

Invitation for Bids

**Maluhia Chilled Water Source Heat Pump Upgrade
23M-0311**

The Hawaii Health Systems Corporation (HHSC) Oahu Region is requesting bids from qualified companies for the replacement of the Chilled Water Source Heat Pump at Maluhia located at 1027 Hala Dr., Honolulu, HI 96817.

The IFB may be obtained electronically from the following website:

<http://maluhia.hhsc.org/procurement/notices/>

A site visit is scheduled for March 26, 2024 at 10:00 a.m. All interested companies shall meet in the Maluhia sub-basement entrance area, adjacent to the main parking lot. The deadline for submission of written/mailed questions pertaining to the IFB is April 2, 2024.

All bids must be received by HHSC by April 12, 2024, 2:00 p.m. Hawaii Standard Time. All bids shall be sent digitally to skawai@hhsc.org. E-mail bids not received by deadline will be disqualified for consideration. No exceptions will be made even if network provider or software (e.g. MS Outlook) delays delivery. Please note that large files (>10MB) may experience network delivery issues.

Addenda to the IFB will be posted on the website listed above.

For any inquiries, please contact Scott Kawai, Oahu Region Contracts Department, at (808) 832-3025 or by email at skawai@hhsc.org.

Maluhia
1027 Hala Drive
Honolulu, HI 96817

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SECTION 1
ADMINISTRATION

1.0 INTRODUCTION

This Invitation for Bid (hereinafter “IFB”) is issued by the Hawaii Health Systems Corporation (hereinafter “HHSC”), a public body corporate and politic and an instrumentality and agency of the State of Hawaii. All procedures and processes will be in accordance with HHSC Oahu Region policy and procedures.

In order for HHSC to accept Bidder’s response in a timely manner, please thoroughly read this IFB and follow instructions as presented.

1.1 IFB TIMETABLE AS FOLLOWS

The timetable as presented represents HHSC’s best estimated schedule. If an activity of the timetable, such as “Closing Date for Receipt of Bids” is delayed, the rest of the timetable dates may be modified. BIDDER will be advised, by addendum to the IFB, of any such modifications to the timetable. Contract start date will be subject to the issuance of a Notice to Proceed.

ACTIVITY		SCHEDULED DATES
1.	IFB Public Announcement	March 19, 2024
2.	Pre-Bid Orientation Maluhia sub-basement entrance 10:00 a.m.	March 26, 2024
3.	Closing Date for Receipt of Questions	April 2, 2024
4.	Closing Date for Receipt of Bids 2:00 p.m.	April 12, 2024
5.	Contractor Selection/Award Notification (on/about)	April 15, 2024
6.	Contract Start Date (on/about)	May 6, 2024

1.2 AUTHORITY

This IFB is issued following the provisions of Chapter 323F, Hawaii Revised Statutes (HRS), and its administrative rules. All BIDDERS are charged with presumptive knowledge of all requirements of the cited authorities. Submission of a valid executed bid by any BIDDER shall constitute admission of such knowledge on the part of such BIDDER.

1.2.1 IFB ORGANIZATION

This IFB is organized into four sections:

SECTION 1: ADMINISTRATIVE
Provides information regarding administrative requirements.

SECTION 2: SCOPE OF SERVICES
Provides a detailed description of goods and/or services to be provided and delineates HHSC and CONTRACTOR responsibilities.

SECTION 3: BID FORMS AND GENERAL CONDITIONS
Describes the required format and content for submission of the bid.

SECTION 4: BID EVALUATION AND AWARD
Describes how bids will be evaluation and procedures for selection and award of contract.

1.3 HEAD OF PURCHASING AGENCY (HOPA)

The HOPA for HHSC, or designee, is authorized to execute any and all Agreements (Contracts), resulting from this IFB.

The HOPA for this IFB is:

Derek Akiyoshi
Regional Chief Executive Officer
Hawaii Health Systems Corporation

1.4 DESIGNATED OFFICIALS

The officials identified in the following paragraphs have been designated by the HOPA as HHSC's procurement officials responsible for execution of this IFB, award of Agreement and coordination of CONTRACTOR's satisfactory completion of contract requirements.

1.4.1 ISSUING OFFICER

The Issuing Officer is responsible for administrating/facilitating all requirements of the IFB solicitation process and is the **sole point of contact** for BIDDER from date of public announcement of the IFB until the selection of the successful BIDDER. The Issuing Officer will also be responsible for **contractual actions** throughout the term of the contract. For purposes of this IFB, the designated Issuing Officer is:

Scott Kawai
Director of Contracts and Project Management
e-mail: skawai@hhsc.org
phone: (808) 832-3025

1.5.1 CHARTER

HHSC is a public body corporate and politic and an instrumentality and agency of the State of Hawaii. HHSC is administratively attached to the Department of Health, State of Hawaii and was created by the legislature with passage of Act 262, Session Laws of the State of Hawaii 1996. Act 262 affirms the State's commitment to provide quality health care for the people in the State of Hawaii, including those served by small rural facilities.

1.5.2 STRUCTURE AND SERVICES

HHSC is organized into four operational regions and provides a broad range of healthcare services including acute, long term, rural and ambulatory health care services. As the fourth largest public health system in the country, HHSC is the largest provider of healthcare in the Islands, other than on Oahu. This solicitation is for the Oahu Region.

1.5.3 MISSION

The mission of HHSC is to provide and enhance accessible, comprehensive health care services that are quality-driven, customer-focused and cost-effective.

1.6 FACILITY INFORMATION

Detailed information pertaining to HHSC facilities is located at <http://www.hhsc.org>.

1.7 SUBMISSION OF QUESTIONS

Questions must be submitted in writing via electronic mail, facsimile or post mail to the Issuing Officer no later than the “Closing Date for Receipt of Questions”, identified in paragraph 1.1 in order to generate an official answer. All written questions will receive an official written response from HHSC and become addenda to the IFB.

IMPORTANT

BIDDER may request changes and/or propose alternate language to the attached HHSC General and Special Terms and Conditions during this phase only. All requests will be presented to the HHSC Legal Department for review. No requests to change the HHSC General or Special Terms and Conditions will be entertained after the bids have been submitted or during the contracting process. All written questions and/or approved changes will receive an official written response from HHSC and shall be recorded as addenda to the IFB.

HHSC reserves the right to reject or deny any request(s) made by BIDDER.

Responses by HHSC shall be due to the BIDDER prior to notice of award.

Impromptu, un-written questions are permitted and verbal answers will be provided during pre-bid conferences and other occasions, but are only intended as general direction and will not represent the official HHSC position. The only official position of HHSC is that which is stated in writing and issued in the IFB as addenda thereto.

No other means of communication, whether oral or written, shall be construed as a formal or official response/statement and may not be relied upon.

SEND QUESTIONS TO:

Scott Kawai, Issuing Officer
e-mail: skawai@hhsc.org

1.8 SOLICITATION REVIEW

BIDDER should carefully review this solicitation for defects and questionable or objectionable matter. Comments concerning defects and questionable or objectionable matter, **excluding requests to revise the General or Special Conditions**, must be made in writing and should be received by the Issuing Officer, no later than the “Closing Date for Receipt of Bids” as identified in Section 1.1. This will allow issuance of any necessary amendments to the IFB. It will also assist in preventing the opening of bids upon which award may not be made due to a defective solicitation package.

1.9 IFB AMENDMENTS

HHSC reserves the right to amend the IFB any time prior to the deadline date of the IFB. IFB Amendments will be in the form of addenda.

1.10 CANCELLATION OF IFB

The IFB may be canceled when it is determined to be in the best interests of HHSC.

1.11 PROTESTS

Any protest shall be submitted in writing to the HOPA as noted below.

A protest based upon the content of the solicitation shall be submitted in writing within five (5) working days **after** the aggrieved individual/business knows or should have known of the facts giving rise thereto; provided further that the protest shall not be considered unless it is submitted in writing prior to and not later than the “Closing Date for Receipt of Bid” identified in section 1.1.

A protest of an award or proposed award shall be submitted within five (5) working days after the posting of award of the contract. The notice of award, if any, resulting from this solicitation shall be posted at the following website:
<http://leahi.hhsc.org/procurement/notices/>

Any and all protests shall be submitted in writing to the HOPA, as follows:

Derek Akiyoshi
Hawaii Health Systems Corporation
Oahu Region
3675 Kilauea Avenue
Honolulu, Hawaii 96816

1.12 PERFORMANCE AND PAYMENT BOND

Performance and payment bonds shall be required for contracts \$25,000 and higher. At the time of the execution of the contract, the successful Bidder shall file good and sufficient performance and payment bonds, each in an amount equal to one hundred percent (100%) of the amount of the contract price unless otherwise stated in the solicitation of bids.

1.13 SPECIALTY CONTRACTOR’S LICENSE

A. Contractor shall be solely responsible to ensure that all specialty licenses required to perform the Work are covered by the Contractor and/or its subcontractor(s).

1.14 WORKING HOURS

- A. Regular working hours for this project shall take place between the hours of 8:00 AM to 4:30 PM Monday through Friday, excluding State Holidays, unless otherwise noted or restricted.
- B. The Contractor may be given approval to work beyond the regular hours including Saturdays, Sundays, State Holidays, night work, or after hours under the provisions of the GENERAL CONDITIONS.

1.15 SPECIAL PROCEDURES DURING BIDDING

- A. All bids shall be submitted to the Issuing Officer.
- B. All questions regarding the IFB shall be submitted, in writing, to the Issuing Officer, who shall review the questions and issue any responses via Addendum. Only information received by Addendum shall be binding.
- C. Any visitation to the site to examine the scope of work shall be requested through the HHSC Representative. Disruption of facility operations shall not be permitted.

SECTION 2
SCOPE OF SERVICES

2.0 INTRODUCTION

MALUHIA CHILLED WATER SOURCE HEAT PUMP UPGRADE

Work for this project shall include, but is not limited to upgrading the existing chilled water source heat pump system, electrical work, and mechanical work as indicated in the Plans and Specifications.

2.1 CONTRACT PERIOD

The work shall be completed within 220 consecutive calendar days.

2.2 SCOPE OF SERVICES

- A. The CONTRACTOR shall complete the work specified in the specifications and drawings in APPENDIX C.
- B. Qualifications. The CONTRACTOR shall have:
 - 1. A current and valid license to perform the scope of work.
 - 2. Have been in business for the past three (3) consecutive years.
 - 3. A permanent, on-island office location in conducting business which is accessible to telephone calls. An answering service is not acceptable.
- C. HOSPITAL shall provide:

Technical Representatives who shall have the authority to oversee the successful completion of contract requirements, including monitoring, coordinating and assessing CONTRACTOR performance; placing requests for services; and, approving completed work/services with verification of same for CONTRACTOR's invoices. Technical Representatives will also serve as points of contact for "technical" matters throughout the term of the contract.

SECTION 3
Bid Forms and General Conditions

General Instructions for Completing Forms

- *Bids shall be submitted in the prescribed format outlined in this IFB*
- *No supplemental literature, brochures or other unsolicited information should be included in the bid packet.*
- *A written response is required for each item unless indicated otherwise.*

3.0 Bid Form

The bid form must be completed and submitted to HHSC by the required due date and time, and in the form prescribed by the HHSC. Facsimile transmissions shall not be accepted.

Interested bidders shall submit their bid under the interested bidder's exact legal name that is registered with the Department of Commerce and Consumer Affairs and shall indicate this exact legal name in the appropriate space on page 1 of the bid form. Failure to do so may delay proper execution of the Contract.

Interested bidders shall certify its ability to provide services on May 6, 2024 or upon execution of the Contract agreement by both parties. The Hospital reserves the right to apply liquidated damages for the delay in Contract execution on the part of the Contractor.

The interested bidder's authorized signature shall certify bid documents. If the Bid Form on Appendix A is unsigned the bid shall be automatically rejected.

The option to extend the Contract shall be at the sole discretion of the Hospital and determined to be in the best interests of the State.

3.1 Bid Security

All lump sum bids of \$25,000 and higher, or lump sum base bids including alternates of \$25,000 and higher, that are not accompanied by bid security are non-responsive.

- a. The bid security shall be in an amount equal to at least five percent (5%) of the lump sum bid or lump sum base bid including alternates or in an amount required by the terms of the federal funding, where applicable.

3.2 General Conditions

The State of Hawaii INTERIM GENERAL CONDITIONS, dated August 1999, and AMENDMENTS shall be read by the Contractor as they form a part of the Agreement to be entered into between the Contractor and HHSC. The Interim General Conditions are not physically included in these specifications, but are included by reference. Copies of the INTERIM GENERAL CONDITIONS may be obtained from the Division of Public works, Department of Accounting and General Services, State of Hawaii at the following website:
http://hawaii.gov/pwd/construction_bids/Members/qc/gen_cond_constr

The General Conditions are hereby amended as follows:

- a. The following terms specified in Section 1 are hereby defined:
 - i) Bidder shall have the same definition as Contractor.
 - ii) Comptroller shall be the Chief Financial Officer at HHSC or his authorized representative.
 - iii) Department shall be HHSC or its designee.
 - iv) Engineer shall be the person so designated by HHSC.
 - v) State shall be HHSC or its designee.
- b. Section 1.20 and 1.25 replace "State of Hawaii" with "State".
- c. The last two sentences of the third paragraph of Section 2.1.1.2, in the Interim General Conditions is deleted and is replaced with the following:

" If the notice is faxed, the time of receipt by the CEO's fax machine shall be official. The submittal of intention to bid via fax is acceptable only to this office."
- d. Section 2.1.2.1: second sentence is hereby deleted in its entirety.
- e. Last sentence of paragraph 2.1.2.3 of the Interim General Conditions is amended to read as follows:

"Failure to submit either the required tax clearance certificate or Bid Form will be sufficient grounds for HHSC to refuse to receive or consider the prospective bidder's proposal."
- f. The addresses specified in Section 2.6.1 of the Interim General Conditions shall be changed to Leahi Hospital 3675 Kilauea Avenue Honolulu Hawaii 96816.
- g. Sections 2.10 through 2.11 are hereby deleted in their entirety.
- h. Paragraph 3.8.1 of the Interim General Conditions is amended to read as follows:

"The contract shall be signed and forwarded to HHSC (Contracts Office), by the successful bidder all within three (3) days of receipt of the contract. The performance and payment bonds shall be received by HHSC (Contracts Office) within ten (10) calendar days after the bidders is awarded the contract. No proposal or contract shall be considered binding until the contract has been fully and properly executed by all parties thereto."
- i. In paragraph 3.9.2 of the Interim General Conditions, "ten (10) calendar days after such award or within such further time as the Comptroller may allow" shall be replaced with, "the time allowed in the previous section."
- j. Section 4.1: the words "accepted bid" is deleted from the first sentence.
- k. Section 4.9.3: the words "submission of bids" is replaced with the words "execution of this contract".
- l. Section 5.5: the last sentence is hereby deleted in its entirety and replaced with the following:

“In the event of conflict among the Contract Documents, the order of precedence is listed in paragraph 5 of this contract and is further detailed in the following subparagraphs:”

- m. Sections 5.5.1 and 5.5.2 are hereby deleted in their entirety.
- n. Section 5.8.1: “twenty-four (24)” is hereby changed to “three (3)”.
- o. Section 5.11 is hereby deleted in its entirety.
- p. Section 5.12.4 is hereby deleted in its entirety.
- q. Section 7.3.7.4, subparagraphs a and b: Replace “If the project falls within the State University System, The University of Hawaii” with “HHSC.”
- r. Section 7.4.1 is hereby deleted in its entirety and replaced with the following:

“The Contractor shall prepare, process, obtain, and pay for all permits necessary for the proper execution of the work.”
- s. Section 7.7.2 is amended to read as follows: “The wage rate schedule is attached to this contract.”
- t. Sections 7.14.2, 7.19.2, and 7.19.4: delete “Departments and Agencies and their” and insert “directors” between “officers” and “representatives”.
- u. Section 7.14.4 is hereby added and reads as follows:

“Contractor warrants that it and none of its employees, agents or subcontractors performing services or providing goods pursuant to this Agreement are excluded from participation in federal health care programs, as defined in the Social Security Act (section 1128 and 1128A), and other federal laws and regulations relating to health care. HHSC reserves the right to verify that the above warranty is true and to immediately cancel this Agreement in the event it is violated.”
- v. Section 7.15 delete “and its Departments and Agencies”.
- w. Section 7.21.8.6 — Delete the word “bad” before the words “weather day conditions.”
- x. Section 7.35.1: the last word “earlier” is changed to “later”.

3. CORPORATE COMPLIANCE PROGRAM. A description of the Corporate Compliance Program of HHSC is posted on the HHSC Internet (www.hhsc.org). The CONTRACTOR, by signing this contract, acknowledges that it has read said description, and that the CONTRACTOR knows of the fact and substance of the Corporate Compliance Program, which governs operations at all facilities of the HHSC. The CONTRACTOR understands and agrees that employees, agents, and contractors performing any services at any of the HHSC facilities shall be fully subject to such Corporate Compliance Program, as may be amended from time to time, as well as all federal program requirements and applicable policies and procedures of HHSC and its facilities. The Corporate Compliance Program requires periodic training, including an orientation program, of all people who provide financial, business office, personnel, coding, medical records information systems and clinical services in the facility. The CONTRACTOR agrees to cause its employees, agents, and contractors who provide any services at any financial, business office, personnel, coding, medical records information systems and clinical services at any of the HHSC facilities to participate in the orientation and training programs.

4. CONFIDENTIAL INFORMATION. It is acknowledged and agreed that all of the trade secrets, business plans, marketing plans, know how, data, contracts, documents, scientific and medical concepts, billing records, personnel records, medical records of any kind, and referral resources for existing or future services, products, operations, management, business, pricing, financial status, valuations, business plans, goals, strategies, objectives and agreements of HHSC and any of its facilities, affiliates or subsidiaries, and all patient information, in any form, whether written, verbal, or electronic, are confidential (“Confidential Information”); provided, however, that Confidential Information, with the exception of patient information, shall not include information that is in the public domain.
5. CONTRACTOR EXCLUSION FROM FEDERAL PROGRAMS. CONTRACTOR warrants that it and none of its employees, agents or subcontractors performing services or providing goods pursuant to this Agreement are excluded from participation in federal health care programs, as defined in the Social Security Act (section 1128 and 1128A), and other federal laws and regulations relating to health care. HHSC reserves the right to verify that the above warranty is true and to immediately cancel this Agreement in the event it is violated.
6. CAMPAIGN CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS. CONTRACTORS are hereby notified of the applicability of Section 11-205.5, HRS, which states that campaign contributions are prohibited from specified State or county government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body. For more information, please consult with the Campaign Spending Commission, or visit its website, www.hawaii.gov/campaign.

(END OF SECTION)

SECTION 4
BID EVALUATION AND AWARD

4.0 Bid Evaluation

Each bid offer will be reviewed for exact conformity of the requirements in the IFB, known as a responsible bid. Information provided in/with the bid offer will be used to determine whether the interested bidder has the technical and financial capacity to deliver the goods or services, known as a responsive bid.

4.1 Method of Award

- A. The contract will be awarded to the lowest responsive and responsible Bidder whose bid (including any alternates which may be selected) meets the requirements and criteria set forth in the solicitation documents.
- B. In the event the total lump sum bid of all bidders exceeds the project control budget, HHSC reserves the right to make an award to the apparent Low Bidder if additional funds are available or by reducing the scope of work through negotiation.

4.2 Contract Execution

Upon receipt of the Contract document, the CONTRACTOR shall have ten (10) business days to execute and return the Contract to the Issuing Officer. Explicit execution instructions will accompany the Contract. A copy of the fully executed Contract will be provided the CONTRACTOR within seven (7) business days of Contract execution.

Award of Contract may be withdrawn if the CONTRACTOR is unable to meet Contract execution requirements.

(END OF SECTION)

SAMPLE BID TRANSMITTAL COVER LETTER

Dear Mr. Kawai,

(Name of Business) proposes to provide any and all goods and services as set forth in the “Invitation for Bid” for Maluhia Chilled Water Source Heat Pump Upgrade IFB No. 23M-0311, for which fees/costs have been set. The fees/costs offered herein shall apply from XXX, 2024 to XXX, 2025.

It is understood and agreed that (Name of Business) have read HHSC’s Scope of Services described in the IFB and that this bid is made in accordance with the provisions of such Scope of Services. By signing this bid, (Name of Business) guarantee and certify that all items included in this bid meet or exceed any and all such Scope of Services. (Name of Business) agree, if awarded the contract, to provide the goods and services set forth in the IFB; and comply with all terms and conditions indicated in the IFB; and at the fees/costs set forth in this bid. The following individual(s) may be contacted regarding this bid: _____

Other information:

Address:		Federal Tax ID #:	
Phone No.:		Hawaii GET ID #:	
E-mail address:			

(Name of Business) is a: Sole Proprietor Partnership Corporation Joint Venture Other (Specify) _____

State of Incorporation is: (Specify) _____

Year of Business started: _____

The exact legal name of the business under which the contract, if awarded, shall be executed is: _____

(Authorized Bidder’s Signature, Printed Name/Title; Corporate Seal or Notarized)

IFB No. 23M-0311
Maluhia Chilled Water Source Heat Pump Upgrade

BID FORM

After carefully examining the bid documents, drawings and specifications identified above, the Bidder proposes to furnish at its own expense all necessary labor, materials, tools and equipment to complete the work according to the true intent and meaning of the drawings and specifications, all for the Lump Sum Base Bid of:

_____ DOLLARS (\$ _____)

(Schedule of Values must be submitted with the Bid).

