prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in Section 099113 "Exterior Painting." Section 099123 "Interior Painting."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 08 71 00 "Door Hardware."

B. Prime and Paint all six sides of door prior to installing. For paint refer to Section 09 91 23.

C. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

D. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide1/4 inch from bottom of door to top of threshold unless otherwise indicated.

E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

F. Flash door threshold opening prior to new install with Peal and Stick weather proof flashing. Extend flashing vertically a minimum of 6 inches up framing.

G. Flash all exterior doors with peal and stick flashing: jamb to existing framing.

H. Caulk new trim with polysulfide calk to create a weather proof seal.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

REV - ADDENDUM 2

DIVISION 22 - MECHANICAL

SECTION 22 00 00

GENERAL MECHANICAL REQUIREMENTS

PART 1 – GENERAL

1.1 GENERAL CONDITIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. These general mechanical requirements govern work specified under all sections of Division 22 - MECHANICAL.

B. The Contractor shall furnish all labor, materials, tools and equipment and perform all work and services necessary for a complete and properly operating mechanical equipment system, as shown on the drawings and as specified, in accordance with provisions of the Contract Documents and completely coordinated with work of other trades.

C. The Contractor shall completely examine the drawings and specifications and report to the HPHA any error, inconsistency, omission, or error in the work of others affecting the mechanical work. If the Contractor proceeds with the work affected without instructions from the HPHA, he shall correct or pay for any resultant damage or defect.

D. Furnish and install all supplementary or miscellaneous items, details, appurtenances and devices incidental to, or necessary for a complete operating system where work required is not specifically indicated or specified.

E. Drawings and specifications shall be taken together. Provide work specified and not indicated or work indicated and not specified as though mentioned in both.

F. 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 one year. It shall be the Contractor's responsibility to obtain extended warranties for use of all new equipment provided by the Contractor prior to project acceptance at no additional cost to the HPHA.

G. The Contractor shall maintain at the job site one copy of all drawings, specifications, addenda, approved shop drawings, change orders, and other modification, in good order and marked to record all changes made during construction. These documents shall be made available to the HPHA.

H. 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.

I. The Contractor shall schedule a date and time with the HPHA, a minimum of 7 days in advance, for all testing. The Contractor shall bear all cost of the tests.

J. The HPHA shall have the right to accept or reject material, equipment, and/or workmanship and determine when the Contractor has complied with the Contract Documents.

1.3 INSPECTION OF SITE

A. The 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.

1.4 SUBMITTALS

A. Submit in accordance with Section 01330 – SUBMITTAL PROCEDURES and the following requirements.

B. Submit eight (8) copies of each required submittal to the HPHA. Submittals shall include the manufacturer's name, trade name, place of manufacture, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable industry, and technical society reference standards, years of satisfactory service, and other information necessary to establish contract compliance of each item the Contractor proposes to be provided. Photographs of existing installations and date submitted in lieu of catalog data are not acceptable and will be returned without review. Partial submittals are not acceptable and will be returned without review.

C. At the time the submittals are submitted, the Contractor shall inform the HPHA, in writing, of any deviation in the shop drawings and other submittals from the requirements of the contract documents.

D. Manufacturer's Catalog Data: Submittals for each manufactured item shall be current manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves and catalog cuts.

E. Shop Drawings

1. Submit drawings a minimum 22 by 34 inches in size, using a minimum scale of 1/8 inch per foot. Include floor plans, section views, wiring diagrams, and installation details of equipment; and equipment spaces identifying and indicating proposed location, layout and arrangement of items of equipment, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Indicate locations of items requiring maintenance or inspection. Wiring diagrams shall identify circuit terminals, and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of equipment devices.

2. Provide a written certification with the shop drawing submittal stating that the Contractor has determined and verified all field measurements, sizes and obstructions, and that he has coordinated the shop drawings with the field conditions and the work of other trades.

F. Manufacturer's Instructions: Where installation procedures or part of installation procedures are

required to be in accordance with the manufacturer's instructions, submit printed copies of those instructions prior to installation. Installation of the item shall not proceed until the manufacturer's instructions are received. Failure to submit can be cause for rejection of the equipment or material.

G. Certificates of Compliance: Submit a certificate of compliance from the manufacturer for approval for products, finishes, and equipment as specified in the technical sections whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance. The certificate shall identify the manufacturer, the products, equipment, or materials and the referenced standard and shall simply state that the manufacturer certifies that the product conforms to the requirements specified.

H. Reference Standards Compliance: Where equipment or materials are specified to conform to industry and technical society reference standards of organizations such as the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), American Society of Mechanical Engineers (ASME), American Gas Association (AGA), American Refrigeration Institute (ARI), and Underwriters Laboratories (UL), submit proof of such conformance. If an organization uses a label or listing to indicate compliance with a particular reference standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections.

I. Independent Testing Organization Certificate: In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing and approved by the HPHA. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

J. Site Maintained Drawings

1. Maintain an accurate record of all changes made in installation from layout and materials shown on Contract Drawings and/or approved shop drawings.

2. Indicate location of items requiring maintenance or inspection.

3. Submit reproducible copies (contract velum) of these drawings to HPHA prior to final inspection.

K. Record Drawings: Record changes from the contract drawings of all ductwork, piping and equipment. Indicate location of valves and items requiring maintenance or inspection. Submit as-built drawings for review prior to final inspection. Also see Section 01330 – SUBMITTAL PROCEDURES.

L. Operation and Maintenance Manuals: Submit eight (8) hard bound copies of the operating and maintenance manuals 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 number, 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. Provide tabs separating each piece of equipment. When standard manufacturer's brochures are used, adequately indicate (highlight, arrow, etc.) the project related information and delete (X or cross-out) the non-applicable information. Include all applicable submittal items and information. Submit complete manuals for review prior to final inspection.

Operating Instructions in manual shall include:

1. Detailed description of the system and sequence of operations for all equipment.

2. Step by step procedure to follow in putting each piece of equipment in operation and trouble shooting.

3. Provide schematic control diagrams for each separate system. Each diagram shall show locations of start-stop switches and correct operating settings for each control instrument shall be marked on this diagram.

4. Provide diagram for the electrical control system showing the as-built wiring of all related electrical control items and interlocks.