Respectfully Submitted:

Signature / Printed Name

Date

Title

OTHER CONDITIONS

1. Bidder agrees to liquidated damages as specified.
2. By submitting this proposal, the Bidder is declaring that its firm has not been assisted or represented on this matter by an individual who has, in a County capacity, been involved in the subject matter of this contract in the past two years;
3. Anti-collusion certification. In accordance with HAR 3-122-192, by submitting this proposal, the Bidder is declaring that the price submitted is independently arrived at without collusion.
4. Certification for Safety and Health Program for bids in excess of \$100,000. In accordance with HRS 396-18, the Bidder certifies that its organization will have a written safety and health plan for this project that will be available and implemented by the Notice to Proceed date of this project. Details of the requirements of this plan may be obtained from the Department of Labor and Industrial Relations, Occupational Safety and Health Division (HIOSH); and
5. Upon the acceptance of the proposal by the HHSC, the Bidder must enter into and execute a contract for the same and furnish a Performance and Payment bond, as required by law.

RECEIPT OF ADDENDA

Receipt of the following addenda issued by HHSC is acknowledged by the date (s) of receipt indicated below:

Addendum No. 1 _____
Date

Addendum No. 3 _____

Addendum No. 2 _____

Addendum No. 4 _____

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

ALL JOINT CONTRACTORS OR SUBCONTRACTORS TO BE ENGAGED ON THIS PROJECT

The Bidder certifies that the following is a complete listing of all joint contractors or subcontractors covered under Chapter 444, Hawaii Revised Statutes, who will be engaged by the Bidder on this project to perform the nature and scope of work indicated and understands that failure to comply with this requirement may be just cause for rejection of the bid.

The Bidder further understands that only those joint contractors or subcontractors listed shall be allowed to perform work on this project and that all other work necessary shall be performed by the Bidder with his own employees. If no joint contractor or subcontractor is listed, it shall be construed that all of the work shall be performed by the Bidder with its own employees.

The Bidder must be sure that it has and that the subcontractor(s) listed in the proposal have all the necessary specialty licenses needed to perform the work for this project. The Bidder shall be solely responsible for assuring that all the specialty licenses required to perform the work are covered in its bid.

The Bidder shall include the license number of the joint contractors or subcontractors listed below. Failure to provide the correct names and license numbers as registered with the Contractor's Licensing Board may cause rejection of the bid submitted.

Complete Firm Name Joint Contractor or Subcontractor for <u>Lump Sum Base Bid</u>	License <u>Number</u>	Nature and Scope of Work to be <u>Performed</u>

Enclosed herewith:

- 1. Surety Bond (*1))
 - 2. Legal Tender (*2))
 - 3. Cashier's Check (*3))
 - 4. Certified Check (*3))
- (Cross Out Those Not Applicable)

in the amount of:

_____ DOLLARS (\$_____).

as required by law.

Respectfully submitted,

Name of Company, Joint Venture or Partnership

License

By _____
Signature (*4)

Title _____

Date: _____

(CORPORATE SEAL)
(*5)

NOTES:

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

END OF BID FORM

APPENDIX C

MALUHIA
Chilled Water Source Heat Pump Upgrade
Honolulu, Hawaii
TMK No. 1-6-009:004

PREPARED FOR:
Hawaii Health Systems Corporation
Maluhia
1027 Hala Drive
Honolulu, HI 96817

TECHNICAL SPECIFICATIONS

FINAL SUBMITTAL

December 2023

Prepared By:



828 Fort Street Mall, Suite 500 • Honolulu, Hawaii 96813
Tel: 808 521-3773

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DIVISION 0 – INTRODUCTORY, BIDDING AND CONTRACTING REQUIREMENTS

SECTION 00210 - INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.01 GENERAL:

- A. Only Bidders with the required contractor’s license(s) are eligible to submit a Bid.
- B. Bidders (Contractors) shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract. The following definitions are used in the solicitation documents.
 - 1. Hawaii Business §3-1222-112 HAR: A bidder who is registered and incorporated or organized under the laws of the State is a “Hawaii Business” and eligible for an award.
 - 2. Compliant non-Hawaii Business §3-122-112 HAR: A bidder not incorporated or organized under the laws of the State, but is registered to do business in the State and complies with or is exempt from the requirements of §3-122-112 HAR, is a “Compliant Non-Hawaii Business” and eligible for an award.
 - 3. Non-compliant Bidder: If a bidder is a non-Hawaii business and is not registered with the DCCA Business Registration Division (BREG) or cannot comply with §3-122-112 HAR, then the bidder is non-compliant and is ineligible for an award.
- C. Prospective Bidders shall submit their “Intention to Bid”.
- D. Bidders shall submit the “Sealed Bid Form”, bid bond (if required), tax clearances, Hawaii business certificates, and any other documents required by the bidding documents.
- E. The GENERAL CONDITIONS set forth additional terms and conditions for the bid and award process. The GENERAL CONDITIONS will be part of the contract documents by which HHSC and the bidder (prospective contractor) will be bound. Bidders are directed to the GENERAL CONDITIONS for contract and statutory requirements and for Bidding and Execution of the Contract Requirements. Bidders are also directed to “Section 00800 – Special Conditions” of these specifications for definitions and modifications to the GENERAL CONDITIONS.

1.02 OFFEROR(S) or BIDDER(S):

- A. The terms “Offeror” and “Bidder” are synonymous when used in this Section 00210 and other solicitation documents.

1.03 ADDENDA, CLARIFICATIONS:

- A. Addenda: The HHSC may periodically issue an addendum that may increase or decrease the scope of work or contract time, provisions or conditions. The HHSC will make the addenda available online on the facility website. Bidders are responsible for the information contained in the addenda or bid clarification whether or not the Bidder receives the addenda or clarification.
- B. Bidders discovering an ambiguity, inconsistency or error when examining the bidding documents or the site and local conditions or bidders with questions or clarification requests shall send their written requests (email or fax notification are acceptable) to the Contract Manager. Bidders shall comply with the following procedures:
 - 1. Identify each request with the Project Name and HHSC Project Number.
 - 2. Indicate the appropriate section number, paragraph, drawing and detail number, schedule or other identifier.
 - 3. The request should be brief, concise, but complete enough to properly evaluate and determine the merits or non-merits of the question or request.
- C. Bidders shall make any requests for clarifications no later than fourteen (14) calendar days prior to the submission date for sealed bids. Refer to the "Notice to Bidders" for submission date.
- D. HHSC will respond to important requests or clarifications by way of addenda. HHSC may not address or respond to all bidders inquiries, if the HHSC determines the request is unimportant or not required to disseminate to all Bidders.

1.04 SEALED BID FORM (BID FORM):

- A. Bidder shall fill out the "Sealed Bid Form" completely. Write in ink or type. Besides the following paragraphs with instructions, there are supplemental Bidder's Instructions within the text of the "Sealed Bid Form" and bidders shall comply with the instructions. Do not alter the "Sealed Bid Form", and maintain the form intact.
- B. RECYCLED PRODUCT PREFERENCE is not applicable to this project.
- C. OTHER CONDITIONS: Bidder acknowledges and agrees to the provisions and certifications stated in this article.
- D. RECEIPT OF ADDENDA: Bidder shall fill in the appropriate dates any addenda were received.

- E. LISTING JOINT CONTRACTORS OR SUBCONTRACTORS:
1. Bidder shall complete the “Joint Contractors or Subcontractors List.” It is the sole responsibility of the bidder to review the requirements of this project and determine the appropriate specialty contractor’s licenses that are required to complete the project. Failure of the bidder to provide the correct names, license numbers, specialty class number, classification description and to indicate that the specialty contractor is required for this project, may cause the bid to be rejected.
 2. Bidder agrees the completed listing of joint contractors or subcontractors is required for the project and that the bidder, together with the listed joint contractors and subcontractors, have all the specialty contractor’s licenses to complete the work.
 3. Based on the Hawaii Supreme Court’s January 28, 2002 decision in Okada Trucking Co., Ltd. v. Board of Water Supply, et al., 97 Hawaii 450 (2002), the bidder as a general contractor (‘A’ or ‘B’ license) is prohibited from undertaking any work solely or as part of a larger project, which would require the bidder (‘A’ or ‘B’ general contractor) to act as a specialty (‘C’ license) contractor in any area in which the bidder (‘A’ or ‘B’ general contractor) has no specialty contractor’s license. Although the ‘A’ and ‘B’ contractor may still bid on and act as the “Prime Contractor” on an ‘A’ or ‘B’ project (See, *HRS §444-7 for the definitions of an “A” and “B” project*), respectively, the ‘A’ and ‘B’ contractor may only perform work in the areas in which they have the appropriate contractor’s license. The bidder (‘A’ or ‘B’ general contractor) must have the appropriate ‘C’ specialty contractor’s licenses either obtained on its own, or obtained automatically under HAR §16-77-32.
 4. General Engineering ‘A’ Contractors automatically have these ‘C’ specialty contractor’s licenses: C-3, C-9, C-10, C-17, C-24, C-31a, C-32, C-35, C-37a, C-37b, C-38, C-43, C-56, C-57a, C-57b, and C-61.
 5. General Building ‘B’ Contractors automatically have these ‘C’ specialty contractor’s licenses: C-5, C-6, C-10, C-12, C-24, C-25, C-31a, C-42a, and C-42b.
 6. The table that lists the specialty contractor’ classifications in the bid form is from the Department of Commerce and Consumer Affairs’ (DCCA) website www.state.hi.us/dcca/har/index.html. Bidders shall provide the appropriate classifications numbers and descriptions for any specialty contractors that are not included in the bid form and bidders are directed to the DCCA web site for the latest updated list.
 7. Instructions to complete the Joint Contractors or Subcontractors List:
 - a. Determine the specialty contractor classification(s) required for this project and provide the complete firm name and license number of the joint contractor or subcontractor in the respective columns. If the bidder is a general contractor and providing the work of the required specialty contractor

classification, fill in the bidder's (general contractor's) license number and name.

- b. List only one joint contractor or subcontractor per required specialty contractor's classification.
 - c. For projects with alternate(s), fill out the respective "Joint Contractors or Subcontractors List for the Alternate(s)." Bidder shall determine the specialty contractor's classification and description required for the respective alternate. Bidders shall fill in the complete class number, class description, firm name and license number of the respective joint contractor or subcontractor. The bidder shall not include any joint contractor or subcontractor previously listed for the base bid.
- F. **COST AND TIME:** Bidder shall completely fill out the article and enter the cost for the Project Bid Price, and Alternates when provided. Bidder shall tabulate the Project Bid Price, and Alternates when provided, and the Bidders shall then enter the Total Lump Sum Bid Price. **BE SURE TO ENTER THE TOTAL LUMP SUM BID PRICE IN WORDS AND NUMERALS.** Refer to Bidder's Instructions located within the article.
1. If provided, bidder shall fill in total costs for each alternate.
 2. The bidder is directed to the construction time information paragraph "B" for the list of contract times and dates which may include: contract duration, project start date, jobsite start date, jobsite completion, contract completion date and construction time for alternates. Bidder shall refer to "Section 01100" of these specifications for additional construction time information, as applicable.
- G. **SIGNATORY PAGE:** Bidder shall completely fill out article (page). Bidder shall indicate if it is a "Hawaii Business" or a "Compliant Non-Hawaii Business." Also, bidder shall refer to Bidder's Instructions located within the article.

1.05 **EVALUATION CRITERIA:**

- A. **EVALUTATING BIDS:** The lowest responsive, responsible bid is determined by the following procedures:
1. The total lump sum bid price is adjusted to reflect the applicable preferences.
 - a. For projects with alternates, the total lump sum base bid price and alternates will be adjusted to reflect the applicable preferences.
 2. Project control budget is established prior to the submission of bids.

1.06 **METHOD OF AWARD:**

- A. The contract will be awarded to the lowest responsive and responsible Bidder whose bid (including any alternates which may be selected) meets the requirements and criteria set forth in the solicitation documents.

- B. In the event the total lump sum bid of all bidders exceeds the project control budget, HHSC reserves the right to make an award to the apparent Low Bidder if additional funds are available or by reducing the scope of work through negotiation.

1.07 OTHER CONDITIONS FOR AWARD:

- A. The Chief Procurement Officer may reject any or all bids and waive any defects if the Chief Procurement Officer believes the rejection or waiver is in the best interest of HHSC.
- B. The Chief Procurement Officer may hold all bids up to 60 calendar days from the date bids were opened. Unless otherwise required by law, bids may not be withdrawn without penalty.
- C. The award of the contract is conditioned upon funds made available for the project (or projects if applicable)

1.08 COMPLIANCE WITH §3-122-112 HAR:

- A. As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the bidder shall meet the “Hawaii Business” or “Compliant non-Hawaii Business” requirements and shall provide the following documents:
 - 1. Department of Taxation (DOTAX) and the IRS tax clearance certificates.
 - 2. Department of Labor (DLIR) certificate of compliance.
 - 3. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) certificate of good standing.
 - a. A Hawaii business that is a sole proprietorship is not required to register with the BREG and therefore not required to submit the DCCA, BREG “Certificate of Good Standing.”
- B. The apparent three low bidders shall furnish the required documents to HHSC within seven calendar days from the bid opening date. If a valid certificate is not submitted on a timely basis for award of a contract, a bidder otherwise responsive and responsible may not receive the award. Bidder is responsible to apply for and submit the documents by the required deadlines.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 REQUIRED DOCUMENTATION FOR HAWAII BUSINESS OR COMPLIANT NON-HAWAII BUSINESS (§3-122-112 HAR):

- A. **TAX CLEARANCE REQUIREMENTS (HRS Chapter 237):** Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is ~~are~~ valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by HHSC.
1. DOTAX *TAX CLEARANCE APPLICATION* Form A-6 (Rev 2003) is available at DOTAX and IRS (State of Hawaii) offices or DOTAX website, and by mail or fax.
 - a. DOTAX website: <http://www.state.hi.us/tax/alphalist.html#a>
 - b. DOTAX forms by fax/mail: (808) 587-7572 or 1-800-222-7572
 2. Mail, fax or submit in person completed tax clearance application forms to the Department of Taxation, Taxpayer Services Branch or to the address listed on the application. Facsimile numbers are:
 - a. DOTAX: (808) 587-1488
 - b. IRS: (808) 539-1573
 3. DOTAX will return the form to the bidder. The bidder is reminded that it is responsible to submit the applications for the tax clearance directly to DOTAX or IRS and not to HHSC.
- B. **DLIR CERTIFICATE of COMPLIANCE (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers' Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care):** Bidder shall obtain a certificate of compliance from the Hawaii State Department of Labor and Industrial Relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by HHSC.
1. DLIR *APPLICATION FOR CERTIFICATE OF COMPLIANCE WITH SECTION 3-122-112 HAR*, Form LIR#27 is available at DLIR website or at the neighbor island DLIR District Office.
 - a. DLIR website: <http://www.dlir.state.hi.us/LIR#27>
 2. Mail, fax or submit in person completed application form to the Department of Labor and Industrial Relations, Administrative Services Office at the address listed on the application.
 3. DLIR will return the form to the bidder. The bidder is reminded that it is responsible to submit the application for the certificate directly to DLIR and not to HHSC.
- C. **DCCA CERTIFICATE OF GOOD STANDING:** Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The

certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by HHSC.

1. DCCA *CERTIFICATE OF GOOD STANDING* is available from the business registrations website or by telephone. Bidders are advised there are costs associated with registering and obtaining the certificate.
 - a. DCCA form website: <http://www.BusinessRegistrations.com>
 - b. DCCA telephone: (808) 586-2727, M - F 7:45 to 4:30 HST
2. Submit the application per DCCA's requirements.
3. DCCA will return the form to the bidder. The bidder is reminded that it is responsible to submit the application for the certificate directly to DCCA and not to HHSC.

END OF SECTION

SECTION 00800 - SPECIAL PROVISIONS

PART 1 - GENERAL

1.01 SUBSTITUTION REQUESTS:

- A. Written substitution requests must be submitted with your Invitation for Bid (IFB) in accordance with IFG Section 3. All substitutions will be reviewed and approved in accordance with the GTC.
- B. Substitution requests by FAX are not acceptable.

1.02 PROJECT CONTACT PERSON:

- A. HHSC Representative – For access to the site.

NAME: Mr. Ron Kurasaki
POSITION OR TITLE: Project Manager
TELEPHONE NUMBER: (808) 497-9350
Email: rkurasaki@hhsc.org

- B. Project Coordinator - For questions and clarifications during bidding and Requests for Substitutions.

NAME: Mr. Kai Tachino
POSITION OR TITLE: Project Engineer
TELEPHONE NUMBER: (808) 521-3773
Email: ktachino@insynergyeng.com

- C. Procurement Agency – For questions regarding proposal and contract requirements.

NAME: Mr. Scott Kawai
POSITION OR TITLE: Contracts Manager
TELEPHONE NUMBER: (808) 832-3025
Email: SKawai@hhsc.org

1.03 OFFEROR'S RESPONSIBILITY FOR EXAMINING PLANS, SPECIFICATIONS AND SITE OF WORK:

- A. Offerors herewith refers to sub-contractors, suppliers, manufacturer's representatives as well as contractors.

1.04 LIQUIDATED DAMAGES:

- A. The time of completion for the Work shall be within 220 consecutive calendar days from the official commencement date of the Notice to Proceed (NTP).

- B. In accordance with the General Conditions, upon failure to complete Work or any portion of the Work within the time or times fixed in the contract or extension thereof, the Contractor shall pay liquidated damages to the Department in the amount of \$250.00 per calendar day of delay.
- C. In accordance with the General Conditions, PROJECT ACCEPTANCE DATE, for failure to correct punch list deficiencies, within the time or times fixed in the contract or extension thereof, the Contractor shall pay liquidated damages to the HHSC, in the amount equal to ten percent (10%) of the liquidated damages per calendar day of delay.
- D. In accordance with the General Conditions FINAL SETTLEMENT OF THE CONTRACT, for failure to submit closing documents within the time or times fixed in the contract or extension thereof, it is agreed that the Bidder shall pay liquidated damages to HHSC in the amount equal to five percent (5%) of the liquidated damages per calendar day of delay.

1.05 SPECIALTY CONTRACTOR'S LICENSE:

- A. Contractor shall be solely responsible to assure that all the specialty licenses required to perform the Work are covered by the Contractor or its subcontractor(s).

1.06 WORKING HOURS:

- A. The regular working hours for this project is from 8:00 AM to 4:30 PM Monday through Friday, excluding State Holidays, unless otherwise noted or restricted under "Section 01100". The Working Hours provisions of specification "Section 01100" shall govern over this article 1.06.
- B. The Contractor may be given approval to work beyond the regular hours including Saturdays, Sundays, State Holidays, night work, or after hours under the provisions of the GENERAL CONDITIONS, "Overtime And Night Work Section" and under specification "Section 01100".

1.06 SPECIAL PROCEDURES DURING BIDDING

- A. Bid documents will be available online and from the Contracts Manager's office, at Maluhia, 1027 Hala Drive, Honolulu, HI, 96817.
- B. All bids shall be submitted to the Contracts Manager.
- C. All questions regarding the plans and specifications shall be submitted, in writing, to the Engineer. The Engineer will review the questions and issue any responses via Addendum. Only information received by Addendum shall be binding.
- D. All questions regarding the proposal or contractual requirements shall be submitted, in writing to the Contracts Manager. The Contracts Manager

will review the questions and issue any responses via Addendum. Only information received by Addendum shall be binding.

- E. Any visitation to the site to examine the scope of work shall be requested through the HHSC Representative. Disruption of facility operations shall not be permitted.

1.07 PROCEDURES DURING CONSTRUCTION

- A. Upon issuance of the Notice to Proceed, the Contractor shall submit a work schedule for review and discussion. The work schedule shall be updated on a weekly or bi-weekly basis as directed by the Architect.
- B. On a weekly or bi-weekly basis, the Contractor shall conduct a progress meeting with Maluhia and Engineer. The meeting will discuss the progress of the construction, discussion of problems, and review of outstanding issues. The Contractor shall conduct the meeting and prepare the meeting notes and minutes and distribute to all parties.
- C. During the construction, submittals and RFIs shall be submitted to the Engineer for review and action. To expedite the review, the Contractor may make submittals via email.
- D. Periodic requests for payment shall be submitted to the Engineer for review and confirmation. Approved requests for payment will be forwarded to the Contracts Officer for processing of payment.
- E. Upon substantial completion of the project, the Contractor shall submit in writing to the Architect a request for a pre-final inspection. The Contractor shall have completed their own inspection and completed all noted discrepancies. Include with the request for the pre-final inspection a list of all outstanding work not completed or corrected.
- F. Upon conducting a pre-final inspection, the Engineer shall prepare a punchlist of noted discrepancies for the Contractor's remedial action. A final inspection will be performed upon completion of all punchlist items.

1.08 PROJECT RESTRICTIONS:

- A. The Contractor is informed that the facilities will be fully occupied and work shall be performed in close coordination with the HHSC representative. Work shall be phased and may be limited to one area at a time. If work will require the relocation of clients from the work area, time shall be allocated for Maluhia to conduct this relocation. Scheduling of the work shall be closely monitored and work performed to minimize the disruption to the remaining areas of the facility. All work schedules shall be approved by HHSC prior to starting.
- B. Staging and storage of materials on-site is limited and shall not be allowed unless coordinated and approved with the HHSC representative.

Contractor may be required to store materials off-site at his own expense.

- C. Parking on-site is limited and may be restricted to only active delivery of materials and equipment. Coordinate with the HHSC representative. If on-site parking will not be available, the Contractor shall park off-site.
- D. The above restrictions shall be considered in the work of this project and shall be included in the Contractor's cost. No additional compensation shall be made for not considering these restrictions.

PART 2 - MATERIALS (Not Used)

PART 3 - EXECUTION

3.01 FINAL PAYMENT REQUIREMENTS:

- A. In addition to the requirements in the GENERAL CONDITIONS "Final Payment" section, the contractor shall submit:
 - 1. Tax clearance certificate from DOTAX and IRS, current within two months of the issuance date; and
 - 2. An originally signed Certificate of Compliance for Final Payment (SPO Form - 22, modified), affirming that the contractor remained in compliance with all laws as required by (§3-122-112 HAR). A contractor making a false affirmation shall be suspended and may be debarred pursuant to section 103D-702 HRS.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01019 - GENERAL PROJECT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY OF WORK:

- A. Perform operations and furnish equipment, tools, materials, related items and labor necessary to execute, complete and deliver the Work as required by the Contract Documents.

1.02 DIVISION OF WORK:

- A. The Division and Sections into which these specifications are divided shall not be considered an accurate or complete segregation of work by trades. This also applies to work specified within each section.
- B. Where devices, or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items or parts as are required to properly complete the Work.
- C. Specifications and Drawings are prepared in abbreviated form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", "an", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.
- D. Specifying of interface and coordination in the various Specification Sections is provided for information and convenience only. Such requirements in the various Sections shall complement the requirements of this Section.

1.03 NOTIFICATION:

- A. Contact the Engineer and HHSC Representative at least five (5) working days prior to starting any onsite work.

1.04 SAFETY REQUIREMENTS:

- A. The Hawaii Occupational Safety and Health Law, Chapter 396, Hawaii Revised Statutes, effective May 16, 1972, as amended, is applicable and made a part of the Contract. Carefully read and strictly comply with its requirements.
- B. Protect the facility personnel, students, and the public whenever power driven equipment is used. Ensure adequate safety precautions are used when operating any power driven equipment.

1.05 PERFORMANCE AND COORDINATION:

- A. Contractor shall be in charge of the Work and the Project Contract Limits, as well as the directing and scheduling of all work. Contractor shall include general supervision, management and control of the Work of this project, and in addition to other areas more specifically noted throughout the Specifications. Final responsibility for performance, interface, and completion of the Work and the Project shall be the Contractor's.

- A. Jobsite Administration shall be the responsibility of the Contractor. Provide a competent superintendent on the job and provide an adequate staff to execute the Work. In addition, all workers shall dress neatly and conduct themselves properly at all times. Loud abusive behavior, sexual harassment and misconduct will not be tolerated. Workers found in violation of the above shall be removed from the job site as directed by the HHSC Technical Representative.

- B. The HHSC and/or Maluhia will hold the Contractor liable for all the acts of Subcontractors and shall deal only with the Prime Contractor in matters pertaining to other trades employed on the job.

- C. Coordination: Provide project interface and coordination to properly and accurately bring together the several parts, components, systems, and assemblies as required to complete the Work.
 - 1. Provide interface and coordination of all trades, crafts and subcontracts. Ensure and make correct and accurate connections of abutting, adjoining, overlapping, and related work. Provide anchors, fasteners, accessories, appurtenances, and incidental items needed to complete the Work, fully, and correctly in accordance with the Contract Documents.
 - 2. Provide additional structural components, bracing, blocking, miscellaneous metal, backing, anchors, fasteners, and installation accessories required to properly anchor, fasten, or attach material, equipment, hardware, systems and assemblies to the structure.
 - 3. Provide caulking, sealing, and flashing as required to waterproof the building complete and as required to insulate the building thermally and acoustically. Include sealing, flashing, and related work as required to prevent moisture intrusion, air infiltration, and light leakage.
 - 4. Materials, equipment, component parts, accessories, incidental items, connections, and services required to complete the Work which is not provided by subcontractors shall be provided by the Contractor.

1.06 COOPERATION WITH OTHER CONTRACTORS:

- A. Maluhia reserves the right at any time to contract for or otherwise perform other or additional work within the Project Contract Limits. The Contractor of this project shall to the extent ordered by the HHSC Representative, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by Maluhia or other contractors.

1.07 SUBMITTALS:

- A. Furnish required submittals specified in this Section and in the Technical Sections. Submittals include one or more of the following: shop drawings, color samples, material samples, technical data, material safety data information, schedules of materials, schedules of operations, guarantees, certifications, operating and maintenance manuals, and field posted as-built drawings.
- B. Record Drawings: Field Posted As-Built Drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be prepared and submitted by the Contractor. To accomplish this, the following procedure shall be followed by the Contractor:
 - 1. A full-size set of field posted as-built drawings shall be maintained at the job site. All deviations from alignments, elevations and dimensions which are stipulated on the drawings and authorizations given by the HHSC Technical Representative to deviate from the drawings shall be clearly and accurately recorded by the Contractor on this set of record drawings.
 - 2. Changes shall be recorded immediately after they are constructed in place to assure they are not forgotten. Record the changes in red pencil and where applicable, refer to the authorizing document or Change Order. The field posted as-built drawings shall be made available to the Engineer and HHSC Technical Representative at any time so that its clarity and accuracy can be monitored.
 - 3. The words "FIELD POSTED AS-BUILT" shall be labeled on the title sheet and certified by the Contractor as to accuracy and completeness as shown below:

FIELD POSTED AS-BUILT

Certified By: _____ Date: _____
Contractor (Include name and company)

- 4. The words "FIELD POSTED AS-BUILT" shall be labeled on all sheets in the margin space to the right of the sheet number written from the bottom upward.

5. The Index to Drawings shall be revised with the label "FIELD POSTED AS-BUILT" for each sheet. The index shall conclude with the following note: "A COMPLETE SET CONTAINS ____ SHEETS" with the total number of sheets comprising the set to be placed in the blank.
6. Any "FIELD POSTED AS-BUILT" drawing which the Engineer determines does not accurately record the deviation may be corrected by the Engineer and the Contractor shall be charged for the services.
7. Submit the set of "FIELD POSTED AS-BUILT" drawings to the Engineer and notify the HHSC Technical Representative no later than five (5) calendar days prior to the date of final inspection.
8. "AS-BUILT" drawings will be prepared by the design consultant using the "FIELD POSTED AS-BUILT". Both sets of drawings will be sent to the Contractor for review and approval. The Contractor shall retain the "FIELD POSTED AS-BUILT" drawings for records, sign the "AS-BUILT" set of drawings, indicating approval, and return the drawings in a timely manner to the Engineer and notify the HHSC Representative.

1.08 CONSTRUCTION SCHEDULE:

- A. The Construction Schedule completion date will be approved prior to award. The daily activities of the Construction Schedule will be reviewed within fifteen (15) calendar days after the Notice to Proceed or upon earlier written instruction by HHSC.
- B. The schedule shall be related to the entire project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the work. If requested by the Engineer or HHSC Representative, the Contractor shall participate in a preliminary meeting to discuss the proposed schedule and requirements prior to submission of the schedule.
- C. Contractor shall prosecute the work according to the Schedule. The Engineer and HHSC Representative shall rely on the reviewed Contractor's Schedule and regular updates for planning and coordination. The HHSC Representative's review of the Contractor's Construction Schedule does not relieve the Contractor of its obligation to complete the work within the allotted contract time. Nor does the review grant, reject or in any other way act on the Contractor's request for adjustment(s) to complete remaining contract work, or for claims of additional compensation. Such requests shall be processed in accordance with other relevant provisions of the contract.
- D. If the Engineer issues a Field Order or Change Order or requires Force Account Work that affects the sequence or duration of work activities noted on the construction progress schedule, the Contractor shall

promptly update the schedule. This shall be accomplished by adding, deleting or revising the work activities noted, or changing the logic in the schedule to show the Contractor's plan for incorporating the change into the flow of work. All Change Orders and Time Extension requests that affect the construction schedule shall be evaluated based on their impact on the approved Construction Schedule.

1.09 MEETINGS:

- A. Contractor shall meet with Maluhia's representative, weekly or other interval as determined, to discuss the progress of the Work.
- B. For each meeting, Contractor shall take meeting minutes and provide a list stating all items, work or material, which may cause a delay or have an impact on the project's contractual dates. The list shall be inclusive of items requiring action from all responsible parties such as outstanding submittal status, request for information (clarification), force account work, change order, and change proposals. The format of this list shall be at the Contractor's discretion, subject to the Engineer's approval. Submit the list to all parties for discussions as a meeting agenda. Contractor shall provide a plan of corrective action for any item, which is delayed or expected to be delayed, where that item impacts the contractual dates.

1.10 PROJECT AND SITE CONDITIONS:

- A. Project Contract Limits (Contract Zone Limits) shown on the drawings indicate only in general the limits of the work involved. Perform necessary and incidental work, which may fall outside of these demarcation lines. Confine construction activities within the Project Contract Limits and do not spread equipment and materials indiscriminately about the area.

1.11 SANITARY FACILITIES:

- A. The Contractor shall be allowed to utilize on-site restrooms as directed by the Architect and/or HHSC Representative. The Contractor shall maintain the facility in clean and sanitary condition at all time. Failure to do so, may require the Contractor to provide portable temporary toilet facilities for the contractor's use.

1.12 CONSTRUCTION AIDS:

- A. Provide construction aids and equipment required by construction personnel and to facilitate execution of the Work including: scaffolds, ladders, ramps, platforms, railings, and other such facilities and equipment.

PART 2 - MATERIALS

2.01 QUALITY:

- A. Materials, items, equipment and fixtures specified in the various Divisions and Sections shall be new unless otherwise specified.

2.02 STORAGE AND HANDLING:

- A. Contractor shall supervise jobsite delivery and handling, and assign storage space for materials, items, equipment and fixtures of all trades. Contractor and installer are responsible for delivery, unloading, unpacking, handling, storage, distribution, installation and protection of its materials at the jobsite.
- B. Except as otherwise required by these specifications or by Maluhia, determine and comply with manufacturer(s) recommendation(s) on product handling, storage and protection.
- C. Deliver products to the jobsite in manufacturer's original containers, with labels intact and legible. Maintain packaged material with seals unbroken and labels intact until time of use. Promptly remove damaged materials and unusable items from the jobsite, and promptly replace with material meeting the specified requirements, at no additional cost to Maluhia.
- D. The Architect may reject as non-complying such material and products that do not bear identification satisfactory to the Architect as to manufacturer, grade, quality, and other pertinent information.

PART 3 - EXECUTION

3.01 EXAMINING THE SITE:

- A. Contractor and Subcontractors are expected to visit the site and make due allowances for difficulties and contingencies to be encountered. Compare contract documents with work in place. Become familiar, with existing conditions, the conditions to be encountered in performing the Work, and the requirements of the drawings and specifications.
- B. Verify construction dimensions and elevations indicated on the drawings before any construction begins. Any discrepancy shall be immediately brought to the attention of the Engineer, and any change shall be made in accordance with the Architect's instruction. Contractor shall not be entitled to extra payment if it fails to report the discrepancies before proceeding with any work whether within the area affected or not.

- C. Obtain all field measurements required for the accurate fabrication and installation of the Work included in this Contract. Exact measurements are the Contractor's responsibility.
- D. Furnish or obtain templates, patterns, and setting instructions as required for the installation of all Work. All dimensions shall be verified in the field.
- E. The Contractor shall accept the site in the condition which exists at the time access is granted to begin the Work.
 - 1. Verify existing conditions and dimensions shown and other dimensions not indicated but necessary to accomplish the Work.
 - 2. Locate general reference points and take action to prevent their destruction. Lay out work and be responsible for lines, elevations and measurements and the work executed. Exercise precautions to verify figures and conditions shown on drawings before layout of work.
 - 3. Before starting the Work, the Contractor and each Subcontractor, shall verify governing dimensions and shall examine adjoining work on which the Contractor's work is in any way dependent. No additional compensation will be allowed on account of differences between actual measurements and dimensions shown. Submit differences discovered during the verification work to the Engineer for interpretations before proceeding with the associated work.

3.02 UTILITY SERVICE:

- A. Electricity - Make arrangements with the facilities for temporary use of electricity for construction use.
- B. Telephone - Make arrangements with the utility companies for temporary telephone service for construction use or utilize cellular phone service.
- C. Water - Make arrangements for temporary water use with the facilities.

3.03 ENVIRONMENTAL:

- A. General Contractor shall oversee that proper environmental conditions are met regarding temperature, humidity, lighting and ventilation.

3.04 PREPARATION AND PROTECTION:

- A. Protection of Property: Continually maintain adequate protection of the Work from damage and protect all property, including but not limited to buildings, equipment, furniture, grounds, vegetation, material, utility systems located at and adjoining the job site. Repair, replace or pay the expense to repair damages resulting from Contractor's fault or negligence.

- B. Before starting work to be applied to previously erected constructions, make a thorough and complete investigation of such recipient surfaces and determine their suitability to receive required additional construction and finishes. Contractor, at its expense, shall make whatever repairs and conditioning required to properly prepare such surfaces. Contractor shall coordinate the work to provide a suitable surfaces to receive following work.
- C. Commencement of work by any trade will be construed as acceptance of existing conditions and surfaces as being satisfactory for application of subsequent work, and full responsibility for finished results and assumption of warranty obligations under the Contract.
- D. Protect existing work in a manner to prevent damage including interior work from damage by vandals or the elements. Provide temporary protection. Use curtains, barricades, or other appropriate methods. Take positive measures to prevent breakage of glass and damage to plastic, aluminum and other finishes.
- E. Repairs and Replacements: In event of damage, promptly make replacements and repairs to the approval of the Engineer and/or HHSC Representative and at no additional cost to Maluhia. Additional time required to secure replacements and to make repairs will not be considered to justify an extension in the Contract Time or completion.

3.05 BARRICADE:

- A. Erect temporary construction barricade(s) to prevent unauthorized persons from entering the project area and to the extent required by the Engineer and/or HHSC Representative.
- B. Maintain temporary construction barricade(s) throughout the duration of the Work. During the course of the project, the Engineer and/or HHSC Representative may require additional barricades be provided for the safety of the public. Contractor shall erect the additional barricade(s) at its own expense.

3.06 INSTALLATION:

- A. Materials, items, fixtures required by the various Divisions and Sections of the Specifications shall be installed in accordance with Contract Documents, by workers specially trained and skilled in performance of the particular type of work, to meet guarantee and regulatory agency requirements. Should the drawings or specifications be void of installation requirements, install the materials, items, fixtures in accordance with the manufacturer's current specifications, recommendations, instructions and directions, and/or best construction industry standards.

3.07 CUTTING AND PATCHING:

- A. General Contractor shall oversee cutting and patching of concrete, masonry, structural members and other materials where indicated on drawings and as job conditions require. Unless noted elsewhere in the Drawings and Specifications, no cutting or patching of existing or new structural members will be permitted without previously notifying the HHSC Technical Representative.
- B. Patching materials and workmanship shall be of equal quality to that indicated on the drawings, specified for new work, and/or to match the construction of item to be patched.

3.08 CLEAN-UP:

- A. Rubbish and debris resulting from work of the various Divisions and Sections of the specifications shall be collected and disposed of by the Contractor at legal disposal areas away from the project site. Clean up and remove from premises all debris accumulated from operations from time to time and as directed by the Engineer and/or HHSC Representative. Permission to provide on-site trash containers shall be granted by Maluhia and shall be placed where directed by the Architect and/or HHSC Representative.

END OF SECTION

SECTION 01100 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Contract description.
- B. Contractor use of premises.
- C. Owner furnished/Owner installed products.
- D. Owner furnished/contractor installed products.
- E. Hospital occupancy.

1.02 CONTRACT DESCRIPTION:

- A. Description: Upgrade the existing chilled water source heat pump system for the Maluhia:
 - 1. Provide a new chilled water source heat pump next to the existing chilled water source heat pump which will remain as back-up.
 - 2. Provide new chilled water and hot water circulating pumps for the new heat pump.
 - 3. Upgrade the existing chilled water source heat pump by replacing one of the refrigerant compressors which is failing and replace its chilled water and hot water circulating pumps.
 - 4. Upgrade the existing control system to incorporate the new additional equipment.
 - 5. Provide additional breakers and branch circuiting from the existing distribution panel to power the new heat pump and circulating pumps.
- B. Contract Documents Identification: These are identified as: *HHSC: Maluhia, Chilled Water Source Heat Pump Upgrade dated December 1, 2023.*
- C. Contractor shall complete the attached Bid Breakdown with Contractor's Proposal (Bid Breakdown is at the beginning of the specifications).
- D. Related Provisions: The following applies to all the Work.
 - 1. Conditions of the Contract.
 - 2. Contract Drawings.
 - 3. Division 1 Specification Sections.
 - 4. As applicable to each Entity, the appropriate Specification Sections and related Specification Sections of other Installers as necessary for the proper coordination of Work.

5. Modifications to the Contract, if any.
- E. Special Submittals: In addition to other documentation as may be required by the Contract Documents, submit following as a condition for securing the Contract for the Work.
1. List of Primary Contractors: List of primary Subcontractors (Installers) for each work as specified in each Division 2 through Division 16 Sections. Include company name, primary contact, telephone number, fax number, and e-mail address.
 2. List of Primary Products: List of primary products bid for each Division 2 through Division 16 Sections. Include manufacturer name and specific product name or names.
 3. Certification: Installer certification that specified requirements are in accordance with the Manufacturer requirements as specified in Section 01600 - Product Requirements prior to signing the Contractor for the Work.

1.03 CONTRACTOR USE OF PREMISES:

- A. Limit use of premises to allow for continued Hospital occupancy.
- B. Emergency Building Exits During Construction: Must remain open and unblocked at all times. Maintain access for staff, patients, and public.
- C. Construction Operations: Limited to areas noted on Drawings.
- D. Staging and Parking
 1. Staging area and limited contractor employee parking will be made available on site.
 2. Repair and clean pavements and restore landscaping in staging areas at the completion of construction operations.
- E. Time Restrictions for Performing Work:
 1. General: 9:00 am to 5:00 pm. Coordinate w/ Owner, work necessary outside these normal operating hours. Submit written notice a minimum three days in advance.
- F. Cooperate with Maluhia to minimize conflict and to facilitate Maluhia's operations. Coordinate operations with Maluhia's Technical Representative (HTR).
- G. Access to adjacent floors must be approved in advance by Maluhia. Submit written notice not less than seven days in advance of intended work on adjacent floors.
- H. Do not close or obstruct roadways without first consulting with the Owner. Conduct operations with minimum interference to public or private roadways.

- I. Maintain vital services with the minimum of interruption. Outages and interruptions must be approved in advance by Maluhia. Submit written notices of outages and interruptions not less than seven days in advance.

- J. Contractor's personnel:
 - 1. Do not allow personnel to park off site.
 - 2. Contractor's personnel may use Maluhia's cafeteria.
 - 3. Smoking is not permitted anywhere on Maluhia's property. Consumption of food and beverages will not be permitted on the premises except in designated areas.
 - 4. Playing of radios will not be permitted.
 - 5. Shall be properly attired for work. (No tank tops, cut-off jeans, slippers, etc.)
 - 6. Shall conduct themselves with decorum and courtesy toward staff, patients, and public.
 - 7. Shall not use loud and offensive language.

- K. Construction Zone Accessibility Requirements
 - 1. General: Hawaii Revised Statutes (HRS)103-50 requires this project to conform to the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG).
 - 2. Ensure accessible routes to emergency entrances and exits to and from accessible parking public pedestrian routes during the construction period as required by ADAAG 4.1.1(4).
 - 3. Temporary buildings and facilities that are not of permanent construction but are extensively used or are essential for public use for a period of time shall be accessible.
 - 4. Provide temporary safe pedestrian passageways around a construction site.
 - a. Areas that are used only as work areas shall be designed and constructed so that individuals with disabilities can approach, enter, and exit the areas.
 - b. These guidelines do not require that any areas used only as work areas be constructed to permit maneuvering within the work area or be constructed or equipped (i.e., with racks or shelves) to be accessible.