1.5 LAWS, REGULATIONS AND CODES

A. All work shall be in accordance with government laws, ordinances, rules and regulations, and orders.

B. Comply with the County of Maui building, fire and plumbing codes; State Department of Health and Department of Labor and Industrial Relations Regulations; U.S. Occupational Safety and Health Act; U.S. Environmental Protections Agency Regulations; National Fire Protection Association Codes; and other laws, codes and regulations, and ordinances and manufacturer's recommendations and requirements, when applicable and as referenced in these specifications. The Contractor shall schedule and pay for all inspections required by any government agency.

1.6 PERMITS AND INSPECTIONS

A. Applications for permits will be done by the Consultant. The Contractor shall pay for all necessary permits and fees required for the mechanical work.

B. The Mechanical Contractor shall apply and pay for all necessary inspections required by any public authority having jurisdiction.

1.7 DISCREPANCIES

A. The Drawings and Specifications are intended to be cooperative. Any material, equipment, or system related to this section and exhibited on the Architectural, Structural, 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 more stringent of the requirements shall govern.

C. Drawings and Specifications are intended to be in full agreement, but should any discrepancy or apparent difference occur between the Drawings and Specifications or should any error occur in the work of others affecting the work, the Contractors shall notify the HPHA at once. If the Contractor proceeds with the work affected without instructions from the HPHA, he shall make good any resultant damage or defect. All interpretations of Drawings and Specifications shall be clarified by the HPHA.

1.8 TRADE NAME

A. Mentioning of a trade name in the plans or specifications indicates that the manufacturer is acceptable to the HPHA. However, certain specified construction and details may not be regularly included in the manufacturer's cataloged product. The Mechanical Contractor shall provide the material or equipment complete as specified.

1.9 WORKMANSHIP AND MATERIALS

A. Workmanship shall be of the best quality and none but competent mechanical workers skilled in their trades and thoroughly familiar with the work involved 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 pre-approved equal", or other words of similar intent or meaning are used, implying judgement is to be exercised, it is understood that it is the judgement of the HPHA that is referred to.

D. The HPHA 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 HPHA. Damaged or defective items, in the opinion of the HPHA, shall be replaced.

F. Reference to standards is intended to be the latest version of the standard referenced.

1.10 MANUFACTURER'S RECOMMENDATIONS

A. Equipment and/or systems installed under this Division of the Specifications shall be installed according to the manufacturer's written 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 Manufacturer's written recommendations, printed copies of these recommendations shall be furnished to the HPHA prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received and approved by the HPHA. The HPHA shall have final authority in approving manufacturer's recommendations. Failure to furnish these recommendations can be cause for rejection of the material.

1.11 CONTINUITY OF SERVICES

A. The facility will be in use during construction of this project. It is intended that interruption of utilities be kept to a minimum. Notice of service interruptions shall be submitted to the HPHA for approval at least three weeks before the intended date of service interruption. Exact date and time of interruption shall be determined by the HPHA. Provide temporary valves, connections, piping, etc., as necessary to assure the continuity of service and shall be removed when no

longer necessary. This shall be provided at no additional cost to the HPHA.

B. The Contractor shall submit to the HPHA a copy of his work schedule indicating the date and area to be affected by his work.

C. Execute work using such methods, techniques, connections and tie-ins which will cause least interference and interruptions of existing utilities and services. Keep roads clear of materials, debris, etc., to maximum extent possible. Schedule and make necessary arrangements for all work which will cause interferences or interruptions in advance with the HPHA, all other affected trades and authorities having jurisdiction.

D. Examine site and become familiar with existing local conditions affecting work.

E. Examine all Drawings and Specifications, including electrical, 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.

F. Investigate, determine and verify locations of any overhead utilities on or near 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 coordinate with the work to be done under other sections in providing information as to openings required in walls and slabs for all ductwork and piping, including sleeves, where required.

B. Any drilling or cutting required for the performance of work under this Section shall be the responsibility of the Contractor and the cost shall be borne by him.

C. The Mechanical Contractor shall pay all costs for cutting holes. All holes through existing concrete shall be toned to locate existing rebar, pre-stressed cables, or other utilities and shall either be core drilled or saw cut. All holes required shall have the approval of the HPHA prior to cutting or drilling.

D. It shall be the responsibility of the Contractor to ascertain that all openings are properly located and that no rebars, pre-stressed cables or other utilities are severed. Any damage due to the cutting or sawing shall be repaired by the Contractor.

1.13 ELECTRICAL WORK

A. Provide electrical components of mechanical equipment and systems such as motors, controllers, contactors, starters, and disconnects under DIVISION 22 - MECHANICAL, as specified herein, and as necessary for complete and operable systems. Provide interconnecting wiring for components of packaged equipment as an integral part of the equipment. Interconnecting power wiring and conduit for field erected equipment shall be as specified in DIVISION 26 - ELECTRICAL. Control wiring rated less than 100 volts or less and conduit shall be provided under DIVISION 22 – MECHANICAL and as specified in DIVISION 26 - ELECTRICAL. Extended voltage range motors will not be permitted. Motor control equipment forming part of motor control centers, assemblies, or other power sources to mechanical equipment shall conform to DIVISION 26 - ELECTRICAL.

B. Electrical work under Electrical Division is based on the electrical rating of equipment indicated on the Mechanical Drawings. Additional electrical work caused by any deviation under the Mechanical Division shall be paid for by the Mechanical Contractor.

1.14 SAFETY REQUIREMENTS

A. Equipment Safety: Fully enclose or properly guard, in accordance with DOSH regulations, belts, pulleys, chains, gears, couplings, projecting setscrews, keys, rotating parts, and other power transmission apparatus, located where persons can come in close proximity thereto. Points of operation, in going nip points, and machinery producing flying chips and sparks shall be guarded in accordance with the applicable portions of DOSH regulations. Provide positive means of locking out equipment so that the equipment cannot be accidentally started during maintenance procedures. 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 the type specified. Ensure that access openings leading to equipment are large enough to carry through routine maintenance items such as filters and tools.

B. Warning Sign: Provide a permanent placard or sign at the entrance to confined spaces contained in the equipment. The sign shall warn personnel not to enter the space until the atmosphere inside has been tested and systems have been de-energized.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. All materials and equipment shall be new and free from defects. Unless otherwise specified, each equipment or material of its kind shall be the standard product of a single manufacturer. All pump motors shall be sized to not overload anywhere on the operating curve. Safety factor shall be a minimum of 1.15.

B. Material and Equipment Qualifications: Provide materials and equipment that are standard products of manufacturers regularly engaged in the manufacture of such products, which are of a similar material, design and workmanship. Standard products shall have been in satisfactory commercial or industrial use for 2 years prior to award of this contract. The 2 year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the 2 year period. The Contractor shall provide a list of locations in Hawaii with addresses and telephone number when requested by the HPHA. All equipment with local manufacturer's representation shall be purchased through the local factory authorized distributor. Preference should be given to products made or manufactured in the United States of America.