1.04 MALUHIA OCCUPANCY:

- A. Maluhia will remain operational during entire period of construction for the conduct of normal operations.

- B. The Contractor is to coordinate the work and details within each phase, to minimize disruption to Maluhia's Technical Representative's operation. Proper notification of disruption due to noise and other factors is required.

- C. Provide dust and noise barriers where specified under other portions of the contract documents. Follow infection control procedures during construction, i.e. Policy #125-54 as attached. Walk off mats at site entrance shall be changed as needed. HEPA filtration units are to be utilized 24 hours per day throughout the construction process. Complete Interim Life Safety Measures check sheet daily. Portable dust barriers shall be utilized for AC replacement work.
- D. Schedule the Work, and cooperate with Maluhia to minimize conflict with, and to facilitate Maluhia's operations. Take extreme care and caution with work involving dust, noise, and odor.

1.05 QUALITY ASSURANCE:

- A. Other Contract Related Documents: If required by Contractor to determine accurate information for the Project, review such other documents in possession of Maluhia and the Project Consultants that have a bearing on the Contractor's Work; examples as follows:
 - 1. Available documents of existing facilities
- B. Authority Related: Comply with the following:
 - 1. Regulations: All laws, ordinance, rules, and regulations, by any governmental authority, which in any manner apply to or affect those employed in the Work, the materials used in the Work, and the conduct of the Work. Comply with all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the Work and which are or have the affect of law.
 - 2. Disabled Persons:
 - a. ADAAG or UFAS compliance: Applicable requirements or where both is used, comply with the stricter of the requirements applicable to each work.
 - b. Tolerance: Due to actual variations in work tolerances, ensure that each work meets the minimum or maximum dimensions as required by the applicable standard,
 - c. Authority Changes: Where Authority directs changes in the Work, immediately notify consultants, prior to execution of such changes, to ensure such changes are not in conflict with any original approvals made by Authorities.
- C. Community Related:
 - 1. Intent: Owners operation is public sensitive and Contractor shall take necessary precautions in his operations as not to upset or aggravate the public, e.g. polluting operations, other nuisance conditions, and operations which can endanger people, illegal activities, unbecoming conduct, etc.
 - 2. Resolving Contentious Issues: It is the Contractor's responsibility to resolve any contentious issues amenably, fairly, and expeditiously. If a situation occurs, notify the Consultants immediately and keep

Consultants informed of methods and results of ongoing negotiations in resolving any issues. Not under any circumstances is Contractor to place Owner in precarious situation that could place owner in a tenuous conflict with any of the public, without the Owner's knowledge. Contractor is ultimately and solely responsible for his actions and resulting outcomes; regardless of Owner's knowledge of any ongoing contentious events and shall hold Owner harmless from such issues should they result in any litigation.

- D. The Work:
 - 1. Industry Standards: Industry standards apply to the Work whether indicated or not. When not indicated, the industry accepted quality applicable to the class (grade) of work intended shall apply.
 - 2. Completeness of Work: Provide necessary work normally provided for the quality of work indicated to ensure the Work is complete and fully functional for each use.
- E. Project Manual:
 - 1. Language: Imperative language is intended and specified requirements are to be executed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 TIMES FOR CONDUCTING WORK:

- A. Daily: In accordance with any Owner's standard published policies for Contractor's conducting work on premises. Secure standards and comply with requirements; unless Owner otherwise agrees to in writing at time of signing Contract for the Work.
- B. Weekends: As approved at time of signing Contract for the Work; otherwise as approved by Owner.
- C. Other Time Restrictions:
 - 1. General: Refer to "Operational Restrictions" paragraphs herein and Section 01500 - Temporary Facilities & Controls.
 - 2. Polluting Operations: Verify time restrictions on polluting operations, e.g. dust, noise, or any other that may be restricted by Owner and include impacts into Contract for the Work.
 - 3. Special Events: Verify any Owner known and potential scheduled events that would interrupt Contractor's operations and include impacts into Contract for the Work.

3.02 OPERATIONAL RESTRICTIONS:

- A. General: Refer to Section 01500 - TEMPORARY FACILITIES & CONTROLS.
- B. Physical Limits: Limit Primary Work to immediate Project Site. Work required on property outside of Project Site, to be done in accordance with the Authorities.
- C. Personal Conduct, General: Owner's work is public sensitive and Contractor and entities under Contract to him shall respect this and refrain from any conduct that would compromise the Owner. Public sensitive issues include, but are not necessary limited to, following.
 - 1. Outside Site/Work Envelope: Any operations that could negatively affect surrounding community adjacent to Site, e.g. noise, pollution, illegal activities, etc.
 - 2. Within Site and Work Areas:
 - a. Archeological or historical related funds.
 - b. General: Any conduct that could negatively affect It's employees and public, e.g. disrespectful and unacceptable language, use of inappropriate alcohol usage at inappropriate times, illegal activities, smoking in non- smoking areas, etc.
 - c. Radios: Not allowed; except two-way communication radios.
 - d. Meals: Eaten only in Owner approved areas.
 - e. Building Areas: Any restricted public and non-public areas on property and within any building structures.
- D. Other Owner Conditions for Performing Work: Work is to be scheduled around the Owner's ongoing operations. Prior to Bid verify following and include impacts into Contract for the Work.
 - 1. Verification of Owner's responsibilities with regard to condition in which each space and surface will be turned over to Contractor and verification of exact degree of preparation work required by Contractor.
 - 2. Verification of extent of each work to be painted and conditions of acceptability.
 - 3. The degree to which Contractor is required to remove or move equipment, furnishings, and other work.
 - 4. Sequence, timing, and extent of areas to be made available to Contractor to complete the required work.
 - 5. Limits and restrictions placed on use of each work area.
 - 6. Methods of moving material and equipment around, within, to and from staging and delivery areas to each work area.
 - 7. Methods for conducting the work due to Contractor's operations which are restrictive to Owner's ongoing operations.
 - 8. Degree and duration in which equipment and materials may be left in place.
 - 9. Available parking.

10. Available services, such as for power and water.
11. Available facilities, such as restrooms.
12. Available staging areas.
13. Availability of elevators for the Work.
14. Conditions under which Owner's available facilities and services are provided.
15. Restrictions on generation of noise.
16. Security required.
17. Safety precautions and amount of protections required.
18. Degree of cleanliness and orderliness expected in Work areas.
19. Special activities of Owner occurring during course of Work and which could impact Contractor's ongoing Work.
20. Verification of all Owner work impacting Work of this Contract, if any.
21. Verify salvageable work, if any, required by Owner and conditions of delivery to Owner.
22. Other Owner requirements.

END OF SECTION

SECTION 01120 - ALTERATION PROJECT PROCEDURES

PART 1 - PRODUCTS

1.01 SALVAGED MATERIALS:

- A. Salvage sufficient quantities of cut or removed material to replace damaged work of existing construction, when material is not readily obtainable on current market.
- B. Incorporate salvaged or used material only as indicated or with permission of Maluhia.

1.02 PRODUCTS FOR PATCHING AND EXTENDING WORK:

- A. New Materials: Match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspection and testing products where necessary, referring to existing Work as a standard.

PART 2 – EXECUTION

2.01 EXAMINATION:

- A. Verify that demolition is complete, and areas are ready for installation of new Work.
- B. Beginning of restoration Work means acceptance of existing conditions.

2.02 PREPARATION:

- A. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.
- B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- C. Remove debris and abandoned items from area and from concealed spaces.
- D. Prepare surface and remove surface finishes to provide for proper installation of new work and finishes.

- E. Close openings in exterior surfaces to protect existing work and salvage items from weather and extremes of temperature and humidity. Insulate duct work and piping to prevent condensation in exposed areas.
- F. Do not demolish, chip, or penetrate existing structural members without the expressed approval of the Engineer.
- G. Perform cutting and removal work to remove minimum necessary, and in a manner to avoid damage to adjacent work and provide proper surfaces to receive installation of repair and new Work.

2.03 INSTALLATION:

- A. Coordinate work of alterations and renovations to expedite completion and to accommodate Owner occupancy.
- B. Project areas and Finishes: Complete in all respects including operational mechanical and electrical work.
- C. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to original or specified condition as appropriate.
- D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
- E. In addition to specified replacement of equipment and fixtures, restore existing plumbing, ventilation, air conditioning, and electrical systems to full operational condition.

2.04 TRANSITIONS:

- A. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patched Work to match existing adjacent Work in texture and appearance.
- B. Cut finish surfaces such as masonry, tile, plaster, or metals by methods to terminate surfaces in a straight line at a natural point of division.
- C. When finished surfaces are cut so that a smooth transition with new Work is possible, terminate existing surface along a straight line at a natural line of division. Provide trim appropriate to finished surface subject to approval of Maluhia's Representative.

2.05 ADJUSTMENTS:

- A. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls and ceilings to a smooth plane without breaks, steps or bulkheads.
- B. Where a change of plane 1/4 inch or more occurs, submit recommendation for providing a smooth transition for Maluhia's Representative review.
- C. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
- D. At penetrations of fire-rated wall, ceiling, or floor construction, completely seal voids with fire rated, fire resistant material, full thickness of the construction element.

2.06 REPAIR OF DAMAGED SURFACES:

- A. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- B. Repair substrate prior to patching finish.

2.07 FINISHES:

- A. Finish surfaces as specified in individual Product Sections.
- B. Finish patches to product uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

2.08 CLEANING:

- A. In addition to cleaning as specified in these specifications. Broom-clean owner-occupied areas daily.
- B. Clean spillage, over-spray, and dust in Owner-occupied areas immediately.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01140 - WORK RESTRICTIONS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This section includes work restrictions on the Contractor's operations, and construction as required to maintain the facility's operation during the construction period.
- B. Construction Provisions:
 - 1. Rules and Regulations: Consult with the Engineer and HHSC Representative at the pre-construction conference and become familiar with the rules and regulations of the facility.
 - 2. Contractor's Operations: Confine all construction operations to the immediate vicinity of the construction activity. Store building materials, equipment, tools and incidentals in an enclosed area as directed by the HHSC Representative. Take precautions and prevent access to power equipment, tools, etc., by other than authorized construction personnel. Perform operations to insure the safety of the occupants of the buildings at all times.
 - 3. Perform operations to minimize inconvenience or disturbance upon the personnel and residents.
 - 4. Protection of occupants: Special consideration must be made by the Contractor at all times to safely protect the occupants and facility personnel from any and all injuries that may be caused as a result of the work performed under this contract.
 - 5. Caution: The Contractor shall caution his personnel on the job that any association with the occupants be avoided as much as possible, that when spoken to by occupants, normal courtesy shall be maintained at all times.
 - 6. None of the foregoing regulations shall be construed as a restriction on the legal prosecution of the work.

1.02 SEQUENCING OF WORK:

- A. The Contractor shall schedule his work in general consideration for the on-going operation of Maluhia. All work shall be coordinated with the HHSC Representative.
- B. Stoppage of work for the duration of CMS and State Survey audits shall not incur additional costs to the HHSC.
- C. All work shall be coordinated and scheduled with Maluhia and/or HHSC Representative. In general, the Contractor will be restricted to work areas as coordinated with the HHSC Representative.

MALUHIA
CHILLED WATER SOURCE
HEAT PUMP UPGRADE

01140
Work Restrictions

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01210 - ALTERNATES

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Alternates.
- B. Related Sections:
 - 1. Division 1 Sections.
 - 2. As indicated in scheduled Alternate descriptions.

1.02 DEFINITIONS:

- A. Alternate
 - 1. General Definition: A lump sum amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either the amount of the construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.
 - 2. Proposed Cost: Each proposed amount for an Alternate to be complete and include entire Bidder's cost for the alternate work. No other adjustments to the Contract Sum will be allowed after signing of Contract for the Work.
 - 3. Work Included: Each proposal for an Alternate to represent all work, e.g., materials and its related workmanship, required to incorporate the work in place. In addition to other work, proposed work for each alternate to include work and coordination required to modify adjacent work at time each alternate required.
 - 4. Owner Action: Owner reserves the right to take action or no action on any Alternate during course of Contract Period. Each proposal to be non retractable and held without change during the Contract Period, except added costs may be negotiated when submitted written documentation is provided that clearly show that added time affects Progress Schedule or added scope of Work for any Alternate has changed by time of Owner acceptance and reasonably affected Contractor's cost to do the work. Any requested added costs are to be for added work and shall not change the cost of any work as proposed by the original proposal.

1.03 SUBMITTALS:

- A. Intent: Submit Change Order Proposals: Submit proposals for work required by Project Consultant's to fully evaluate compliance with Project requirements, e.g., written detailed cost breakdowns, related product

data, published drawings, specifications, tested, performances, and samples.

- B. Progress Schedule: Incorporate into first Progress Schedule required for submittal.
 - 1. Time for Owner's Decision: Indicate latest time when Owner's decision for each Alternate must be made to ensure that each Alternate, if accepted does not increase cost proposed for each Alternate and does not affect Contract Progress Schedule.
 - 2. Notifications: Notify Project Consultants and parties affected by Alternates as to status of Alternates during course of Work to ensure proper and timely coordination. Addendum: relative to allowances in form of Change Order proposals. Itemize in detail, quantities and unit prices of materials, products, and assemblies required, in addition to any other reasonable Contractor's costs for review by Consultants. The proposed work shall be complete assessed to address all changes as a result of the work, and shall not result in additional changes.

1.04 QUALITY ASSURANCE:

- A. Submittals: Prior to purchase and fabrication of any materials, provide Consultants requested submittals and secure successful review for all design considerations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 ADMINISTRATION:

- A. Prior to signing Contract for the Work: Meet with the Owner and Consultants and clearly define scope of work included in each Alternate and conditions for administration of Alternate work. Incorporated changes to scope of Contract, if required.
- B. After Signing Contract for the Work: Upon written notification from Owner of acceptance of any Alternate, institute procedures in accordance with the Contract for changes to the Work

3.02 INSTALLATION OF ALTERNATE WORK:

- A. General: Coordinate adjacent Work and install products in accordance with successfully Consultants reviewed submittals and each Manufacturer's Project specific requirements.

3.03 SCHEDULE:

- A. Alternate No. 1
 - 1. Alternate Type: Additive
 - 2. Include in Base Contact: Not applicable.
 - 3. Alternate: Cos to add item(s) as indicated on Drawings.

END OF SECTION

SECTION 01290 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Applications for payment.
- B. Related Sections:
 - 1. Division 1 Sections.
 - 2. Section 01330 - SUBMITTAL PROCEDURES.
 - 3. Section 01320 - CONSTRUCTION PROGRESS DOCUMENTATION.

1.02 SUBMITTALS

- A. Application for Payment Documents: Submit following.
 - 1. Application for Payment documents.
 - 2. Schedule for Values documents.
 - 3. Supporting documentation.
- B. Number of Submittal Sets: Refer to Section 01330 - SUBMITTAL PROCEDURES.
- C. Quality Assurance Submittals: Refer to “Quality Assurance” paragraphs herein. Alternate

1.03 QUALITY ASSURANCE:

- A. Content and Format Approval: Adjust format to satisfaction of Consultants.
- B. Accuracy, Completeness, Coordination of Scheduled Values: Each scheduled item in Schedule of Values and Applications for Payment document submittals to be accurate, complete, and fully coordinated between documents, including cost information.
- C. First Submittal of Schedule of Values: Submit prior to signing of Contract for the Work. Intent: Submit Change Order Proposals: Submit proposals for work required by Project Consultant’s to fully evaluate compliance with Project requirements, e.g., written detailed cost breakdowns, related product data, published drawings, specifications, tested, performances, and samples.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 APPLICATION FOR PAYMENT-GENERAL:

- A. Submittal Time:
 - 1. Draft Copies: Seven (7) calendar days before the date scheduled for submittal of the formal Application for Payment.
 - 2. Formal Submittal: Submit corrected Application on regular dates each month; agreed to before signing Contract for the Work; otherwise Owner to determine regular scheduled dates.
- B. Review Process:
 - 1. Consultants:
 - a. Draft Submittal: Review draft. Forward copy to Owner. Make corrections, if required. Return to Contractor after reviews completed and advise Contractor of any actions, if any required.
 - b. Formal Submittal: Review. Sign and forward to Owner.
 - 2. Owner: After satisfactory review of documents, sign and forward documents for payment. Pay Contractor. Prior to signing Contract for the Work: Meet with the Owner and Consultants and clearly define scope of work included in each Alternate and conditions for administration of Alternate work. Incorporated changes to scope of Contract, if required.

3.02 APPLICATION FOR PAYMENT-PRIMARY FORMS:

- A. Documents: Execute on AIA Forms, G702 and Continuation Sheets G703. Information to be correlated with Schedule of Values.

3.03 SCHEDULE OF VALUES:

- A. Breakdown-Level of Detail:
 - 1. General: Each principal subcontract amount to broken down into sufficient detail and organized into a format as to facilitate reasonable and continued evaluation of the progress of each subcontract for duration of Project.
 - 2. Stored Work: List separately. Distinguish work stored on-site and those stored off-site. Show insurance coverage and bonded warehousing costs.
 - 3. Contractor's Option: Temporary facilities and other major cost items that are not direct cost of any specific scheduled work may be shown as separate line items in the schedule of values or distributed as general overhead expense.
- B. Format: In addition to any other format requirements, include following.
 - 1. Project Identification: For each set, indicate following.
 - a. Contractor's name and address.

- b. Contractor's Project submittal tracking number. Put on every sheet of each submittal set.
 - c. Date of submittal. Put on every sheet of each submittal set.
 - d. Consultant's Project number, name, location.
 - e. Consultant's name.
 2. Tabular Schedule: For each scheduled value, provide data for following items in a table under separate columns; organize similar to Project Manual Technical Specifications.
 - a. Generic description of the work.
 - b. Related Specification Section.
 - c. Name of Subcontractor
 - d. Name of Primary Manufacturer or Fabricator.
 - e. Name of Supplier.
 - f. Amounts for each value as a percentage and actual dollar value.
 - g. Change Orders that have affected each value.
 - C. Amounts:
 1. Completeness: Each scheduled value to be complete cost for that work and include proportionate values for overhead, profit, and taxes.
 2. Values as Percentage: Percent of total Contract Sum; to nearest one hundredth percent.
 3. Dollar Values: Round to nearest whole dollar.
 4. Contract Sum Reconciliation: All scheduled values to add up to Contract Sum.
 - D. Schedule Updating: Update and submit for following.
 1. With each Application for Payment.
 2. When Change Orders result in a change in Contract Sum.
- 3.04 FIRST APPLICATION-CONDITIONS AFFECTING:
- A. List of Subcontractors.
 - B. Contractor's Progress Schedule.
 - C. Schedule of principal products.
 - D. Submittal Schedule.
 - E. List of Contractor's staff assignments.
 - F. Initial Progress Report.

3.05 APPLICATION AFTER SUBSTANTIAL COMPLETION-CONDITIONS AFFECTING:

- A. Submittals Due Prior to Application: Complete Closeout Submittals and Procedures.

3.06 FINAL APPLICATION-CONDITIONS AFFECTING:

- A. Full completion of all work to satisfaction of The Consultants and Owner.
- B. Full completion of all required Closeout submittals and procedures.
- C. Proof of payment of all obligations.
- D. Removal of all Contractors' work.
- E. Removal of surplus materials, rubbish, and similar elements.
- F. Satisfactory final cleaning of all work.

3.07 SUPPORTING DOCUMENTS:

- A. Waivers of Mechanic's Lien:
 - 1. Intent: Submit waivers of mechanic's lien from every Entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by payment. Waivers to show reasonable, timely, and regular payment by Contractor to Entities completing work performed for him.
 - 2. Form: Acceptable to Owner.
 - 3. Information: Each waiver to include Subcontract Sum amount, total of payments made (prior to last payment), and current work, payment, and date of payment covered by waiver.
- B. Other: If required by the Consultants, submit receipts or vouchers for payment of labor and materials from Entities and other documentation confirming work claimed for in each Contractor's Application for Payment.
- C. Specified in Other Sections: As follows.
 - 1. Updated Progress Schedules.

END OF SECTION

SECTION 01296 - CONTRACT CLARIFICATIONS

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Request for Information (RFI) procedures.
 - 2. Change Orders procedures.
- B. Related Sections:
 - 1. Division 1 Sections.

1.02 SUBMITTALS:

- A. General: As specified herein.

1.03 QUALITY ASSURANCE:

- A. RFI Content: Make one single request per RFI. Multiple requests under a single RFI number will be rejected.
- B. Basis of RFI's:
 - 1. Contractor Responsibility: RFI's are to be used as a method to clarify the intent of Contract Documents when such intent is not readily evident. It is the responsibility of the Contractor to make a reasonable review of the Contract Documents to ensure that the requested information is not readily inferable from the Contract Documents.
 - 2. Reimbursable Costs: Should The Consultants determine that any RFI could have been reasonably inferred from the Contract Documents, the Consultant reserve the right to deduct a fair and reasonable amount for the time and effort expended by them or their Consultants from the Contract Sum. This is not a penalty, but a fair reimbursement of a cost that the Contractor should have otherwise expended in researching the information.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 REQUEST FOR INFORMATION (RFIs):

- A. Time of Submittal: As soon as issue requiring clarification arises.

- B. RFI Form: Form to be provided by the Consultants.
- C. Submittal: Submit following.
 - 1. Identification of Affected Work: Submit list of Contract drawn work and Specifications affected.
 - 2. Supporting Data:
 - a. General: Submit applicable supporting data, drawings, and materials as required or as otherwise requested by the Consultants. Attach to RFI.
 - b. Field Conditions: If required or requested by the Consultants, submit "As-Built Drawings" complying with Section 01785 - PROJECT RECORD DOCUMENTS.
 - 3. Solutions: Propose potential solutions

3.02 CHANGE ORDERS (MODIFICATIONS):

- A. Proposal Requests:
 - 1. Basis: When changes are made in the Work that require an equitable adjustment to the Contract amount and/or time, submit to The Consultants a written proposal for adjustments to the Contract.
 - 2. Adjustment to Cost: With proposal, submit detailed itemized breakdown, including following.
 - a. Material quantities and item cost.
 - b. Labor costs by material item.
 - c. Construction equipment cost.
 - d. Workmen's compensation and public liability insurance.
 - e. Overhead.
 - f. Profit.
 - g. Taxes. No overhead or profit will be allowed on employment taxes.
 - 3. Adjustment to Time: Submit proposal with justifications.
 - 4. Impact on Design Intent: Submit written and graphic descriptions indicating how proposal differs from original design intent, e.g., physical differences, aesthetic differences in material quality, compliance with Code and Authority requirements, etc.
- B. Change Orders: For each Proposal Request in which The Consultants has determined, and Owner has approved, that equitable adjustment is be made, a Change Order will be issued in writing.

END OF SECTION

SECTION 01310 – PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Administration requirements.
 - 2. Coordination of Owner's work.
- B. Related Sections.
 - 1. Division 1 Sections, general.
 - 2. Section 01100 - SUMMARY OF WORK.

1.02 SUBMITTALS:

- A. General: Refer to "Execution" paragraphs herein.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PERSONNEL DOCUMENTATION:

- A. Submittals: Submit following.
 - 1. Superintendent: Resume of experience.
 - 2. Key Personnel and Assignments:
 - a. Company hierarchical organization related to Project from President and/or CEO on down.
 - b. Name, title, primary Project responsibility, telephone and facsimile number, and e-mail address of each personnel.
- B. When Submitted: Within ten (10) working days after Notice to Proceed

3.02 PROGRESS SCHEDULES:

- A. Type: Critical Path Method (CPM) Network Analysis System.
- B. Diagramming Method: Precedence Diagramming Method (PDM).
- C. When Submitted:
 - 1. First Submittal: Within 10 working days after Notice to Proceed.
 - 2. Updates: With each Application for Payment or within six (6) working days for each Change Order affecting Contract Scope and/or Time.

- D. Schedule Types Required:
 - 1. Summary Network Schedule: Schedule showing relationships between primary work types.
 - 2. Detailed Network Schedule: Detailed schedule required by Contractor for proper overall coordination of the Work.

- E. Format:
 - 1. Media:
 - a. Blueprints: 30" x 40" prints; two (2) sets.
 - b. Reproducible Media: 30" x 40" xerox from which blueprints can be made; one set.
 - 2. Data Required: In addition, usual network information, include following.
 - a. Sheet interface registration marks.
 - b. Legend describing all abbreviations.
 - c. Time line.
 - d. Cost loading showing cost and quantities; for each activity.
 - e. Manpower loading showing number of workmen; for each activity.
 - f. Long lead work.
 - g. Submittals to Consultants.

3.03 PROGRESS MEETINGS:

- A. General: Following to apply to all meetings; unless otherwise acceptable to Consultants.
 - 1. Location: Job Site or as otherwise agreed to by the Parties involved.
 - 2. Conduct of Meeting: Contractor to preside.
 - 3. Attendees: Capable of making binding and legal decisions in behalf of each Entity they represent.
 - 4. Agenda: Develop and distribute to all attending parties one (1) working day minimum, but not less than required for proper preparation by attending parties.
 - 5. Minutes:
 - a. Recording: Contractor to record and distribute written minutes within two (2) working days to all parties at meeting and to those impacted by meeting minutes.
 - b. Addenda: Parties who wish to enter revisions or add other statements for the record may do so not later than by the end of the next OAC meeting. Contractor may revise and reissue the previous minutes or record statements to next recorded minutes with specific reference to the original statements that are impacted.

- B. Contractor's Meeting: As required for proper coordination of the Work.

- C. Owner-Architect-Contractor (OAC) Meetings:
 - 1. When: One meeting each two working weeks on regularly scheduled day agreed to by Consultants and Contractor.
 - 2. Submittals:
 - a. Agenda: Submit not less than two working days prior to each scheduled meeting.
 - b. Minutes: Submit.

- D. Preinstallation Conferences:
 - 1. General: Conduct as required or specified for proper coordination of the Work.
 - 2. Consultants Notification: Notify Consultants of scheduled preinstallation conference five (5) working days in advance of each. Consultants to attend when requested by Contractor or when specified that Consultants be present.
 - 3. Agenda: Include following.
 - a. Coordination, including potential problems.
 - b. Interface and preparation, including potential problems.
 - c. Compatibility issues.
 - d. Tolerances.
 - e. Contact compliance, including code, fire, warranty, workmanship, personnel training, and other pertinent issues.
 - f. Review of Progress Schedule, e.g., delivery, installation, etc.
 - g. Housekeeping and cleaning.
 - h. Safety procedures.
 - i. Other issues and potential conflicts.

END OF SECTION

SECTION 01320 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Construction photographs.
- B. Related Sections.
 - 1. Division 1 Sections.
 - 2. All work.

1.02 DEFINITIONS:

- A. Intent for Number of Photos: The number of photographs will vary and may not be required or exceed the base line maximum specified at any given time; as may be necessary to achieve photographing intent. The general intent is to compile a historical sequence and record of ongoing construction of each primary Project system or product being installed and to show concealed services that can assist the Owner in any future addition, renovation, an ongoing maintenance of his Project. Contractor and Consultants to arrive at a general understanding of desired kinds and number of photos to be taken.

1.03 SUBMITTALS:

- A. Photographs: Submit photographs as follows.
 - 1. Weekly Submittals.
 - a. Number of Photos: Up to 200 photos per week.
 - b. Submittals: Submit two (2) sets of following.
 - 1. Electronic Data: Record to CD-RW or DVD disks or USB Flash Drive. Disks to be identified with data and general listing of photographs.
 - 2. Plan Drawings: Show locations of what is shown on each photograph.
 - c. When Submittals Required: Submit at end of each work week.
 - 2. Closeout Submittals: Submit following.
 - a. Electronic Data: Record on CD-RW or DVD disks or USB Flash Drive, selected Consultants and Owner photos; selected from all photos taken during duration of Project as part of Closeout submittals. Record in historical sequence and as otherwise directed by Consultants.
 - b. Hardcopies: Include hardcopy printouts on photographic paper as part of Owner's Closeout Project Manual.
 - c. Drawings: Plans showing locations of what is shown on each photo.

1.04 QUALITY ASSURANCE

- A. Assigned Personnel: Contractor to assign dedicated personnel to take photographs on regular basis and to work with Consultants in properly documenting progress and details of installed work.
- B. Camera Type: High resolution digital camera producing photographs acceptable to Consultants. Resolution of camera to be highest or very close to highest commercial (not necessarily Professional) resolution available at time Project is started. Digital camera to be capable of placing data and time minimum on each photo.
- C. Electronic Data: Type of electronic data to be viewed on current Owner's computer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXECUTION:

- A. General: Consultants to continually work with assigned Contractor's personnel to work out general types of photographs to be taken.
- B. Intent-General Types of Photos Required:
 - 1. "Before" photographs of existing work that may be damaged as a result of Contractor's operations.
 - 2. Photos from distance of Site and each Project work.
 - 3. Close-up photos of each installed work to show compliance with Contract requirements.
 - 4. Close up and distant photos of concealed services in detail as necessary to assist Owner in locating each work; whether below grade and in each structure for future addition, renovation and maintenance.
 - 5. Photos of all critical details of all work.
 - 6. Distance and close-up photos of non-complying work, if any.
 - 7. Photos of any cutting and patching and restoration work, if any.
 - 8. Photos documenting Contractor procedures for accomplishing each work.
 - 9. Other as may be determined by Consultants during course of the Work.

END OF SECTION

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. General requirements for submittals.
- B. Related Sections.
 - 1. Division 1 Sections.

1.02 SUBMITTALS:

- A. General: Refer to Contract Conditions and individual Specifications Sections.
 - 1. Administrative Submittals.
 - 2. Work Related Submittals.
 - 3. Quality Assurance Submittals.
 - 4. Closeout Submittals.
- B. Submittal Schedule:
 - 1. Type: Submit a written list of required submittals with planned date of submission and date when submittals are required to be returned to Contractor in advance of critical path and lead times required for proper procurement and fabrication of Project products.
 - 2. Submittal Review: Consultants will review Submittal Schedule and make adjustments to submission dates to allow for reasonable review period by them. Make Consultant's indicated time adjustments to review period; unless other times are agreeable to Consultants.
 - 3. Progress Schedule: Incorporate final Submittal Schedule successfully reviewed by Consultants into Progress Schedule.
 - 4. Submittal Times:
 - a. First: Refer to Section 01290 - Payment Procedures.
 - b. Subsequent: Update and resubmit each time schedule is changed. Progress Schedule is to be simultaneously updated and resubmitted in accordance with Section 01310 - Project Management & Coordination.

1.03 QUALITY ASSURANCE:

- A. Review Period: Contractor to include adequate review period for all submittals, including but not limited to following.
 - 1. Adequate time for review by each party requiring review of submittals.

2. Adequate time necessary for delivery of submittals to each party and between parties
 3. Time necessary due to resubmissions for various causes, e.g., incomplete submittals, non-compliance of submitted work, clarifications, design changes, etc.
 4. Each review period to be in advance of Progress Schedule critical path and lead time dates for proper procurement, manufacturer, delivery, and installation of materials.
- B. **Completeness of Submittal Package:** Any single submittal package which is not representative of all required submittals for each work is not acceptable. Consultant's successful review of piecemeal submittals to be considered conditional; until review of all submittals has been completed; to minimize errors in determining Contract compliance, e.g. initial selection from product data does not differ from actual Project samples.
- C. **Submittal Project Specificity:**
1. **General:** Submittals to be clearly and boldly identified, e.g. Contractor inserted underlining, highlighting, bracketing, and written identifications, for all Manufacturer approved Project specific requirements; where specific submitted data is not entirely related to Project requirements. Data not properly identified may be returned for re-submittal.
 2. **Contract Variance:** Distinguish Project data from work which vary from Contract requirements. In addition to highlight, indicate by written text "contract variance" or similar bold text that clearly defines which items vary from Contract requirements.
 3. **Successfully Reviewed Unmarked Data:** Where Contractor submits general data that does not clearly and boldly distinguish Manufacturer approved Project specific data and where any such data has been successfully reviewed by Consultants; then the following applies.
 - a. Contractor's submittal of data contains the Manufacturer approved Project specific requirements.
 - b. Contractor and the specific Entity or Entities responsible for the Work indicated somewhere in any such undistinguished submittals has verified from the Manufacturer specific Project requirements and clearly understands which Manufacturer's requirements are to be implemented in order to comply with the Contract intent.
- D. **Consultant's Review:**
1. **Contractor's Responsibility:** From time to time, the Consultants may include review information is provided solely to assist the Contractor as part of the review process. The Consultants makes no claim to the accuracy of information provided, nor is it to be construed as an infringement of what is the Contractor's responsibility as defined by the Conditions of the Contract. The Contractor is solely responsible

- for all construction means, methods, techniques, sequences and procedures, and therefore shall be responsible for determining the accuracy of such information provided by the Consultants and for the use in the Work.
2. Review of Component vs. Complete Assembly: Consultant's review of single component of a larger assembly does not constitute his approval of the entire assembly, unless otherwise indicated.
 3. Piecemeal Submittals: Do not purchase, fabricate, and manufacture any product for which Consultants has not completed successful review of all required submittals for any product. Contractor assumes risk, e.g. additional costs for compliance with Design Intent, e.g. costs for purchase, manufacture, fabrication, installation, and replacement of non-complying work, costs for Contract time impacts, etc., as a result of beginning any work where Consultant's successful review of all submittals has not been accomplished.
 4. Contractor's Questionable Review: Consultants will reject submittals not reviewed by Contractor; even when stamped.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 SUBMITTAL FORMAT:

- A. Submittal Sets: Number of submittals refers to submittal sets. Each submittal set includes all unique documents (not copies of) required for a particular submittal and are assembled together into a single unique and related group for submission.
- B. Contractor Transmittal of Each Submittal Set: Included following minimum information.
 1. Contractor letterhead, company name, address, phone/fax numbers, with responsible person sending submittal with his printed name and signature.
 2. Installer, Supplier, and Manufacturer company name, contact persons, addresses, phone/fax numbers.
 3. Addressee information.
 4. Numbering System: Unless otherwise approved by Consultants, the following system to be used; appended to all submitted documents and not just the cover sheet.
 - a. Initial Submittal: Specification Section Number followed by a sequence number, e.g. 08110-001.
 - b. Resubmissions: Specification Section Number followed by an R, applicable previous sequence number to relate it back to the original initial submission and an extension number to show further sequencing, e.g. 08110-R-001.01.

5. Append applicable numbering system to all documents.
 6. Date.
 7. Impacted Specification Section numbers; with applicable paragraph references.
 8. List of submittals.
- C. Origination Transmittal: Submit copy of Entity originating submitted information to Contractor.
- D. Submittal Sets: Submit not less than following to each entity; for every submittal required; unless otherwise specified.
1. Printed, Written, or Published Data: Digital Format: Portable Document Format or PDF. Provide one (1) reproducible set submitted through email. Upon approval provide (4) sets for Owner and Consultants; consisting of not less than one (1) original publications; other sets shall be clean and clear photocopies of the originals.
 2. Drawings: For Shop Drawings and other similar drafted type work, submit following.
 - a. Digital Format: Portable Document Format or PDF: Provide one (1) reproducible set submitted through email. Upon approval provide (4) sets for Owner and Consultants; consisting of not less than one (1) original publications; other sets shall be clean and clear photocopies of the originals.
 - b. As-Builts: Portable Document Format or PDF: Provide one (1) reproducible set submitted through email. Upon approval provide (4) sets for Owner and Consultants; consisting of not less than one (1) original publications; other sets shall be clean and clear photocopies of the originals. Also provide AutoCAD drawing files.
 3. Samples:
 - a. Type: Same materials and finishes scheduled for Project.
 - b. Sizes: Not less than following sizes; unless otherwise specified or acceptable to Consultants.
 1. Board and Sheet Type Samples: Actual thickness x 8-1/2 x 11"
 2. Running Samples: Profile x 11-1/2" lengths.
 3. Other: As acceptable to the Consultants.
 - c. Number of Submittal Sets: Same as required for "Printed, Written, or Published Data".
- E. Contractor's Review Stamp: Stamp each document. Date and sign each stamp. Stamp to include text that confirms submitted documents fully reviewed by Contractor for compliance with Contract intent.

3.02 ADMINISTRATION SUBMITTALS:

- A. General: Refer to individual Sections for specific requirements.

3.03 WORK RELATED SUBMITTALS:

- A. Product Data: Submit all standard publications available and applicable to Project requirements, including but not limited to, generic material data, installation instructions, tested characteristics, MSDS sheets, standard detail drawings, and color charts. Where standard data not complete, submit other written recommendations necessary to assure that Project data is complete.

- B. Shop Drawings:
 - 1. Types: Include plans, elevations, sections, and details.
 - 2. Scale: Similar to or larger than similar drawn elements on Contract Drawings.
 - 3. References: Same as Consultants; where different than Consultant's method must set up a referencing system so Consultants can readily find relationship to his similarly drawn elements.
 - 4. Level of Detail: As required for proper fabrication and installation of the work. Show relationship and interface to adjacent work.

- C. Samples:
 - 1. Initial Selections: May be made from charts and photographs that accurately depict products; when acceptable to Consultants. If in opinion such replications are not accurate enough, submit actual samples in full range of available characteristics.
 - 2. Final Samples: Actual Project representative materials and finishes selected by Consultants for Project.
 - 3. Colors, Finishes, Textures, Patterns: Where not specified, verify prior to submission of Bid; otherwise provide full range of available standards from Manufacturer for selection by Consultants.
 - 4. Options: Where not specified, verify prior to submission of Bid; otherwise provide full range of options available from Manufacturer for selection by Consultants.

3.04 QUALITY ASSURANCE SUBMITTALS:

- A. General: Refer to specific paragraphs, e.g. "Quality Assurance", "Field Quality Control" and other paragraphs, in individual Specification Sections for specific requirements.

3.05 CLOSEOUT SUBMITTALS:

- A. General: Refer to paragraphs, e.g. "Submittals", "Warranty", "Maintenance", "Owners Instructions" and other paragraphs, in individual Specification Sections for specific requirements.

END OF SECTION

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Quality assurance and control of installation.
 - 2. References.
 - 3. Inspection and testing laboratory services.
 - 4. Special inspections.
 - 5. Manufacturers' field services and reports.
- B. Related Sections.
 - 1. Section 01330 - SUBMITTAL PROCEDURES: Submission of Manufacturers' Instructions and Certificates.
 - 2. Section 01600 - PRODUCT REQUIREMENTS: Requirements for material and product quality.

1.02 QUALITY ASSURANCE/CONTROL OF INSTALLATION:

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.03 REFERENCES:

- A. Conform to reference standard by date of issue current on date for receiving bids.
- B. Obtain copies of standards when required by Contract Documents.

- C. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.04 INSPECTION AND TESTING LABORATORY SERVICES:

- A. When the individual specifications sections require it, the Contractor shall appoint, employ, and pay for services of an independent firm to perform inspection and testing. Seismic testing will need to be performed by a special inspector. Contractor to coordinate inspection, but Maluhia will pay for said inspection directly.
- B. Services will be performed in accordance with requirements of governing authorities and with specified standards.
- C. Reports will be submitted by the independent firm to the Engineer, in duplicate, indicating observations and results of tests and indicating compliance or non compliance with Contract Documents.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 1. Notify the Project Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- E. Retesting required because of non conformance to specified requirements shall be performed by the same independent firm on instructions by the Project Engineer and shall be paid by the Contractor.

1.05 SPECIAL INSPECTIONS:

- A. Owner will employ Special Inspectors acceptable to Honolulu County to perform inspections on various elements of the work as required by the Building Code as locally adopted. During the course of the work under inspection, each Special Inspector will submit detailed reports relative to progress and conditions of the work including deviations from specified requirements and stipulating dates, times, and locations. Special inspector will submit a final report to the County. Contractor must cooperate fully with the Special Inspectors.

1.06 MANUFACTURERS' FIELD SERVICES AND REPORTS:

- A. Submit qualifications of observer to the Owner Representative 30 days in advance of required observations. Observer subject to approval of the Project Engineer and the Owner.
- B. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start up of equipment, or to test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
- C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Submit two (2) copies of report written by representative, both to the Owner and to the Project Engineer listing observations and recommendations, within ten days of observation

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Use of Standards.
 - 2. Abbreviation use and format
- B. Related Sections.
 - 1. Division 1 Sections.
 - 2. Divisions 15 and 16.

1.02 REFERENCES:

- A. Standards:
 - 1. Requirement: Each type of work provided for this Project is required to comply with recognized Industry standards (also may be referred to as "references") that are applicable to the class of work intended by the Contract Documents. Compliance is required whether such standards are indicated or not and whether such standards are in published form or an unwritten but accepted practice in the Industry for the class of work.
 - 2. Use:
 - a. General: Where a specific standard is indicated, the most current standard is intended and this is to be interpreted as a method for conveying the design intent and its use expands on or clarifies the requirements and its use is not intended to apply to the class of work to be provided.
 - b. Conflict: Where several Industry standards apply to the Work, and where quality requirements of these applicable standards conflict for the class of work required, it is intended that the standard producing the higher quality work is to apply.
 - c. Out-of-Date: Where any specified standard is not current, one of following may be provided.
 - 1) Provide work complying with non-current standard; except where older standards are not compliant with any Code requirements, then provide work complying with standard; but modified to extent as necessary to comply with applicable Codes.
 - 2) Provide work complying with non-current standard; except where older standards are not compliant with any Code requirements, then provide work complying with standard; but modified to extent as necessary to comply with applicable Codes.