C. Alternative Qualifications: Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, can be shown.

D. Service Support: The equipment items shall be supported by more than one local service organization. Submit a certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

E. Manufacturer's Nameplate: Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of distributing agent will not be acceptable.

2.2 ASBESTOS PROHIBITION

A. 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.

PART 3 - EXECUTION

3.1 FACTORY PAINTING OF EQUIPMENT

A. Factory applied painting of equipment shall be as specified herein, and provided under each section. Manufacturer's standard factory painted systems may be provided subject to certification that the factory painting system applied will withstand 125 hours in a salt spray fog test, except that equipment located outdoors shall withstand 500 hours in a salt spray fog test. Salt spray fog test shall be in accordance with ASTM B117. Immediately after completion of the test, the paint shall show no signs of blistering, wrinkling or cracking; no loss of adhesion; and the specimen shall show no signs of rust creep-age beyond 0.125 inch on either side of the scratch mark. The film thickness of the factory painted system applied to the equipment shall be not less than the film thickness used on the test specimen. If manufacturer's standard factory painting system is being proposed for use in lieu of the shop painting systems, submit certifications that the manufacturer's standard factory painting system conforms to the heat resistance requirement in addition to other certifications.

3.2 FIELD PAINTING

A. Conform to Section 099113 – EXTERIOR PAINTING and Section 099123 – INTERIOR PAINTING. Provide labels/signs for all piping.

3.3 EQUIPMENT IDENTIFICATION

A. Equipment shall be labeled with black melamine plastic labels with white lettering; labels shall be a minimum of 3-inches high with 2-inch high lettering. At Contractor's option, lettering may be painted with 2-inch high letter stencils.

3.4 PIPING INSTALLATION

A. Conform to the requirements of the Uniform Plumbing Code and all manufacturer's recommendations. Inspect all pipes inside and outside. Remove interior obstructions and ream out pipe ends. Tool markings on polished fittings are not acceptable. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings. Bushings are not permitted. Pull-tees are not permitted. Install valves with stems above horizontal. Provide proper support and adequate provisions for expansion, contraction, slope and anchorage. Provide dielectric unions

or separation at all dissimilar metals. Wrap pipe or tubing with 1/4-inch thick felt, secured with tape, where they contact other materials. Have piping treated, inspected and approved before it is furred in, buried or otherwise hidden. Provide standard weight galvanized steel pipe sleeves for all pipes passing through structure, sufficiently large to provide 1/4-inch clearance around pipe. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeve and when it contacts concrete or masonry. Grout with fire proof material around all pipe penetrations through slabs and walls full length of penetrations. Provide chrome plated brass escutcheons, set tight on the pipe and to the wall where pipes are exposed in finished areas. Provide clamping collar or membrane flange where pipe or drains penetrate waterproof membrane. Perform all welding using qualified welders in accordance with American National Standards Institutes Code B31.1 and American Welding Society Standard B3.0.

3.5 FIELD TESTS

A. The Contractor shall provide all labor, material, equipment, and instruments needed for the tests. During pressure test, all items in the system to be tested, which are not designed for the test pressure shall be removed or isolated from the system, and shall be reconnected or unblocked after the tests are completed. If operating tests require the supervision of the manufacturer's representative, the Contractor shall assist the representative by providing any labor, material, or equipment needed by the representative.

3.6 SEISMIC RESTRAINTS

A. The requirements for seismic protection measures described in this section shall be applied to mechanical equipment and systems specified herein. Seismic protection requirements shall be in accordance with ICBO-01 using and importance factor of 1 and shall be provided in addition to any other requirements called for in other sections of this specification. This facility shall be designed as being in seismic zone 3. Lateral support against earthquake induced forces shall be accomplished by positive attachments without consideration of friction resulting from gravity loads.

Mechanical equipment, water heaters, water, waste, drainage and gas piping shall be required to have seismic restraints as specified in this section.

The bracing for mechanical equipment and systems shall be developed by the Contractor in accordance with the requirements of this specification.

Exclusion

Seismic protection of piping for fire protection systems shall be installed in accordance with NFPA.

Pipes and ducts do not require special seismic restraints on:

1. Piping in less than 1/4" diameter.
2. All other piping less than 1-1/2" inside diameter.
3. Electrical conduit less than 2-1/2" inside diameter.
4. Piping suspended by individual hangers 12" or less in length from the top of pipe to the bottom of the supporting structural member where the hanger is attached, except as noted below.

All hangers shall meet the length requirements. If the length requirements is exceeded by one

hanger in the run, the entire run shall be braced.

Submittals

Detailed drawings along with catalog cuts, templates, etc. shall be submitted with other equipment and/or materials in this section of the specification.

Products

All materials and equipment shall be hot dipped galvanized.

1. Bolts and nuts shall be ASME F 593, Group 2 and ASTM F 594, Group 2.

2. Sway bracing shall be structural steel conforming to the following.
   a. Plates, rods and rolled shapes, ASTM A 36
   b. Wire rope, ASTM A 603
   c. Tubes, ASTM A 501
   d. Pipes, ASTM A 500
   e. Light gauge angles less than 1/4" thick, ASTM A 446
3. Flexible couplings shall have the same pressure and temperature ratings as adjoining pipe.

Execution

Bracing and Coupling

Bracing and coupling shall conform to the arrangements shown. Provisions of this paragraph apply to all piping within a 5 foot line around outside of building unless buried in the ground. Piping grouped for support on trapeze type hangers shall be braced at the same intervals as determined by the smallest diameter pipe in the group. No trapeze type hangers shall be secured with less than two ½" bolts. Bracing rigidly attached to pipe flanges or similar shall not be used where it would interfere with thermal expansion of piping.

Pipe Sleeves

Pipe Sleeves in interior if non-fire rated walls shall be sized as indicated on the drawings to provide clearances that will permit differential movement of piping without piping striking the pipe sleeve.

Spreaders

Spreaders shall be provided between adjacent piping runs to prevent contact during seismic activity whenever pipe or insulated pipe surfaces are less than 4" apart. Spreaders shall be applied at the same interval as sway braces at an equal distance between the sway braces. If rack type hangers are used where the pipes are restrained from contact by mounting to the rack, spreaders are not required for pipes mounted in the rack. Spreaders shall be applied to the surface of bare pipe and over insulation on insulated pipes utilizing high density inserts and pipe protection shields in accordance with manufacturer's recommendations.