- 3) Provide work complying with current standard that is the equivalent of the non-current standard or higher quality standard which is closest equivalent.

B. Abbreviations and Acronyms:

1. Industry Related: Industry accepted abbreviations and acronyms are used throughout the Contract Documents. If any is not understood, these should be verified from the Consultants; prior to Bid.
2. Product Identification Format: Where used in Contract Documents the following format is used.
 - a. Format: Abbreviation of one or several letters, followed by a hyphen, followed by an identification number, e.g. WD-1 for wood type number one or WPM-1 for waterproof membrane type number one.
 - b. Number Sequence and Related Sections: Designations may be used between related specification sections where primary product is similar and therefore numbers are not necessarily sequential within a specific specification section, although the numbering will be sequential between all related sections where similar designations are used.

1.03 DEFINITIONS:

- A. Related Sections: The listed specification sections under the "Related Sections" paragraphs indicates some of the primary related work which is impacted by the work of the specific specification section in which the list appears. It is not intended as a complete list (which in many cases would otherwise be enormous) but has been provided to assist the Contractor.
- B. Exposure Definitions: Unless otherwise redefined elsewhere, the following applies.
 1. Exterior Surfaces: Exposed on the outside envelope of structure or surfaces of other constructed elements and equipment which are exposed and not fully enclosed by walls, floors, roofs, windows, and doors, are to be considered as part of the exterior and surfaces occurring in such spaces are to be considered exterior surfaces. Naturally vented, but enclosed, attic or similar spaces to be included.
 2. Interior Surfaces: Surfaces interior to the fully enclosed envelope of a structure or within the fully enclosed envelope of other constructed elements and equipment. These surfaces are not exposed to the "outside air".
 3. Exposed: Surfaces which are exposed to view from most vantage points, which are not concealed from view due to permanent inaccessible construction or earth, and which is not defined as semi-exposed.

4. Semi-Exposed: Surfaces not readily visible but are accessible and viewable from selected vantage points. These surfaces include those hidden by and hidden on removable or openable doors, panels, and drawers, and surfaces or undersides of shelves, counters, desks, and toe spaces, surfaces, which are hidden by moveable equipment/furnishings, and other similar surfaces.
 5. Concealed: Surfaces not exposed to view from any vantage point and which is concealed by permanent inaccessible construction, earth, and equipment/furnishings. Such concealed surfaces include those surfaces permanently concealed within walls, above ceilings, within floor construction, within shafts, and those buried underground in earth. Include within this definition, surfaces above otherwise semi-exposed accessible suspended acoustical ceilings, if any.
- C. Type: Word “type” as used herein is defined to mean any characteristic, e.g. shape, size, finish, pattern, texture, color, sheen, of a product that may be different from another similar product.
- D. Defect: Word “defect” as used herein is anything that would make a product less in quality than would be expected of the product at anytime from its time of manufacture to the end of its useful installed life; when normal wear and tear and abnormal impacts, e.g. Acts of God or other impacts for which the product was not designed or engineered for are taken into consideration; except to the extent such abnormal impacts may otherwise be warranted by the Manufacturer by published statements, verbal promises, and written Warrantees.
- E. Wet and or both Humid Interiors:
1. General: Refers to interior areas or rooms that are exposed to higher wet and or both humid conditions, e.g. swimming pools, steam rooms, saunas, bathrooms, showers, restrooms, commercial kitchens, locker rooms with showers or similar gang type wet fixtures, Janitor’s rooms with sinks, etc.; when compared to typical conditioned areas or rooms of a building. Open areas or rooms immediately adjacent to such areas or rooms are included; where exposed to potential effects of such conditions.
 2. Exposed Wet and or both Humid Conditions: Surfaces directly adjacent to and enclosing equipment and or both fixtures producing wet and or both humid conditions, e.g. walls and ceilings directly adjacent to a tub.
 3. Indirectly Exposed Wet and or both Humid Conditions: Surfaces part of area or room directly outside of enclosed or partially enclosed area or room producing wet and or both humid conditions, e.g. surfaces just beyond enclosure of a tub.

MALUHIA
CHILLED WATER SOURCE
HEAT PUMP UPGRADE

01420
References

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01450 - QUALITY CONTROL

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Quality control testing and inspection requirements.
- B. Related Sections.
 - 1. Division 1 Sections.

1.02 SUBMITTALS:

- A. From Testing-Inspection Service: Submit Testing-Inspection Reports directly to Consultants.
- B. From Contractor: Schedule each testing-inspection required in Progress Schedules.
- C. Quality Assurance Submittals: Refer to "Quality Assurance" paragraphs herein.
- D. Special Inspector Qualifications

1.03 QUALITY ASSURANCE:

- A. Testing Owner Requires: In addition to any Authority required and specified testing, Owner reserves right to test and inspect any and all work of Project.
- B. Securing of Testing-Inspection Services:
 - 1. Contractor:
 - a. Responsibility: For Authority required and specified testing, secure a Testing-Inspection Service and pay for testing required.
 - b. Owner Approval: Secure Owner's acceptance of Contractor's selected Testing-Inspection Service, prior to signing any Contract for any required services. Submit proposed Testing-Inspection Service qualifications for review in timely manner. Do not use any Testing - Inspection Service not acceptable to Owner.
 - 2. Other Testing: Except for Authority required and specified testing, Owner to secure his own Testing-Inspection Service and pay for any other testing he may require.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 INSPECTIONS-TESTING, GENERAL:

- A. General: Comply with requirements of the General Conditions of the Contract and requirements specified herein. Use of any testing inspection service shall in no way relieve Contractor of his obligation to perform the Work in accordance with the Contract.
- B. Contractor shall retain any required special inspector and special inspection requirements as required by Honolulu County Department of Planning and Permitting.

3.02 LABORATORY & INSPECTOR DUTIES:

- A. Performance of Service: Perform required inspections, sampling, and testing of materials and methods of construction. Ascertain compliance with requirements of Contract Documents as measured by standards required by specifications, by Authorities, and by recognized ASTM and other acceptable Industry standards applicable to each tested work.
- B. Notifications: Promptly notify Consultants of irregularities or deficiencies of the inspected and/or tested Work. Submit test reports for review.

3.03 CONTRACTOR'S RESPONSIBILITIES:

- A. Contractor Notifications: Notify each Testing-Inspection Service each time required and within time period requested by Service; to allow them to properly preparation for and schedule each type testing-inspection required.
- B. Cooperation: Cooperate with testing service personnel. Provide appropriate access to work where inspections, sampling and testing required. Furnish causal labor as necessary to assist access to work to be tested, to assist in obtaining and handling of samples at the site, and to otherwise facilitate the inspection and testing process.
- C. Protection and Repair: Protect each work being tested-inspected from anything that would invalidate the testing-inspection results and for duration of each testing-inspection period. Upon completion of inspection, testing, and sampling, repair damaged work and restore finishes to match the adjacent finishes.

- D. Contractor Arranged Tests: Contractor may arrange and pay for additional inspections, sampling, special inspection, and testing beyond the required testing from Testing-Inspection Service.
- E. Non-complying Work: Where non-complying work is evidenced by Testing-Inspection Service, Contractor to comply with following.
 - 1. Owner's Costs Directly Attributable to Defective Work: When Owner has paid for testing, pay for all costs incurred by the Owner and the Consultants.
 - 2. Correction of Work: Provide all work necessary to correct defective work to comply with Contract requirements.
 - 3. Time Impact to Work: Request for additional time will not be considered when resulting from installation of defective work.

END OF SECTION

SECTION 01500 - TEMPORARY FACILITIES AND QUALITY CONTROLS

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Requirements for construction facilities and temporary controls.
- B. Related Sections.
 - 1. Division 1 Sections.

1.02 SUBMITTALS:

- A. Reports and Permits.
 - 1. During Progress of Work: Submit copies of reports and permits required by governing authorities.
 - 2. Closeout Submittals: Refer to Section 01785 - PROJECT RECORD DOCUMENTS.
- B. Quality Assurance Submittals: Refer to "Quality Assurance" paragraphs herein.

1.03 QUALITY ASSURANCE:

- A. Standards: In addition to applicable codes and other Authority requirements, comply with applicable requirements of following.
 - 1. ANSI A10.6.
 - 2. ASHRAE 62.1 and 170
 - 3. NECA, including "Temporary Electrical Facilities.
 - 4. NFPA 70 and 241.
 - 5. NEMA.
 - 6. OSHA.
 - 7. UL.
- B. Use Charges: No additional cost or use charges for temporary facilities or services are chargeable to Owner, unless otherwise agreed to by Owner.
- C. Use Charges:
 - 1. Intent: Include all use charges for temporary facilities and services in Contract Sum.
 - 2. Utilities: Arrange with Utility Companies e.g., sewer, water, power, telephone, etc., for methods necessary for use of services so it is directly chargeable to Contractor during Contract Period. Pay for services.
 - 3. Owner Incidental Use: Allow incidental use of services (without charge) by Owner, Consultants, governing Agencies, and any of

- their designated entities, agents, and personnel that require access to the Project Site.
4. Exception: Long distance telephone charges may be billed directly to Entities responsible for persons making such calls. Owner, Consultants, and governing Agencies are not responsible for any long distance calls made by any other Entity, even where such Entities responsible for such calls are under contract to any of them.
- D. Permits: Secure permits required to carry out the Work.
- E. Regulations:
1. General: Comply with Authorities having jurisdiction over Project.
 2. Community Rules: Refer to Section 01100 - SUMMARY OF WORK.
 3. Safety: Temporary work to comply with OSHA as applicable to each Trade.
- F. Pollution Related Submittals:
1. Conditions of Use: Generally any legal toxic, hazardous, or noxious operations, equipment, and materials may be used on the Project when used in strict accordance with the law, except Consultant reserves the right to deny use of any such operations, equipment, and materials where in its opinion the use of such operations, equipment and materials may negatively impact personnel or surrounding community.
 2. Submittal: Submit a list of such operations, equipment, and materials, their intended scheduled time of use, and related product data and MSDS sheets prior to expending any moneys for such operations, equipment, and materials; for approval by Consultants.
 3. Progress Schedule: Incorporate pollution related operations into Progress Schedules when directed by Consultants.
 4. Costs: Where use of any pollution creating operations, equipment, and materials are denied by Consultants and for which there are no prior approval by Consultants prior to spending any moneys for such operations, equipment, and materials, then expended costs and any additional costs which may result from implementing Consultant acceptance alternative means for accomplishing the Work in accordance with Contract requirements are to be borne solely by Contractor.
- G. Owner and Consultant's Use: Unless not possible or where unreasonable, allow general incidental use of available facilities, e.g., conference or desk space, telephones (except for long distance), sanitary facilities, etc., by Owner, the Owner Representatives, and their personnel and designated guests.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT:

- A. Quality, Maintenance, Suitability: Used materials and equipment that are undamaged and in serviceable condition may be used. Provide appropriate maintenance schedule to ensure materials and equipment properly perform during time of service required. Provide only material and equipment suitable for the intended use.

2.02 TEMPORARY SERVICES:

- A. General: Provide equipment and materials from each Utility Company connections as required for the Work.
- B. Telephones: Each Entity to pay for their own telephones and services as they may require for the Work.

2.03 TEMPORARY CONSTRUCTION & SUPPORT FACILITIES:

- A. General: Provide as required for the Work.
- B. Field Offices-Contractor: Provide trailers or other enclosed facilities required by Contractor for his work. In addition to Contractor's facilities, provide following enclosed and furnished facilities which may be a part of Contractor's facilities.
 - 1. Furnished conference room for Project meetings; air conditioned and large enough to hold large meetings up to 20 people minimum.
 - 2. Work area for review of Project record documents; air conditioned.
 - 3. Dedicated storage area for approved Project samples.
 - 4. Dedicated shelved area for codes, standards, and references applicable to specified Project requirements; including applicable UBC Code, set of ASTM Building standards, and ACI standards.
 - 5. Extra supply of hardhats for visitors.
- C. Sanitary Facilities: Provide facilities as required by Contractor for the Work. If portable units are provided, provide types in accordance with Health Authorities. Maintain on reasonable and regular sanitary maintenance schedule, e.g., waste removal, cleaning and supplies.
- D. Temporary Controls: Provide materials, equipment, and facilities necessary to properly implement temporary controls specified herein.
- E. Waste/Refuse Removal: Provide necessary equipment for waste and refuse removal from the Project site.

- F. Temporary Use of Elevators: Verify temporary use of elevators for Work and included impacts in Bid; if not fully restricted, comply with following, prior to signing Contract for the Work.

PART 3 - EXECUTION

3.01 PROCEDURAL REQUIREMENTS:

- A. General: Provide each temporary facility and utility ready for use at each location when it is first needed, to avoid delay in performance of the work. Provide facilities that can be properly maintained throughout their use at the Project site. Adjust service capacity of temporary services and facilities as needed throughout the progress of the Work. Do not remove until services or facilities are no longer required.
- B. Inspections and Testing: Inspect and test each service before placing temporary services in use.
- C. Conditions of Use: Operate temporary services and facilities in a safe and efficient manner. Do not overload temporary services or facilities, and do not permit them to interfere with the progress of the work. Do not allow unsanitary conditions, public nuisances, or hazardous conditions to develop or persist on the site.

3.02 TEMPORARY CONTROLS:

- A. General:
 - 1. Restrict the Work, e.g., deliveries, staging, other operations, materials and facilities, to immediate limits of Site; unless further restricted by other Contract requirements or unless otherwise approved by Owner.
 - 2. Maintain temporary controls whenever required and for periods as long as necessary to control conditions for which temporary controls are required during the Contract Period.
- B. Protection and Security Facilities: Provide temporary protective structures, including enclosures, supports, barricades, partitions, warning signs, warning lights, and other forms of protection as created by ongoing operations and required by working areas and conditions, including , but not necessarily limited to, the following:
 - 1. To protect all persons and property from hazards on ongoing operations.
 - 2. To provide security from access by unauthorized persons.
 - 3. To protect exposed work from damage from the weather.
 - 4. To efficiently route vehicular and pedestrian traffic around obstructing.

- C. Fire Protection Requirements: If any Project areas are secured, maintain security and exist requirements in compliance with Authorities. Provide portable fire extinguishers, if required, by Authorities. Instruct all personnel on use of fire extinguishing equipment and exiting procedures prior to start of Work.
- D. Construction Cleaning: Comply with requirements specified in Section 01740 - CLEANING.
- E. Waste Disposal: Dispose of all waste material in a legal manner off site. Do not burn or bury any wastes on Project site. Do not dispose of any wastes into the storm or sanitary sewers.
- F. Pollution Controls:
 - 1. Intent: Limit pollution and any possible resulting contamination of the site and surrounding areas to avoid creating hazardous or unreasonable nuisance conditions from the ongoing operations.
 - 2. Authority Requirements: Comply with applicable requirements of following. Secure permits from Authorities having jurisdiction over the Project; as required by law or provided for protection of Contractor.
 - a. Federal Government.
 - b. State Government, including State Department of Health and its "Public Health Regulations".
 - c. City Government.
 - 3. Types of Controls: Include, but not be limited to, the following.
 - a. Dust Control: Use appropriate containment methods as required to limit dust contamination of any built project structures and surrounding community.
 - b. Noise Control: Minimize noise produced by ongoing operations. Secure and pay for "Community Noise Permit" as required by the State of Hawaii Health Department.
 - c. Light Pollution: If any, night operations are required.
 - d. Air Pollution: Limit mist, smoke, vapor, gases, odorous substances, particulate matter, and other similar pollutants to acceptable levels.
 - e. Chemical Control: Limit use of hazardous and toxic chemicals in strict accordance with lawful regulations and Authorities. Prevent contamination by chemicals to the environment. Prevent nuisance conditions which could arise from use of the chemicals.
 - f. Hazardous Waste Disposal: Volatile, toxic, and other hazardous wastes are to be removed daily, except as otherwise allowed and accepted by Authorities having jurisdiction over the Project. Refer to "Waste Disposal" paragraphs herein for additional requirements.

- G. People Controls:
 - 1. Owner Restrictions: Comply with Owner's restrictions for personnel doing business on Site.
 - 2. Contractor Controls: Provide safety measures and programs as required by law and required for protection of those on Site.

- H. Vehicle Controls:
 - 1. Access to Site: Verify acceptance routes of access to Site.
 - 2. Public Road Blockage:
 - a. Intent: Avoid blocking to greatest extent possible.
 - b. Full Blockage: No work to fully block passage around such work for more than 5 minutes; regardless of alternate routes; unless such blockage has been approved by Authorities.
 - c. Partial Blockage: Minimize length of time required.
 - d. Controls: Erect temporary traffic safety devices, e.g. signs, cones, personnel directing traffic, etc. as mandated by Authorities and as required to ensure passage of public safely around ongoing operations.
 - 3. Site Entry: Designate specific Project Site entries. No crossing curbs and sidewalks.
 - 4. Speed: Maintain reasonable and safe speed limits on Site. Outside of Site, comply with Authority posted speed limits.
 - 5. Parking:
 - a. On Site:
 - 1) Designate parking areas and controls.
 - 2) No parking on and driving over built structures, e.g., paved driveways, walks, slabs; unless no other means or paths are available and then only as acceptable to Consultants.
 - b. Off Site: Parking off Site, if required, is to be done legally and in manner not to become a nuisance to surrounding community.
 - 6. Spillage: Vehicles to fully contain materials being transported. Where materials are dropped on public ways and properties, full and immediate removal is required.
 - 7. Mud Tracking: Any mud tracking onto public ways to be removed on daily basis by washing. Removal of waste water to conform to what is allowed by Authorities.
 - 8. Maintenance: Maintenance and fueling to be done only in Contractor designated areas. Set up safety program for use of such areas.
 - 9. Washing of Equipment: Hopper, chute, and wheel cleaning allowed as long as washing operations not detrimental to Site and ongoing operations.

3.03 PROCEDURAL REQUIREMENTS - UNKNOWN HISTORICAL SITES:

- A. Encounter: If any, unknown Sites are encountered, stop operations around the immediate area. Erect temporary barriers to prevent other operations from further damaging and disturbing each such Site.
- B. After Encounter:
 - 1. Notification: Immediately notify Consultants, Owner, Authorities, and Organizations to determine extent and limits of barricades to erect. Where conflict occurs between Parties determining limits of barricades, Owner will prevail in determination of barricade limits.
 - 2. Operations: Continue around barricade limits, unless otherwise directed by Consultants.
- C. Cost Impacts: Prior to signing Contract for the Work, work out a method for cost adjustments to the Contract with the Owner based upon potential effects, e.g., scope and length of delays, degree of work stoppage, scheduling, etc., to the contract due to discovery of such unknown sites; otherwise contract Sum is assumed to include all Contractor's costs for conducting his Work; regardless of scope and length of delays to his operations, is such discoveries are made.

3.04 INSTALLATION:

- A. General: Use qualified Tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire Project adequately and result in minimum interference with the performance of the Work. Adjust services and facilities as required during the course of work so as to accommodate the entire work of the Project.

3.05 OPERATIONS:

- A. General: Establish regular programs for personnel health, safety, fire protection, security, maintenance, and cleaning of Project site and temporary facilities.
- B. Supervision: Enforce strict discipline in use of temporary services and facilities at the site. Limit availability of temporary services and facilities to essential and intended uses to minimize waste and abuse. Do not permit temporary installation to be abused or endangered. Do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.
- C. Maintenance: Operate and maintain temporary services and facilities in good operating condition throughout the time of use and until removal is authorized. Protect from damage by dust, rain, and similar elements.

- D. Termination and Removal: Upon completion of each activity remove all unnecessary equipment, materials, and facilities. Upon completion of work remove all equipment, materials, and facilities and remove from site in expeditious manner. Re-establish work areas to clean condition. Repair, restore, or replace any damaged work. Completely clean site of evidence of Contractor's operations.

3.06 DAMAGES:

- A. General: If any damages, e.g., soiling staining, broken elements, damaged landscape, etc., result from Contractor's operations, such damages are to be restored or replaced to "as new" Contract conditions as satisfactory to Consultants. The costs of such remedies shall be borne entirely by the Contractor.

END OF SECTION

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. General requirements for products.
- B. Related Sections.
 - 1. Division 1 Sections.

1.02 DEFINITIONS:

- A. Primary Products: For any given product related Specification Section, the main product of products required for the Project; which is the reason such Specification Section is written.
- B. Related Products: Products required to complete each installation of a primary product.
- C. Defects: Anything about any Project product that would make it less in quality than the intended Contract requirements, e.g., materials not complying with Contract requirements, manufacturing defects, installation defects, damages prior to Contract conclusion, abnormal deterioration, etc., that occur prior to end of any warranties in effect and prior to a reasonable expected life cycle under similar installation conditions and exposures.
- D. Exposures: Refer to Section 01420 - REFERENCES for definitions of exterior", "interior", "exposed", "semi-exposed", and "concealed"; except as otherwise specified.