Anchor Bolts

Floor or pad mounted equipment shall use cast-in-place ½" anchor bolts. One nut shall be provided on each bolt. Anchor bolts that exceed the normal depth of equipment foundation piers

or pads shall extend into concrete floor of the foundation thickness shall be increased in depth to accommodate the bolt lengths. A minimum of 4 anchor bolts per item shall be used. Minimum embedment of 12 bolt diameters, minimum bolt spacing of 16 bolt diameters, minimum edge distance 12 bolt diameters.

Maximum equipment weight (lbs.)	Min. bolt size (in)
500	½
100	½
5000	½

Resilient Vibration Isolation Devices

Selection of anchor bolts for vibration isolation devices and/or snubbers for equipment base and foundations shall follow the same procedure as in paragraph ANCHOR BOLTS except that an equipment weight equal to 5 times the actual weight shall be used.

Resilient and Spring Type Vibration Devices

Vibration isolation devices shall be selected so that the maximum movement of equipment from the static deflection point shall be ½".

Sway Bracing for Piping

Sway bracing shall be provided to prevent movement of the pipes under seismic loading. Braces shall be provided in both the longitudinal and transverse directions, relative to the axis of the pipe. The bracing shall not interfere with thermal expansion requirements for the pipes as described in other sections of these specifications.

Transverse Sway Bracing

Transverse sway bracing for copper pipe shall be provided at intervals not to exceed those given in the tabulation below. All runs shall have a minimum of 2 transverse braces. Transverse sway bracing for all pipes shall not exceed the hanger spacing per code.

Pipe dia. (in)	Span (ft)	Force on brace (lbs.)
1	11	17
1-1/2	12	35
2	14	70
2-1/2	15	110
3	17	150
4	19	300

Note: Bracing shall consist of at least one vertical angle 2x2x16 gauge and one diagonal angle of the same size.

Longitudinal sway bracing shall be provided at 40 foot intervals except when the location of sway braced is shown on the drawings for the particular piping system. All runs shall have one longitudinal brace minimum. Sway braces shall be constructed in accordance with the drawings. Branch lines, walls or floors shall not be used as sway braces.

Vertical Runs

Vertical runs of piping shall be braced at not more than 10 foot vertical intervals. For tubing, bracing shall be provided at no more than 4 foot spacing. Vertical braces shall be above the

center of gravity of the span being braced. All sway braces shall be constructed in accordance with drawings. Branch lines, walls, floors shall not be used as sway braces.

Anchor Rods, Angles and Bars

These items shall be bolted to either pipe clamps or pipe flanges at one end and cast-in-place concrete or masonry insert or clip angles bolted to the steel structure on the other end. Rods shall be solid metal or pipe as specified. Anchor rods, angles and bars shall not exceed lengths given in the tabulation below.

Type	Size (in)	Max Length (ft-in)	Max Load
Angle	1-1/2x1-1/2x1/4	4-10	5.7
	2x2x1/4	6-6	7.8
	2-1/2x1-1/2x1/4	8-0	9.8
Rods	3/4	3-1	3.7
	7/8	3-8	5.0
Flat Bars	1-1/2x1/4	1-2	3.1
	2x1/4	1-2	4.1
Pipes 1		7-0	4.1
Sch. 40	1-1/4	9-0	5.5
	1-1/2	10-4	6.6

Clamps and Hangers

Clamps or hangers in uninsulated piping shall be applied directly to the pipe. Insulated piping shall have clamps or hangers applied over insulation in accordance with the Insulation section.

Bolts

Bolts used for attachment of anchors to pipe and structure shall be not less than ½" in diameter.

Sway Bracing for Ducts

Bracing details and spacing for rectangular ducts shall be in accordance with SMACNA 12 including Appendix E using seismic hazard level C.

Unbraced Ducts

Hangers for unbraced ducts shall be positively attached to the duct within 2" of the top of the duct with a minimum of two #10 sheet metal screws. Unbraced ducts shall be installed with a 6" minimum clearance to vertical ceiling hanger wires.

Equipment Sway Bracing

Equipment sway bracing shall be provided for items supported from overhead floor or roof structures. Braces shall consist of angles, rods, wire rope, bars of pipes arranged as shown and secured at both ends with not less than ½" bolts. Braces shall conform to paragraph Maximum Length for Anchor Braces. Sufficient braces shall be provided for equipment to resist a horizontal force equal to 0.28 times the weight of equipment without exceeding safe working stress of bracing components. Details of equipment bracing shall be submitted for approval. In lieu of

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bracing with vertical support, these items may be supported with hangers inclined at 45 degrees directed up and radially away from equipment and oriented symmetrically in 90 degree intervals on the horizontal plane, bisecting the angles of each corner of the equipment, provided that supporting members are inclined at a 45 degree angle.

Floor or Pad Mounted Equipment

Floor mounted equipment shall be bolted to the floor. Requirements for the number and installation of bolts to resist shear forces shall be in accordance with paragraphs ANCHOR BOLTS.

The ratio of the height of the equipment (measured from the base to the center of gravity of the equipment) to the minimum distance between anchor bolts shall be used to determine if the overturning forces need to be considered in the sizing of an anchor bolt. If this ratio of greater than 8.89, the bolt values in paragraph Minimum Bolt Sizes, Cast-in-Anchor Bolts shall not be used and calculations shall be provided to verify the adequacy of the anchor bolts for combined shear and overturning.

Rigidly Mounted Equipment

The following specific items of equipment to be furnished under this contract shall be constructed and assembled to withstand a horizontal lateral force of 0.06 times the operating weight of the equipment, at vertical center of gravity of the equipment without causing permanent deformation, dislocations, separation of components or other damage which would render the equipment inoperative for significant periods of time following an earthquake.

3.7 CLEANUP AND CLEANING

A. The Contractor 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 the project site as well as his tools, construction equipment, and surplus materials. Clean all new equipment and materials prior to final inspection.

3.8 POSTED OPERATING INSTRUCTIONS

A. Furnish approved operating instructions for each principal item of equipment for the use of the operating and maintenance personnel. The operating instructions shall include wiring diagrams, control diagrams and control sequence for each principal item of equipment. Operating instructions shall be framed under glass or in approved laminated plastic and posted where directed by the HPHA. Operating instructions shall be attached to or posted adjacent to each principal item of equipment including start up procedure in the event of equipment failure and other items of instruction as recommended by the manufacturer of each item of equipment. Operating instructions exposed to the weather shall be made of weather-resistant materials or shall be suitably enclosed to be weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

3.9 INSTRUCTION TO HPHA PERSONNEL

A. The Contractor shall furnish the services of competent, factory certified instructors who will give full instruction to the designated personnel in the adjustment, operation and maintenance, including pertinent safety requirements of the equipment, components and 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. Service Contractor during warranty period must also attend. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the HPHA for regular operation. At a minimum, the number of man-days (eight hours) of instruction furnished shall be as follows: When the number of hours exceeds 3 hours, training shall be provided in four (4) hour blocks per day and shall be scheduled with the HPHA two (2) weeks prior to start of training. When significant changes or modifications in the equipment or system are made under the terms of the contract, additional instruction shall be provided to acquaint the operating personnel with the changes or modifications.

3.10 OPERATION AND MAINTENANCE MANUAL

A. Refer to Section 220000 – GENERAL MECHANICAL REQUIREMENTS, paragraph 1.04.L entitled "Operations and Maintenance Manuals".

3.11 ONE YEAR WARRANTY AND MAINTENANCE SERVICE CONTRACT

A. Contractor shall attend a pre-maintenance meeting with the HPHA Facilities Management Office to review the requirements and expectations of the HPHA. The Contractor and Subcontractor(s) who are primarily in charge of maintenance shall attend this meeting.

B. The installer shall submit eight (8) copies of the Maintenance Service Contract, countersigned by the General Contractor, that will validate the warranty.

C. In addition to the general warranty requirements specified in Section 01770 – CLOSEOUT PROCEDURES, the following shall also apply.

1. The Warranty and maintenance service shall extend for a period of one year commencing after 30 consecutive days of trouble-free operation after the Project Acceptance Date or as authorized by the HPHA, if earlier than the Project Acceptance Date. The warranty and maintenance service shall include all labor, materials, equipment, and parts necessary to service the complete system, in accordance with the attached Schedule of Maintenance Service, so as to assure proper operation and function of the system. All costs for the periodic maintenance, including emergency calls, shall be borne by the Contractor. This maintenance period and the warranty period shall run concurrently (same start and end dates). However, should the Contractor default on or delay the maintenance service contract and must restart or complete the service at a later time, then the warranty period shall also extend to match the revised maintenance service period.

D. Certification of Maintenance Work: All work done under this maintenance contract shall be performed by a technician with a minimum of four (4) years of servicing experience of the equipment being serviced and work shall be certified by a responsible employee of the Contractor who is in charge of or who performs the maintenance work. Service reports shall be made out for all service periods, i.e., monthly, quarterly, semi-annual, annual, emergency, etc. Certification of work by the Contractor shall be construed to mean that work has been performed in accordance with recommended and accepted maintenance procedures in conformance with the full intent of the service contract. Service shall include findings by the service personnel and description of work performed to maintain the systems in proper operating condition. All service reports shall be reviewed with an authorized representative of the HPHA who will acknowledge and sign reports.

E. Work Schedule/Advance Notification

1. 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 HPHA Holidays.

2. Monthly service shall be defined as twelve service periods a year. Each service period shall be approximately 30 days apart. Quarterly service shall be defined as four service periods a year. Each period shall be approximately three months apart. The first service shall occur three months after the start of the maintenance period. Semi-annual service shall be defined as two services per year. Each period shall be approximately six month apart. The first service shall occur six months after the start of the maintenance period. Annual service shall be defined as one service period a year. This service shall be performed twelve months after the start of the maintenance period. Monthly, quarterly, semi-annual and annual services shall all be performed independent of each other but, may be completed simultaneously. For example, quarterly service visits shall not count as monthly service visits.

3. Contractor shall submit a written maintenance work schedule to the HPHA for approval prior to performing the maintenance service work. The schedule shall identify all service tasks (i.e. monthly, quarterly, semi-annual, etc.) accurate to a specific week of each month. Any changes in the schedule that will affect subsequent scheduled services shall be submitted in writing to the HPHA prior to the next service and approved by the HPHA.

4. Contractor shall give the HPHA Facility Management Office a minimum of seven (7) days prior to the notice to any maintenance and repair work. For any work that will require equipment outages, Contractor shall inform the HPHA Facilities Management Office on the estimated duration of the outage.

F. Trouble Calls: Emergency services and repairs required between regular service calls shall be rendered within four (4) hours after the Contractor is notified, non-working days included, at no additional costs to the HPHA. The Contractor shall call the HPHA Facilities Management Office the next working day after being notified of the problem and report the status of repairs.

G. Maintenance Report/Checklist: The Contractor shall prepare and maintain a maintenance service report/checklist for all regular and emergency services which shall include the following:

1. Name of person making the service call
2. Date of call.
3. Time in and out from project site.
4. Nature of call; if emergency, who contacted the service company.
5. Listing of equipment serviced including model and serial numbers.
6. Temperature and pressure readings from all available pressure gauges and thermometers. Readings from all other gauges, thermometers, level indicators, status indicators, sensors, ambient temperature and humidity at the site.
7. All items indicated in the Schedule of Maintenance Service.

The service Contractor shall keep a separate log recording all regular and emergency maintenance calls to the project at his office.

In addition, the Contractor shall submit a signed copy of the written reports of maintenance and repair services performed within two (3) working days after completion of the service. Reports shall be signed by an authorized representative of the HPHA.

H. Maintenance Log: The Contractor shall provide a composition book to log all job site service visits. The log shall include the date, name of mechanic, reason for the service visit, and notes on any discrepancies found and work performed. This composition book log shall remain at the job site. In addition, the Contractor shall provide a copy of the service reports, checklists, and any other pertinent documentation to be left at the job site in a Contractor provided binder.

I. Cleanup and Work Practices: The contractor shall keep the job site free of debris, litter, discarded parts and materials, etc. and shall clean all oil drippings during the daily progress of work. The Contractor shall remove all tools, parts, and equipment from service areas upon completion of the work.

J. 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.

K. All periodic maintenance services performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance tasks.

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ATTACHMENT NO.1

SCHEDULE OF MAINTENANCE SERVICE

1. All services performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance tasks:

A. Exhaust Fans

Quarterly Service

1. Check motor controlled and backdraft dampers for proper operation; lubricate linkage for free movement.

2. Lubricate fan motors and bearings.

3. Check belt wear and tension; adjust or replace as needed.

4. Check sheaves for wear, replace as needed.

5. Check fan collar, bearings and shaft for wear, repair or replace as needed.

6. Replace air filters where installed; remove and wash intake grilles.

7. Certify performance of quarterly fan maintenance service and correct and report all discrepancies.

Semi-Annual Service

1. Check and clean all fan wheels and housings of dust, dirt, and grease.

2. Remove and wash all intake grilles and dampers and repair or replace deteriorated bird screens.

3. Certify performance of semi-annual fan maintenance service and correct and report all discrepancies.

END OF SECTION

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SECTION 22 40 00
PLUMBING

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. As specified in the General Conditions and the Special Conditions.