1.03 SYSTEM DESCRIPTION:

- A. Performance:
 - 1. General: Each product provided shall perform to the Contract requirements under the anticipated conditions of use and installation or exceed such requirements. Performance evaluation of any product to include the performance of the product by itself and its performance relative to the total assembly for which it is a part as exposed to actual installed Project environmental and use conditions.
 - 2. Authority Requirements: Whether specified or not, each Project product to meet all Codes, laws, and other Authority applicable requirements that apply to each product. For any particular product, where specifications does not address any Project applicable

Authority requirement, include in Bid Manufacturer's Code compliant product; which is comparable to original product and that does not jeopardize original Project design intent specified for any such product. Secure Consultant's approval of product; before purchase, fabrication, and installation of such products.

1.04 SUBMITTALS

- A. List of Products: As a condition to securing the Contract for the Work, submit a list of primary products to be used for the Work, prior to signing the signing of the Contract for the Work. Secure the Consultant's general approval of the listed products. List products under each related Specification number. List of Products to indicate product, Manufacturer, Installer, and Supplier.
- B. Work Related Submittals:
 - 1. Specified: Refer to other related Sections as follows.
 - a. Section 01330 - SUBMITTAL PROCEDURES.
 - b. Section 01785 - PROJECT RECORD DOCUMENTS.
 - c. Individual Specification Sections applicable to each Entity.
 - 2. Unspecified: Including substitutions, submit any and all documentation required by Consultants in order to determine compliance with intent of Project.
- C. Closeout Submittals: Refer to "Warranty" and "Maintenance" paragraphs herein.

1.05 QUALITY ASSURANCE

- A. Intent of Section: Requirements specified herein are minimum quality standards that apply to all products required for Project; whether requirements are specified or not and are to be complied with unless otherwise acceptable to Consultants.
- B. Manufacturer, Supplier, Fabricator, Installer Qualifications:
 - 1. General Qualifications: Notify Consultants where any of following qualifications cannot be met.
 - a. The Manufacturer best understands the performances of Its' products relative to Project's requirements.
 - b. Those working with any Project products, e.g. Installer and Fabricator, has secured proper Manufacturer training to professionally fabricate and install their products in accordance with Manufacturer's Project specific design intent.
 - c. Those working with any Project products, e.g. Installer and Fabricator, has fully disclosed and secured written confirmation of specific Project requirements for each Manufacturer's product from reliable and knowledgeable

- Manufacturer's Technical Representatives; prior to Bid and has incorporated such requirements into Bid.
- d. Those working with any Project products, e.g. Installer and Fabricator, have an intimate knowledge of all the available characteristics and options necessary to provide a complete installation in accordance with Contract design intent.
2. Experience: Except as otherwise indicated, as follows.
- a. Type: Current and continuous experience with the specific Project required products and services being provided or equivalent experience acceptable to Product Manufacturer and Consultants.
 - b. Number of Years: Not less than following.
 - 1) Manufacturer: 10.
 - 2) Supplier: 5.
 - 3) Fabricator: 10.
 - 4) Installer: 5.
3. Certification:
- a. Requirement: Where Manufacturer has a certification or licensing program for installation of Project products, Installer to possess current certification or licensing. Certification to have been attained not less than two year prior to time that Project was Bid.
 - b. Submittal: Submit written documentation of such certification when specified or requested by Consultants.
4. Verification of Project Requirements:
- a. Condition of the Contract: It is the responsibility of the Installer and Fabricator of each work to verify that each Manufacturer's product can meet the specified and drawn Project requirements applicable to the Work; including each Manufacturer's Project related requirements and Industry practices and standards. Verify requirements and Industry practices and standards. Verify requirements during Bidding and prior to signing the Contract for the Work by the Contractor.
 - b. Impact: Where Consultants and Owner has not been notified prior to the signing of the Contract for the Work by the Contractor, Entities responsible for such work, including Contractor, are required to provide work necessary to comply with specified requirements at no additional cost to Owner.
- C. Fire Rated Assemblies:
1. Intent: Provide each installed assembly to exactly match each required Product Manufacturer's tested fire assembly applicable to Project fire rating condition.
 2. Alteration: "Engineering Judgments" or other alterations of Manufacturer's fire tested assemblies are not allowed; unless specifically specified or acceptable to Consultants.

- D. Related Products:
 - 1. Intent: Each related product required to complete the installation of a primary Project product and having a performance related impact on a specific Project product to be approved in writing by the Manufacturer for the primary Project product for use on the Project and for each scheduled type of use on Project; whether provided by them or not.
 - 2. Conflict: Where specified requirements are detrimental to performances and not acceptable to any Manufacturer, notify Consultants for resolution of such conflict; prior to purchase, fabrication, and manufacture of such products.

- E. Manufacturer's Packaging and Labels:
 - 1. General: Keep intact and unopened until just prior to each installation. Packaging may be opened when required by Manufacturer to protect products from damages due to environmental conditions, e.g. condensation, humidity, etc., and only to extent as required by them. When required, maintain protections of products.
 - 2. Label Descriptions: Labels to identify Project products. Specified special performances and Authority required information to appear on labels.

1.06 WARRANTY:

- A. Contractor's Project Warranty: Refer to General and Supplementary Conditions of the Contract.

- B. Manufacturer's Standard Warrantees: Whether specified or not, submit standard available warrantees for primary Project products. All products to have not less than a one (1) year warranty from the Manufacturer against manufacturing defects in materials and its workmanship.

- C. Installer's Warrantees: Whether specified or not, submit each Installer's one (1) year Warranty against defects occurring due to installation of materials and its workmanship; except where any required Special Warrantees extend Installer's One Year Warranty.

- D. Special Warrantees: Refer to individual Specification Sections for other warranties required for Project.

1.07 MAINTENANCE:

- A. Maintenance & Servicing Instructions: Whether specified or not, submit standard published user manuals and maintenance and service instructions for Project materials and equipment. These are in addition to any similar requirements specified in other Specification Sections.

PART 2 - PRODUCTS

2.01 PRODUCTS, GENERAL:

- A. Primary Product: Unless otherwise specified or acceptable to Consultants, products to comply with following.
 - 1. Experience: Used 10 years minimum in projects of similar type, scope, under similar environmental conditions, and under the same installation (assembly) conditions.
 - 2. Compatibility: Compatible with related products required to complete each of its installation and compatible with each interfacing product in each assembly.
 - 3. Single Source Intent: For specified primary products in any particular Section, the indicated products are to be generally provided by a single Manufacturer; unless it is clear that specified requirements cannot be met by a single Manufacturer; then limit number of sources to fewest reasonably possible.
- B. Related Products: Refer to “Quality Assurance” paragraphs herein.
- C. Completeness: Provide all materials necessary to provide a complete and fully functional assembly to each product required for Project.
- D. Finishes of Related Products: For exposed components of related products, provide same finish as required for primary product; unless otherwise specified or acceptable to Consultants.

2.02 FABRICATION:

- A. Project Measurements: Establish written documentation with Contractor coordinating measurements and tolerances required to assure that fabricated work fits final intended Project outcome. Where possible verify actual field conditions prior to final fabrication of Project units affected by field conditions.
- B. Manufacturing Products – Intent:
 - 1. General: Generally specified requirements for any product are those which can be met by standard established manufacturing practices of manufacturers producing types of products required for Project. Generally do not alter the manufacture of such products; except as specifically engineered by Manufacturer to conform their products meet required special or custom requirements to meet Contract intent.
 - 2. Customizations: When required, Manufacturer to have ten (10) years minimum experience engineering products for specific custom performances required for Project; unless otherwise acceptable to Consultants. Acclimation Sensitive Products: Where products are sensitive to environmental conditions, adjust manufacturing and

fabrication of products in manner that defects do not occur under final environmental conditions to which product is to be exposed.

2.03 SPECIAL REQUIREMENTS:

- A. Ferrous Products – General: Whether required for exterior or interior use and unless otherwise acceptable to Consultants, comply with following.
 - 1. Do not install any rusted ferrous products in the Work. If rust occurs, rust to be removed completely from surfaces without destroying functionality of product or replaced with new un-rusted and Contract complying work.
 - 2. Ferrous fasteners when used with metals are to be used only with ferrous materials.

- B. Galvanizing of Ferrous Metal Products: Even when not specified, and except where other galvanizing specified, ferrous metal products to be hot dipped galvanized as follows.
 - 1. Location:
 - a. When part of exterior assemblies, including vented attic spaces exposed to exterior air.
 - b. At interior when installed in or attached to concrete and masonry part of exterior wall or similar assemblies.
 - c. When occurring in with or high humidity areas, e.g., restrooms, janitor's closets with sinks, kitchens, swimming pools, shower areas, steam rooms, saunas, etc.
 - 2. Type of Galvanizing: As applicable to assembly type, comply with following.
 - a. Standard: ASTM A 153, ASTM A 123, and ASTM A 653.
 - b. Vent Holes: If required, fully plug flush with lead after galvanizing. Blended smooth with adjacent surfaces.

- C. Stainless Steel: If any, to be products to be fabricated without ferrous contamination in accordance with NiDI requirements

PART 3 - EXECUTION

3.01 GENERAL EXECUTION REQUIREMENTS:

- A. Intent: Comply with Manufacturer's Project specific requirements as fully submitted and successfully reviewed by Consultants; which shall not be less in quality than Contract intent and applicable Industry standards.

3.02 DELIVERY, STORAGE, & HANDLING:

- A. Delivery: Upon arrival of Site, immediately inspect products for defects. Replace defective products in timely manner; without affecting Project Progress Schedule.

- B. Storage: Comply with each Manufacturer's Project specific requirements. Ensure storage methods do not cause defects to occur. Whether storage is on site or off site, maintain insurance covering full replacement of materials.
- C. Handling: Use methods and equipment approved by each Product Manufacturer for types of handling required in Project.
- D. Protection of Products:
 - 1. Intent: Contract requirements cannot anticipate Contractor's means and methods for shipping of ferrous products where exposure conditions can rust product. Specified requirements are intended for Owner acceptance of installed undamaged and un-deteriorated, as-manufactured products at time of Substantial Completion.
 - 2. Protection Responsibility: Contactor is responsible for means and methods, including interim shipping and storage, to ensure Project products are provided with adequate protections during entire procurement and installation process; so products can be installed accordance with the intent.

3.03 PROJECT SITE CONDITIONS:

- A. Environmental Conditions: Do not proceed with any work under any adverse conditions that would cause defects in products.
- B. Acclimation:
 - 1. General: Acclimation interior products prior to each installation under Manufacturer recommended environmental conditions to ensure success of each installation.
 - 2. Interior Products: Install when each space fully enclosed and when temperature and humidity are in strict accordance with each Product Manufacturer's requirements.

3.04 SEQUENCING & SCHEDULING:

- A. Coordination: Each Installer to coordinate work with other Trades, e.g., schedules, sequence of operations, dimensions, tolerances, finish, embedded items, templates, etc., to ensure work by other Trades are constructed in manner to ensure success each of their installations.

3.05 EXAMINATION:

- A. Existing Conditions: Prior to start of each work, verify existing conditions for conformance with requirements necessary to ensure success of each installation. Start of work indicates acceptance of conditions and confirms its conformance.

3.06 PREPARATION

- A. Responsibility: Each Installer to verify and coordinate following responsibilities; otherwise Installer requiring preparation is required to provide required work necessary to assure success of its installation.
 - 1. Support Work.
 - 2. Substrate preparation.
 - 3. Tolerances.

3.07 INSTALLATION:

- A. General: Refer to "General Execution Requirements" paragraph herein.
- B. Finish, Color, Pattern, Texture Variation: Install products in manner to assure uniform visual appearance acceptable to the Consultants. Methods for insuring uniformity may include utilizing materials in sequence as manufactured from same lots where singular lot may be used for single contiguous area or may require the hand selection of materials between several lots for larger areas.
- C. Defective Work:
 - 1. General: Replace defective work with complying work; unless otherwise acceptable to Consultants.
 - 2. Minor Defects: Very minor damage, deterioration, and other very minor defects may be restored when acceptable to the Consultants.
 - 3. Restoration Intent: In addition to any other requirements, restoration when allowed by Consultants shall meet following minimum criteria.
 - a. After fully finished, no evidence of restoration work to be visible where on any exposed to view surfaces.
 - b. Workmanship of restoration work on concealed surfaces may be less rigorous than work for exposed to view surfaces, but to be generally flush and neat.
 - c. The existing defect and any restoration work is not to reduce the long term performance of the materials and components of the work in any way.
 - d. The method and materials used to restore any defect to be such that it can perform as well or better than the original materials.
 - e. Restoration is to be accomplished at no cost to Owner.

3.08 PROTECTION:

- A. Intent: Provide protections necessary so each work is clean, without contamination, without defects, abnormal deterioration, without damage, and properly functioning at the time of Final Acceptance by the Owner.

3.09 CLEANING:

- A. Intent: Refer to Section 01740 - CLEANING.

END OF SECTION

SECTION 01620 - PRODUCT OPTIONS

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Basis for options available for products.
 - 2. Substitutions proposals.
 - 3. Value engineering proposals.
- B. Related Sections.
 - 1. Division 1 Sections in general.
 - 2. Section 01600 - PRODUCT REQUIREMENTS

1.02 DEFINITIONS:

- A. Substitution Proposal: A proposal offered by the Contractor of a product(s) to be used in lieu of the specified product(s); which is generically similar to the specified product(s) and its specified requirements.
- B. Value Engineering (VE) Proposal: A proposal offered by the Contractor of a product(s) to be used in lieu of the specified product(s); which is generically different than the specified product(s) and which offers a significant advantage or advantages to the Owner relative to cost, scheduling, and/or performance; without altering the original design intent in an unacceptable way to the Consultants.
- C. Products: Use of words such as “products”, “materials”, “assemblies”, “systems”, are to be used interchangeably and unless the proposal is specifically for only a single most basic (cannot be broken down any further) material unit or material component, the proposal shall mean and be measured in terms of all the materials required for each use in the Project as a final in-place assembly or system.
- D. Material Composition: Where word “material composition” is used, this word is to mean the actual scientific makeup of the product with percentage of each material or chemicals going in to make up the final product being evaluated. Material Safety Data Sheets are to be provided when available. Words such as “100% acrylic” or “100% urethane” or other words to that effect are not acceptable when the product is not in fact only made up of that material alone.
- E. Limitations: Where word “limitations” is used in conjunction with products being evaluated in proposals, this word is to mean “anything” which could reduce or be less than any quality or any characteristic of the product as

required for use in the Project at “any time” during its life expectancy, including its “life expectancy”; when compared to the specified product, when compared with other competitive generic products of the same type, and when compared with other competitive products that basically are designed for the same functional purpose. Examples include, but are not limited to, following.

1. Incompatibility with Other Materials: Where any contracting material is deleterious to the other, e.g. electrolysis, corrosion, contamination, chemical sensitivity, bacteria or plant growth (mildew or algae growth, etc.), or any other deleterious material effects.
2. Life Expectancy: Shorter life expectancy than specified materials.
3. Weatherability: Not as weatherproof as specified product, e.g., water leakage, air leakage, ultra-violet exposure, breathability, and hydrostatic pressure effects.
4. Structural: Strength of product compared with specified material, e.g. compressive, tensile, shear, bond, peel, and durometer hardness characteristics.
5. Durability: Resilience of product compared with specified material. Its ability to withstand physical abuse and movement, e.g., impact resistance, abrasion resistance, puncture resistance, and elongation.
6. Fire Resistance: Ability to resist fire exposures.
7. Product Characteristics: Susceptibility to defects occurring due to the characteristics unique to the product, e.g., sensitivities such as those due to material composition (shelf life, curing methods, etc.), configuration, weight, size, substrate conditions, weather conditions, assembly conditions, applications methods, etc.
8. Other Characteristics: E.g., slip resistance, acoustic properties, and resistance to catastrophic events, etc.

1.03 SUBMITTALS:

- A. Substitution or VE Proposals: Submit complete, readable, and organized information, with all proposal data applicable to Project highlight marked. Information to include, but not necessarily be limited to, following.
 1. Substitution/VE Proposal Form: Copy of form has been inserted in Appendix. This is to be “fully” completed and complied with.
 2. Product Data:
 - a. Published Data: Submit Primary Product Manufacturer’s complete available published product data including, but not limited to, primary product descriptions, related product descriptions, color/pattern/texture charts, specifications, drawings, laboratory tested data, fabrication/installation instructions, and list of comparable Projects in Hawaii and other similar salt air/humid environments, such as Guam, Florida, or any of the Southern States bordering the Gulf of Mexico.
 3. Comparison of Products:

- a. Requirement: Submit a detailed comparison of significant generic qualities of the proposed substitution with those of the work originally specified.
 - b. Characteristics: List significant qualities including, but not necessarily limited to, following.
 - 1) Material composition.
 - 2) Sizes.
 - 3) Weight/density.
 - 4) Color, textures, patterns available.
 - 5) Qualities critical to performances.
 - 6) Limitations of product.
 - 7) How long used in locale.
 - 8) Availability in locale, by U.S. regions, and internationally.
 - 9) Market share locally, regionally, and worldwide; based upon equivalent competitive materials.
 - c. Format: Submit in a typewritten table format in which characteristics are compared side by side.
4. Samples: Submit samples. Provide additional samples or small scale mockups, if requested, by Consultants. Samples to be submitted in accordance with Section 01330 - SUBMITTALS.
 5. Project Modifications: Where standard published drawings are not adequate, submit other drawings or legible to scale sketches to show each of following where applicable to Project.
 - a. Where Project dimensions would be affected, indicate with some typical examples how product affects Project dimensions.
 - b. Show custom modifications of product which are required for Project.
 - c. Show additional work required of other Installers which is not otherwise shown.
 - d. If any, penetrations are required through work, show how penetrations through work is to be accomplished, including any multiple penetrations.
 6. Changes to Other Work: Submit a list of written changes to the work of other Installers that would be necessary to accommodate the proposal.
 7. Cost Proposal:
 - a. During Bidding Period: Do not provide.
 - b. Post Bidding Period: Submit. Indicate the overall net change, if any, in the Contract Sum. Separately list cost of proposed Work, cost of changes to other Work, Contractor's cost, cost for Consultant's time (verified from Consultants) and other miscellaneous costs.
 8. Certifications: Sign certifications indicated on form.
 9. Format: Submit proposal form as provided in Appendix and other data requested.

1.04 QUALITY ASSURANCE:

- A. Objective: It is up to those making the proposal to prove to the Consultants that the proposed products will meet the Project requirements. To the extent that the Proposer wishes to pursue the Work, the Consultants reserve the right to request any information and samples necessary for him to make a decision.

- B. Quality of the Proposals: It is intended that the physical appearance and dimensions of the Project and the quality of the specified products required by the Contract Documents be maintained, unless otherwise specifically requested by and acceptable to Consultants. Generally, submit proposals that would result in installations of equivalent quality to that specified.

- C. Conditions for Consideration of a Proposal: The Contractor's proposal will be received and considered when extensive revisions to the Contract Documents are not required, when the proposed changes are in keeping with the primary intent of the Contract Documents, when the requests are timely, fully documented and properly submitted, and when one or more of the following conditions are satisfied.
 - 1. Where the proposal is directly related to an "or equal" or "comparable product" clause or similar language in the Contract Documents.
 - 2. Where the specified product or method cannot be provided within the Contract Time. Do not submit proposals which have resulted from the Contractor's failure to pursue the work promptly or to coordinate the various activities properly.
 - 3. Where the specified requirements cannot receive necessary approval by a governing Authority, and the requested proposal can be approved.
 - 4. Where a substantial advantage is offered by Owner, in terms of cost, time, energy conservation, or other considerations of merit, after deducting additional responsibilities may include such considerations as additional compensation to the Consultants for redesign and evaluation services, the increased cost of other work by the Owner or separate contractors, and similar considerations.
 - 5. When the specified products or methods cannot be provided in a manner which is compatible with other materials of the work, and where the Contractor certifies that the substitution will overcome the incompatibility.
 - 6. When the specified products or methods cannot be properly coordinated with other materials in the work, and where the Contractor certifies that the proposed substitution can be properly coordinated.
 - 7. When the specified products or methods cannot receive a warranty as required by the Contract Documents and where the Contractor

certifies that the proposed substitution can be given the required warranty.