1.2 SUMMARY

A. Work involves replacement of existing water closets, lavs. with faucets, shower heads, shower balancing valves /handles, kitchen sinks with faucets in designated rehabilitated units: 19B, 22C, 23B, 24A. Existing fixtures to be replaced with accessible fixtures for designated mobility impaired units 17, 18A, 18B. Existing sink, accessible lavatories, accessible urinal and accessible water closets to be replaced with accessible fixtures at Building 25, Community Center. Provide new gas flex connections for all gas water heaters and gas ranges to be replaced with new.

1.3 SUBMITTALS

A. Submit in accordance with Section 01330 – SUBMITTAL PROCEDURES.

B. Refer to Section 220000 - GENERAL MECHANICAL REQUIREMENTS for additional submittal requirements.

C. Certificates: As specified in Section 220000 - GENERAL MECHANICAL REQUIREMENTS.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification. Coordinate deliveries to avoid interferences or construction delays. Protect products during delivery, storage, installation, and the remainder of the construction period after installation.

1.5 COORDINATION WITH OTHER SECTIONS

A. Excavating, trenching and backfilling shall follow standard industry practices and the Uniform Plumbing Code, latest edition.

1.6 QUALITY ASSURANCE

A. Comply with all the requirements of the State of Hawaii, County of Maui and applicable utility companies, and all recommendations of manufacturers.

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B. Obtain and pay for all fees, permits, licenses, assessments, connection charges and inspections required for this work.

C. Substitution of another manufacturer's product for equipment specified hereinafter and for items with "or pre-approved equal" after the brand name requires a formal request for substitution by the Contractor. Products of the following manufacturers are acceptable in lieu of those specified hereinafter by the manufacturer and model number.

1. Valves: Dezurick, Hammond, Lukenheimer Nibco, Stockham or Walworth.

2. Fixtures: American Standard, Eljer, Elkay or Kohler.

3. Pipe Supports: Elcen, Fee and Mason, Grinnell or Unistrut.

4. Toilet Seats: Bemis, Beneke, Kohler, Olsonite.

5. Gas Water Heaters: A.O. Smith, Bradford White, Ruud, State.

D. Comply with the recommendations and requirement of the latest edition Codes and Standards listed hereinafter in addition to the detailed requirements of this specification. In the event of conflicting requirements, this specification shall prevail.

1. American Society for Testing and Materials Publications (ASTM):

B 306 Copper Drainage Tube (DWV)

2. American National Standards Institute Publications (ANSI):

B16.18 Cast Copper Alloy Solder-Joint Pressure Fittings

B16.22 Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings

B16.23 Cast Copper Alloy Solder Joint Drainage Fittings - DMV

B16.26 Cast Copper Alloy Fittings for Flared Copper Tubes

B16.29 Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings

3. ADAAG Americans with Disabilities Act Accessibility Guidelines

4. National Fire Protection Agency (NFPA):

70 National Electrical Code

1.7 GUARANTEE

A. All work in this section to be guaranteed for a period of one year commencing after 30 consecutive days of trouble-free operation after the Project Acceptance Date or as authorized by

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HPHA, if earlier than the Project Acceptance Date. Should any equipment, fixture or material fail within this period, the Contractor shall be responsible for all damage to any part of the premises caused by the failure and shall repair or replace the defects at no cost to the HPHA.

1.8 ACCESSIBILITY REQUIREMENTS

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

PART 2 – PRODUCTS

2.1 MATERIALS

A. 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.

2.2 EQUIPMENT

A. Requirements of the manufacturer's equipment that is a component of a system provided under this work is included with the system's specification hereinafter. Capacities and characteristics of the equipment are indicated on the drawings.

1. Gas Water Heater (GWH): Capacity and characteristics as indicated on drawings. Provide heater thermopile to generate power to operate the electronic gas control without requiring an external power source. Propane gas. Provide Seismic strapping to Zone 3 requirements. Provide new gas flex connections for new gas water heaters.

2.3 FIXTURES

A. Provide chrome plated all brass faucets, flush valves, 1/4 turn chromed stops, stainless steel braided supply line, PVC P-traps, flange bolts, PVC or chrome plated brass escutcheons and cover plates. Provide connecting fittings, china bolt caps, wall support brackets as required. Furnish masonry and concrete contractor with standard galvanized wall sleeves and inserts required for fixture installation. All valves bronze and brass with chrome plating. All sinks and lavatories shall have 2.0 gpm cold water flow restrictors. All water closets shall be maximum 1.6 gallons per flush. All urinals shall be maximum 1.0 gallons per flush. Provide access panels as required for servicing of flush valves, valves, etc. Mount accessible flush valve on wider side of stall. Provide brass closet bolts, nuts, washer, plastic bolt caps, escutcheon plates and water closet flange/seal, wax ring for all water closets. Toilet seats shall be white, closed front, elongated type. P-trap guard, off set drain guard and angle stop covers shall be white in color.

1. Water Closet (WC): Floor mounted, floor outlet, tank type, vitreous china, elongated bowl, 1.6 gallons per flush maximum, 14-1/2" high, American Standard Colony 2435.012 (left hand trip lever) or 4003.800 (alternate tank configuration with right hand trip lever). Provide solid high gloss molded, closed front seat, American Standard Laurel 5311.012. Provide trip lever on wider side of toilet location.

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2. Accessible Water Closet (PWC) (Unit 17, 18A, 18B): Floor mounted, floor outlet, tank type, vitreous china, elongated bowl, 1.6 gallons per flush maximum, 17" high, Crane Plumbing Tall Toilet-To-Go. Includes toilet bowl and tank combination, toilet seat, wax ring and flange bolts. Provide trip lever on wider side of toilet location.

3. Accessible Water Closet (PWC) (Bldg 25): Floor mounted, floor outlet, top spud vitreous china, elongated bowl, 1.6 gallons per flush maximum, 17-1/2" high, Kohler K-4368. Provide solid plastic open front seat, with integral molded bumper, check hinge and angle stop. Provide chrome plated, flush valve with screwdriver stop and vacuum breaker (maximum 1.6 gal/flush), Sloan Royal 111 flush valve, maximum 5-lb. force for actuation. Install accessible flush valve lever on wider side of stall.

4. Lavatory (LAV): Oval, drop-in type lavatory, 20-1/8"x16-1/2" basin dimensions, Kohler K-2699-4. Provide Delta #B501LF single handle deck mount faucet less pop-up (chrome finish), 4" center-set (hot and cold water). Provide PVC p-trap, continuous waste (17-gauge, brass, chrome plated), Stainless steel braided supply risers with couplings, 1/4 turn angle stops and escutcheon.

5. Accessible Lavatory (PLAV) (Unit 17 18A, 18B and Building 25): Wall mounted, vitreous china, back overflow, 4" center-set holes, American Standard Lucerne 0355.012. Provide Delta #B501LF single handle deck mount faucet less pop-up (chrome finish), 4" center-set (hot and cold water) ADA compliant. Provide strainer, PVC p-trap, off-set drain, continuous waste (17-gauge, brass, chrome plated), stainless steel braided supply line, ¼ turn angle stops and PVC or Chrome plated brass escutcheon. Provide new floor mounted wall carrier as required. Provide p-trap guard, offset drain guard and angle stop cover.

6. Accessible Urinal (PUR) (Building 25): American Standard Trimbrook 6400.014, vitreous china, siphon jet top spud urinal, 3/4" top inlet. 1.0 gallon per flush. Provide drain screen. Provide new floor mounted carrier as required. Provide chrome plated, maximum 5 lbs for activation of flush valve, diaphragm type with screwdriver stop and vacuum breaker (maximum 1.0 gallon per flush), Sloan Royal 186-1.0 flush valve.

7. Tub Shower Trim: Oak Brook single hand tub and shower faucet (F1215503CP-ACA2) (chrome finish). Single control, anti-scald valve, metal tub spout, ADA compliant.

8. Accessible Shower Trim (Unit 17, 18A, 18B): Speakman model SM-5080-ADA, complete shower combination system including concealed anti-scald thermostatic/pressure balance shower valve, chrome plated, adjustable temperature limit stop factory set at 110 degrees F. Wall supply with 1/2" NPT female inlet and 1/2" NPSM male outlet, a 60" metal shower hose, vacuum breaker and a 24" slide bar. Provide shower drain.

9. Tub Shower: Kohler Villager cast iron bathtub 715-0 (left hand drain) or 716-0 (right hand drain. Overall dimensions 60" L x 30-1/4" W x 14" H, slip resistant surface. Oak Brook single hand tub and shower faucet (F1215503CP-ACA2) (chrome finish). Single control, anti-scald valve, metal tub spout, ADA compliant. White color.

10. Accessible Sink (Two-Compartment) (Unit 17,18A, 18B and Building 25): Elkay LRAD3322, 18 gauge, Type 304 stainless steel, two compartment sink, 33" x 22" x 6" deep, 3 hole standard drilling. Provide stainless steel waste fitting for each waste opening and stainless steel flanged tail piece. Oak Brook Hi-Rise two handle kitchen faucet with without spray (chrome finish) (item number 4309217). Provide strainer, p-trap, drain, continuous waste

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(17-gauge, brass, chrome plated), stainless steel braided supply, ¼ turn angle stops and escutcheon. Provide p-trap guard, offset drain guard and angle stop cover.

11. Sink (Two Compartment) (Non Mobility Impaired Units): Elkay EG3322, 18 gauge, Type 304 nickel bearing stainless steel, two compartment sink, 33" x 22" x 8-1/4" deep, 3 hole standard drilling. Provide stainless steel waste fitting for each waste opening and stainless steel flanged tail piece. Oak Brook Hi-Rise two handle kitchen faucet without spray (chrome finish) (item number 4309217). Provide strainer, p-trap, drain, continuous waste (17-gauge, brass, chrome plated), stainless steel braided supply line, 1/4 turn angle stops and PVC or chrome plated escutcheon.

2.4 PIPE FITTINGS

A. Only "domestic" piping shall be allowed on this project (made in USA, no foreign products).

1. Water Piping: Type "L" hard drawn copper tube, ASTM B 88 with non-lead soldered (95-5) joint wrought copper pressure fittings for aboveground. Use Type "K" copper tube with brazing alloy on joints and pipe below grade. All solder shall be non-lead; flux shall be non-corrosive complying with Copper Development Association Standard 1.0.

2. Waste and Vent Piping Above and Below Grade: Schedule 40 polyvinyl chloride (PVC) pipe or ABS pipe. Provide transition union connections between copper tubing and PVC piping. Provide male threaded joints with PTFE (polytetrafluoroethylene) pipe threaded paste for threaded connections.

3. Gas Pipes: Aboveground piping shall be Schedule 40 seamless galvanized steel pipe ASTM A 53 with screwed fittings.Installation shall be in accordance with gas service provider and Plumbing Code. Provide new flex gas connections for all new gas water heaters and gas ranges.

2.5 PLUMBING SYSTEM SPECIALTIES

1. Gas Flue: Type "B" gas flue, Metalbestos or approved equivalent.

PART 3 - EXECUTION

3.1 PREPARATION

A. Visit the work site and become fully aware of all existing conditions. Investigate the Contract Documents and make proper provisions to avoid interferences or construction delays. Determine the exact route of each pipe. Make off-sets and changes in direction required to maintain proper head room and pitch or to accommodate the structure and the work of other trades. Furnish other trades with information to properly locate and size openings in the structure required for this work. Furnish anchor bolts, sleeves, inserts and support required for this work.

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3.2 INSTALLATION AND REQUIREMENTS

A. Perform work using personnel skilled in the trade involved. Provide competent supervision. Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification and conforming to recognized commercial standards. Provide all extra materials and labor for a complete operable system at no extra cost to the HPHA. Installation shall be in accordance with manufacturer's recommendations. Provide access panels for all items requiring servicing, inspection, maintenance and adjustment.

3.3 UTILITY CONNECTIONS

A. Existing utility locations were determined from information available at the time of design. Verify the exact location and elevation of all existing utilities. Notify the HPHA immediately in writing of all discrepancies. Be fully responsible for any and all damage resulting from failure to exactly locate and preserve existing ground utilities.

3.4 EQUIPMENT INSTALLATION

A. Install equipment in the space allotted with sufficient clearance and support for proper operation and maintenance. Where equipment differs in arrangement or connections from those shown, provide all required changes in piping, supports, floor drain locations and appurtenances and cost of work of any other trades affected. Provide equipment accessories necessary for proper operation and support. Final connections shall include shutoff valves, regulators, traps, unions, strainers, and direct/indirect waste connections. Plumbing contractor shall obtain all information necessary for a complete and operable system. Provide structural steel framing for equipment as required. Water heater installation shall be in accordance with the Plumbing Code. Provide Type "B" flue and approved weather cap with seismic strapping to Zone 3 requirements.

3.5 FIXTURE INSTALLATION

A. Set fixtures in approved workmanlike manner. Point up all edges against walls and partitions with white grout. Provide adequate supports for wall-mounted fixtures. Provide supplies for all water lines to fixtures; Brasscraft or equivalent, compression joint type with chrome plated brass escutcheon and cover tube, 1/4 turn stop valve and braided flex connector. Provide p-trap, waste fittings and escutcheon as required for fixture. Exposed metal including pipe shall be polished chrome plated. Provide concealed arm wall/floor supports for lavatories and urinals.

3.6 PIPING INSTALLATION

A. Conform to the requirements of the Uniform Plumbing Code and all manufacturer's recommendations. Inspect all pipes inside and outside. Remove interior obstructions and ream out pipe ends. Tool markings on polished fittings are not acceptable. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings. Bushings are not permitted. Provide proper support and adequate provisions for expansion, contraction, slope and anchorage. Provide dielectric unions at all dissimilar metals. Wrap pipe or tubing with 1/4-inch thick felt, secured with tape, where they contact other materials. Have piping treated, inspected and approved before it is furred in, buried or otherwise hidden. Provide standard weight

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galvanized steel pipe sleeves for all pipes passing through structure, sufficiently large to provide 1/4-inch clearance around pipe. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeve and when it contacts concrete or masonry. Grout with fire proof material around all pipe penetrations through slabs and walls full length of penetrations. Provide chrome plated brass escutcheons, set tight on the pipe and to the wall where pipes are exposed in finished areas.

3.7 PIPING SYSTEM SUPPORTS

A. Pipe Supports: Factory-fabricated by Elcen, Fee and Mason, Grinnel or Unistrut; no chains or perforated straps permitted. Provide concrete inserts, beam clamps, channel framing, hanger rods and accessories required for proper support. Ramset or explosive type anchors may not be used without written permission by the HPHA.

B. Pipe Hangers: Steel clevis hanger with adjustable hanger rod; 3/8" for pipe 2" and smaller, 1/2" for pipe 2-1/2" through 3-1/2" and 5/8" for pipe 4" and larger. Groups of lines may be supported from steel channel pipe clamp.

3.8 DRAINAGE, WASTE AND VENT PIPING SYSTEMS

A. Slope drain lines at 1/4 inch per foot unless otherwise indicated. On roof drains and where other drains occur above the ground floor, provide clamping device with drain. Provide a prefabricated flashing sheet (non-lead) extending eight inches out around drain body and secure with clamping device. On vents through roof, extend vent flashing eight inches out all around base of vent, extending collar up vent and turn in at top. Install hubless cast-iron pipe in accordance with CISPI pamphlet 100-1972. Provide cast-iron and neoprene gasketed no-hub coupling below grade. MG stainless steel clamps and cast-iron no-hub couplings shall be installed in accordance with manufacturer's written instructions.

3.9 WATER PIPING SYSTEM

A. Secure each water line where it penetrates partitions to serve fixtures, hose bibbs and similar items. Wrap all lines passing through concrete with polyethylene tape. Install unions or flanges at all valves, equipment and system specialties. Set hose bibbs 18 inches above finished grade, unless otherwise indicated. Install dielectric unions at connections of copper and ferrous pipes. Provide access panels as required. No flux shall enter inside of piping.

B. Provide 12-inch long air chambers line sized at all plumbing fixtures.

3.10 FIELD QUALITY CONTROL

A. Test plumbing systems in accordance with the Uniform Plumbing Code. Perform tests in the presence of, and to the satisfaction of inspectors having jurisdiction over the work. Ask for final inspection by the HPHA after tests and adjustments have been performed. Test equipment to demonstrate its operation and compliance with the specification.

1. Test drainage systems in accordance with Section 318 of the Plumbing Code.

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2. Hydrostatically test the domestic water piping system at 100 psi for 2 hours. Inspect the entire system while under pressure and correct all deficiencies.

3.11 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 HPHA.

B. Sanitary and water piping shall be tested in accordance with the Plumbing Code. Sanitary drains shall be tested with a minimum of 10 feet of water for 15 minutes.

C. Defective Work: If inspection of tests show defects, such defective work or material shall be replaced and inspection and tests repeated. Repairs to piping shall be made with new material. No caulking of screwed joints or holes will be accepted. Installation shall be repaired by skilled mechanics of the trade involved at no extra expense to the HPHA.

D. Protection to Fixtures, Materials and Equipment: 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, adjusted and operated.

E. Chlorination: Domestic water lines shall be sterilized with chlorine before acceptance of work. Sterilize water system for 24 hours with 100 ppm chlorine introduced into the lines in an approved manner. Dosage of chlorine shall not be less than 50 ppm. After a contact period of not less than eight (8) 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 HPHA Project Engineer evidencing proper performance of sterilizations.

3.12 CLEANING AND ADJUSTING

A. At the completion of the work, all parts of the installation shall be thoroughly cleaned. Equipment, pipe valves, and fittings shall be cleaned of grease and metal cuttings, and sludge that may have accumulated by operation of the system for testing. Any stoppage or discoloration or other damage to parts of the building, its finish, or furnishing, due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor without cost to the HPHA. Touch-up with matching paint all damaged factory finishes. Adjust system for proper operation ready for use. Sterilize water system for 24 hours with 100 ppm chlorine introduced into the lines in an approved manner. Operate all valves during contact period. Flush system until chlorine is less than 0.2 ppm.

3.13 FINAL CONNECTIONS TO EQUIPMENT

A. Plumbing Contractor shall obtain all information from the HPHA necessary to make final connections to equipment. Provide control wiring and conduit for all items as required. Installation of HPHA furnished equipment to facilitate final connections shall be included.

ADDENDUM 2 REVISION

3.14 INSTRUCTIONS

A. Instruct the HPHA's representative in the proper operation and maintenance of the systems. Review the maintenance manuals with the HPHA. Submit a list of manufacturer's warranties for the equipment furnished.

END OF SECTION

ADDENDUM REVISION 2