- D. Factors Affecting Acceptance of Proposals:
1. Review Intent: It is intended to give all responsible proposals a fair review, however, the Consultants and Owner reserves the right to deny acceptance of any proposal for any reason. Irresponsible use of proposal process may result in termination of the review process in its entirety by Consultants and Owner.
 2. During Bidding Period: Time period allotted to Consultants for review of submittals is short. It is critical full documentation be received and that documentation complies strictly with requirements specified in "Documentation" paragraphs herein.
 3. Post Bidding Period:
 - a. Value Engineering: Only when Owner has directed Consultants that value engineering proposals be considered. Consultants will determine kinds of proposals acceptable during the review process.
 - b. Post Contract: No proposals will be considered, unless significant disadvantage to Contractor or significant advantage to Owner can be shown.
 4. Documentation:
 - a. Intent, Information Access: Competitors should be fully aware of the advantages and disadvantages of their products and of their competitor's products. Should any knowledge be lacking, each competitor should be fully capable of accessing and securing accurate information. Where this is not possible, and unless the product is proprietary, these competitors should not offer proposals for this Project.
 - b. Quality of Information in Proposal: The Consultants should be able to fully and accurately evaluate the difference between the specified product(s) and the proposed product(s) from each proposal. Do not submit proposals with only a minimum amount of information, as Consultants will base his opinion on the information in the proposal only and will not reconsider any proposal that has been "not accepted" for any reason, including one that is not adequately documented in the Consultant's opinion. It is suggested that a complete and accurate "comparison chart" accompany each proposal, unless otherwise acceptable to Consultants.
 - c. Reduction of Information Provided: When acceptable to the Consultants, the extent of the submittals may be reduced when approved by Consultants prior to the submission of each proposal. Generally, these will be for obvious products which are and fall into generic categories very familiar to the Consultants. Where the Consultants agree to reduce the amount of information to be provided, the Consultants reserves the right to expand the requirement again where the

- Consultants feels that the proposal “objective” was not achieved.
- d. Comparison of Products: In addition to the other required submittals, the “Comparison of Products” table is a key submittal to the whole proposal and is a requisite to acceptance. This submittal is not to be deleted.
 - E. As part of Work-Related Submittals: Submission of unspecified products or methods as part of “work-related” submittals does not constitute an acceptable or valid method for processing substitution or value engineering proposals. Successfully reviewed “work related” submittals does not indicate approval of unspecified products or methods.
 - F. Consultant’s Requirements: Verify prior to submission of any proposal, the Consultant’s requirements necessary to fully conform proposal to Contract requirements. Request for additional costs after acceptance of any proposals will be denied.

PART 2 - PRODUCTS

2.01 PRODUCTS THAT QUALIFY AS SUBSTITUTIONS:

- A. Commercial Usage: Same as specified product or ten (10) years minimum; under similar installation and environmental conditions specified for Project.
- B. Material Composition:
 - 1. Primary performance constituents are for all intents and purposes the same or exceed requirements with regard to chemicals and materials, their quantity, and their quality; without violating applicable patents and copyrights.
 - 2. Enhancements are acceptable; except where the enhancements become the primary reason for its performance and in such cases the product will be evaluated as a “value engineering” product.
- C. Product Construction:
 - 1. Assembly: Manufactured and assembled for all intents and purposes the same as specified product; without violating patents and copyrights.
 - 2. Size and Configuration: Similar to specified product.
- D. Performance Characteristics:
 - 1. Critical performance measures have been tested by same kind and number of tests as specified products. Critical performance measures to be those acceptable to Consultants.
 - 2. Tested performances are similar in results; as acceptable to Consultants.

- E. **Manufactured Characteristics:** Available range of manufactured characteristics, e.g., color, texture, pattern, finish, sizes, configuration, customizability, etc., are not less than the specified product or will not restrict the original design intent in any way if the product is acceptable to Consultants.
- F. **Manufacturer Support:** Not less than required for specified product, e.g., financial capability, technical support, standard and special warranties offered, etc.

2.02 PRODUCTS THAT QUALIFY AS VALUE ENGINEERING PRODUCTS:

- A. **General:** Those that do not qualify as “Substitutions.”

PART 3 - EXECUTION

3.01 PROPOSAL PROCESS:

- A. **Proposals Offered During Bidding Period:**
 - 1. **Submission:** In accordance with the “Instructions to Bidders” and its supplements.
 - 2. **Acceptable Proposals:** Consultants to send written notification to each eligible Bidder of acceptance of the proposal with copies of the accepted proposal. Eligible Bidders may incorporate the substitutions in accordance with the accepted proposal.
 - 3. **Proposals Not Accepted:** Consultants to send each proposal that are not accepted back to the Bidder who originated the proposal. Consultants to have marked the proposal “Not Accepted”. Bidder may resubmit proposal, where specified time period allowed for review of proposals is not exceeded and where resubmission is acceptable to Consultants. Refer to Consultant’s “Comments” for additional requirements suggested for compliance, if any.
- B. **Post Bidding Period Proposals:**
 - 1. **Submission:** As directed by Consultants.
 - 2. **Acceptable Proposals:**
 - a. **Preliminary Acceptance:** Where marked “Acceptable, Preliminary” on form, indicates that further information may be required before a decision is made. Comply with “Comments” on form and where not indicated a complete proposal conforming to new requirements. Adjust costs is required. Use of proposed products are not allowed until “Acceptable, Final” is marked on the proposal.
 - b. **Final Acceptance:** Where marked “Acceptable, Final” on form, indicate acceptance of proposals and may become basis of Contract upon execution of forms required changes in Work.

3. Proposals Not Accepted: Where marked “Not Accepted”, resubmission may be allowed when Consultants indicate “Resubmission Acceptable” and resubmission will be denied when Consultants indicates “Resubmission Denied” on form. Where remarks are indicated under “Comments”, comply with any further requests which may be indicated.

3.02 INCORPORATION:

- A. Incorporation of Proposals: Coordinate work with other affected Installers of other Work. Comply in strict accordance with accepted proposal, which should be in strict conformance Product Manufacturer’s Project specific requirements.

END OF SECTION

SECTION 01735 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Cutting and patching requirements.
- B. Related Sections.
 - 1. Division 1 Sections.
 - 2. Section 01540 - QUALITY CONTROL.

1.02 DEFINITIONS:

- A. "Cutting and Patching": The phrase as used herein is defined as follows.
 - 1. Cutting and patching includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required restoring surface to their original condition.
 - 2. Cutting and patching is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.
 - 3. Cutting and patching performed during the manufacture of products, or during the install fasteners and similar operations are also not considered to be "cutting and patching".
 - 4. "Demolition" is recognized as related but separate category of work, which may or may not require cutting and patching as defined in this Section. Cutting and patching work required by demolition to comply with requirements of this Specification Section.

1.03 SUBMITTALS:

- A. Product Data: Submit Product Data on materials to be used in for patching work.
- B. Quality Assurance Submittals: Refer to "Quality Assurance" paragraph herein.

1.04 QUALITY ASSURANCE:

- A. Scheduled Methods: Submit methods for cutting and patching of work prior to execution of any cutting and patching work.
- B. Alternate Methods: Consultants will entertain alternate methods where accomplishing original intent of cutting and patching work. Submit

recommended methods for review. Do not institute alternate methods, unless successful review is secured from Consultants.

- C. Structural Work:
 - 1. General: Do not cut and patch any work in a manner that would result in a reduction of its load-carrying capacity or of its load-deflection ratio.
 - 2. Reinforced Concrete Structures: Do not damage any reinforcing components part of reinforced concrete structures, by drilling, coring, cutting, or other similar operations; including, but not limited for, penetrations, expansion bolts, dowels, etc. Locate reinforcing components with pachometer or other reliable detecting device prior to initiating any potentially damaging operations. Where existing reinforcing components prevent work to be accomplished, notify and secure direction from Consultants prior to conducting any operation.

- D. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life, or decreased safety.

- E. Matching of Exposed-to-View Surfaces:
 - 1. Intent: Cutting and patching work not evident in exposed, final finished, in-place work.
 - 2. Approvals: Consultants to approve following conditions, prior to execution of cutting and patching work.
 - a. Work scheduled with other concealing type finishes, cannot be fully concealed after final finishes are applied, e.g. telegraphing through paint coatings.
 - b. Work not scheduled with any concealing finishes cannot be blended in manner with existing surfaces so that patching is not readily evident to Consultants.
 - 3. Mockups: Consultants approval to be achieved by mockup in existing work in areas selected by Consultants.

- F. Concealed Surfaces: Concealed work may be less rigorous in finishing and final appearance but should be finished flush with adjacent surface with some attempt to smoothly transition the patching materials with adjacent surface.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. General: Except as otherwise indicated or as directed by the Consultants, use materials for patching that are identical in appearance to

existing materials (unless otherwise acceptable to Consultants), result in equal or better performance characteristics than material being patched, and attain bond strengths acceptable to Consultants.

PART 3 - EXECUTION

3.01 PERFORMANCE:

- A. Personnel: Employ skilled workmen to perform cutting and patching work.
- B. Cutting: Cut the work using least destructive but effective methods. In general, it is intended that finish cut surfaces to be clean, straight, and smooth. Method of cutting should minimize damage to adjacent finished surfaces.
- C. Patching: Patch and blend work with adjacent surfaces to obscure evidence of work to greatest extent possible by methods approved by Consultants.

END OF SECTION

SECTION 01740 - CLEANING

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Cleaning during construction.
 - 2. Final Project cleaning.
 - 3. Waste control.
- B. Related Sections.
 - 1. Division 1 Sections in general.
 - 2. Section 01500 - TEMPORARY FACILITIES & CONTROLS.

1.02 DEFINITIONS:

- A. Clean:
 - 1. Relative to Installed Products: Products cleaned in accordance with Manufacturer's recommended procedures, cleaning agents and equipment to remove trash, dust, dirt, stains, and mars from product and adjacent surfaces and areas. Polishing materials are included for materials typically polished.
 - 2. Relative to General Construction Trash and Debris: Verify intent form Owner's Construction Manager and include impacts in Bid.

1.03 SUBMITTALS:

- A. Product Data: If specified or requested by Consultants, submit cleaning data.
- B. Closeout Submittals: Refer to "Maintenance" paragraphs herein.

1.04 QUALITY ASSURANCE:

- A. Trash Removal: Refer to Section 01500 - TEMPORARY FACILITIES & CONTROLS.
- B. General Construction Trash and Debris:
 - 1. Responsibility: Contractor is responsible for informing all Entities prior to signing Contract for the Work, the expected level of cleanliness expected by the Construction Manager.
 - 2. Warning Notices: If required, no more than three written warning notices will be issued by Construction Manager for removal of ignored trash and debris; depending upon degree of non-compliance, potential hazard to Project, and severity of non-complying conditions, e.g. odors, quantities, appearance, etc. When

reasonable written warning notices are unheeded, Owner at his discretion may remove any trash and debris for which reasonable written warnings have been given and costs for removal deducted from Contractor's payments.

1.05 MAINTENANCE:

- A. Maintenance Instructions: For primary materials in each Specification Section 2-16, submit each Manufacturer's standard published maintenance instructions, whether specified or not. Instructions to include recommended material, equipment, schedules, and procedures.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. General: Use only cleaning materials, methods, and equipment recommended by the Manufacturer of the product to be cleaned; specifically for types of cleaning required. Materials utilized should not be detrimental to the original characteristics of the cleaned product.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION:

- A. Premises: Clean premises daily.
- B. Surfaces, General: Responsible parties to clean surfaces contaminated by them. Remove as quickly as needed to prevent permanent damage and to prevent any deterioration to surfaces. Seek written approval of methods for removal of contaminants from surfaces installed by others.
- C. Existing Work: When work operations involves working with existing work, clean exposed, semi-exposed, and concealed components of dirt, marks, stains, etc., without damage and deterioration to such surfaces.
- D. Construction Trash and Debris: Remove trash offsite daily to prevent obstructions and hazard, e.g., fire hazards, and as required to keep the Project reasonably clean and neat in appearance.
- E. Hazardous Materials: Use in manner approved by Authorities. When not in use, contain in proper containers. Dispose of waste off Site in lawful manner.

3.02 AT TIME OF SUBSTANTIAL COMPLETION:

- A. Schedule cleaning so that work can be inspected in clean condition at all scheduled inspections.

3.03 AT TIME OF FINAL INSPECTION:

- A. Comply with same requirements of "Substantial Completion" Inspection.

END OF SECTION

SECTION 01770 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Administration requirements for Contract Closeout.
- B. Related Sections.
 - 1. Division 1 Sections, general.
 - 2. Section 01740 - CLEANSING.
 - 3. Section 01785 - PROJECT RECORD DOCUMENTS.
 - 4. Section 01820 - DEMONSTRATION & TRAINING.

1.02 SUBMITTALS:

- A. At Time of Request for Substantial Completion Inspection:
 - 1. Request for Inspection.
 - 2. Application for Payment.
 - 3. Lien waivers.
 - 4. List of incomplete Work.
 - 5. Final adjustment of accounts for change orders.
 - 6. Insurance change-over requirements.
 - 7. Final Authority releases for full use of project.
 - 8. Project Record Documents for review.
 - 9. Owner paid for additional materials and equipment.
- B. After Substantial Completion Inspection.
 - 1. Punch list, if any.
- C. At Time of Request for Final Inspection:
 - 1. Request for Final Inspection.
 - 2. Final Application for Payment.
 - 3. Consent of Surety for Final Payment: AIA Document G707.
 - 4. Final lien releases.
 - 5. Substantial Completion Punch List: Indicate 100% completion.
 - 6. Completed Project Record Documents.
- D. Other: Refer to each Specification Section.

1.03 QUALITY ASSURANCE:

- A. Number of Consultant's Inspections.
 - 1. Number: Consultants has scheduled only two (2) inspections each for Substantial Completion and Final Completion. Re-inspections

- beyond the scheduled inspections are considered additional inspections.
2. Cost for Additional Inspections: Pay for Consultant's reasonable cost including, but not necessarily limited to, Consultant's personal time at current billing rates, costs for transportation and lodging, if required, and meals.
- B. Punch List Records: Contractor to record and submit written record to Consultants. Revise as requested by Consultants.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PREPARATION-SYSTEMS TESTING:

- A. Owner Instruction: Complete systems testing and complete instructions of Owner's designated representatives prior to request for Substantial Completion inspection.
- B. Special Requirement-Video Taped Sessions: Refer to Section 01820 - DEMONSTRATION & TRAINING.

3.02 INSPECTIONS REQUIRED:

- A. Substantial Completion Inspection.
- B. Final Completion Inspection.

3.03 GENERAL INSPECTION PROCEDURE:

- A. Conduct inspection after successful completion of submissions and its acceptance by Consultants.
- B. Contractor to record punch list items, if any.
- C. Consultants to certify successful inspection or schedule additional inspections.

3.04 ADDITIONAL INSPECTIONS:

- A. The Work: Completion of outstanding work is to be completed expeditiously by Contractor without interruption and will full forces. Submit schedule of completion of each work.

- B. Procedure: Re-conduct inspections in accordance with “general procedure”; until successful review by Consultants achieved.

END OF SECTION

SECTION 01785 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Requirements for Project Record Documents.
- B. Related Sections.
 - 1. Division 1 Sections in general.
 - 2. Section 01770 - CLOSEOUT PROCEDURES.

1.02 DEFINITIONS:

- A. Record Documents: Contractor produced documents representing an accurate recording of the Work provided during the Contract Period; including work that varied from that indicated in the original Contract Documents. Documents include Record Contract Drawings, Record Contract Project Manuals, Record Support Data, and Operation & Maintenance Manuals.
- B. Record Contract Drawings: The primary blueprint Contract set of Drawings used to construct the Project and to which drawn changed information is recorded.
- C. Record Contract Project Manuals: The primary Project Manuals used to construct the Project and containing the specifications and other related written Contract data to which changed written information is recorded.
- D. Record Support Data: Consultants approved, drawn written, published Manufacturer's data and Shop Drawings, which are allowed for use as Record Documents; when standard recording methods can be shown not too be effective or not possible.
- E. Operation & Maintenance Manuals: Organized manuals containing following primary data:
 - 1. Historical data as specified herein.
 - 2. Manufacturer's published Product and related data of all primary products from each Specification Section; including warranties.
 - 3. Operation and maintenance data required for mechanical and electrical work
- F. As-Built Documents: Contractor produced Drawings, required during course of the Work, representing an accurate recording of built structures, and used where Contractor requires clarification with regard to Consultant's intent for subsequent work affecting the drawn conditions.

This is not the “historical” definition of this word and should not be construed as such.

1.03 SUBMITTALS:

- A. Record Documents:
 - 1. Record Contract Drawings: One (1) bound record set.
 - 2. Record Project Manuals: One (1) bound record set.
 - 3. Support Data: One (1) bound record set, if any.
 - 4. Operation & Maintenance Manuals: One (1) bound record set.
 - 5. Other:
 - a. Record progress photos as specified in Section 01310 – PROJECT MANAGEMENT AND COORDINATION.
 - b. Final site survey as specified in Division 1.
 - c. Audio-video recording of Owner instruction as specified in Section 01820 – DEMONSTRATION & TRAINING.
- B. As-Built Documents: One (1) set; each time required.

1.04 QUALITY ASSURANCE:

- A. Record Updating:
 - 1. Up-to-Date Records: Maintain up-to-date documents, Record data within five (5) working days after installation of each specific portion of Work requiring recording, except no record data to be recorded after concealment of each work.
 - 2. Out-of-Date Records: If the Records are not being kept reasonably up to date, the Consultants may withhold payment requests until Record Documents are satisfactorily updated.
- B. Operation & Maintenance Manuals: Organization and included materials to be approved by Consultants,

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 RECORD DOCUMENTS - GENERAL:

- A. Maintenance of Documents: Maintain documents in clean, dry and undamaged condition. Use documents only as necessary to record required information. Do not use as working Construction Documents.
- B. Availability: Make documents available to the Consultants upon request.
- C. Time of Submission: Refer to Section 01770 – CLOSEOUT PROCEDURES.

- D. Labeling:
 - 1. Stamp: Secure rubber stamp with words, "RECORD DOCUMENTS", in bold capital letters, approximately 1" high.
 - 2. Document Stamping: Stamp document in permanent red ink as follows.
 - a. Contract Drawings: Each page.
 - b. Manual Inserted Book Bound Information: Front cover.
 - c. Manual Inserted Stapled and Inserted Individual Pages: Each page.

3.02 RECORD DOCUMENTS – RECORD CONTRACT DRAWINGS, RECORD CONTRACT PROJECT MANUALS, & RECORD SUPPORTING DOCUMENTS:

- A. Information Required for Record Drawings and Project Manuals:
 - 1. General: Record installed work ("field conditions") which varies significantly from the work as originally indicated on Contract Document. Record concealed work which is referenced to exposed-to-view features.
 - 2. Contract Drawings: Record data to scale to clean set of blueprints; dedicated only for record purposes and not for any other purpose.
 - 3. Specification of Project Manual: Record changes to specifications as a result of actual installations.
- B. Record Supporting Documents:
 - 1. Option: Changes may be recorded to other documents only where the intended record date cannot be adequately recorded on Record Drawings or Record Project manual and if a supporting document significantly indicates the required information more clearly than the Drawing or Project Manual.
 - 2. Restriction: Minimize use of such documents and where used, such documents shall be acceptable to the Consultants, prior to its use.
 - 3. Recording Information: Reference such documents appropriately to the Drawing and Specifications. Draw and note changes where different than original drawn information. Such documents shall be compiled into logically organized and bound sets; in manner approved by Consultants.
- C. Method of Recording: Legibly mark with erasable red pencils or other contrasting colored pencils when more than one color may more clearly delineate the recorded information. Where to Contract Drawings, record information to same scale as drawings.

3.03 RECORD DOCUMENTS – OPERATING & MAINTENANCE MANUALS:

- A. Format – General:
 - 1. Binders: Assemble data in hard covered 3 ring, D-ring, binders with clear plastic pockets at front, back, & spine. Provide number of binders as required for each set to comfortably house enclosed data.

2. Cover Sheet: Insert cover sheet, for front and spine, with Project and other information as required by Consultants. Data to be computer generated text and graphics. Where more than one volume submitted, indicate "volume of volumes" applicable to each volume in set provided.
 3. Indexed Data: Index groups of related data. Provide type written identification on each index tab.
 4. Electronic format: Provide reproducible, non-secured Portable Document Format (PDF).
- B. Format – Data Groups: Group data in following broad categories and order. Data within each group to be also logically organized; as acceptable to Consultants.
1. Table of Contents: Detailed listing of contents of each manual.
 2. Contractor's Project Warranty: Original executed warranty, warranting all year from date certified for Substantial Completion.
 3. Contractor Document List:
 - a. List of all Record Drawings.
 - b. List of Sections in Record Project Manual.
 - c. List of Supporting Record Data, if any.
 4. Permits: Signed copies of Authority required permits.
 5. Division 2 – 16 Specification Sections: For each Project Manual listed Specification Section, included following in manuals.
 - a. Intent: Provided information on primary installed products of each information that Owner knows exactly which materials were installed in the Project.
 - b. Entity Documentation: List the Manufacturer, Installer, and Supplier Company Name, Project contact, full address, phone/fax/e-mail number.
 - c. Product Data: Primary published date. All need not be provided.
 - d. Maintenance Data: Manufacturer's standard published data on cleaning materials, recommended equipment, restrictions, etc., as typically published by Manufacturer for each product.
 - e. Standard Warrantees: Insert all standard warrantees available from each Manufacturer; applicable to each product. Execute in behalf of Owner, if execution required by Manufacturer. Submit executed warrantees.
 - f. Special Warrantees: Insert executed, special warrantees, when required for each product.
 - g. User Manuals: If any, for product, insert with related literature for product.
 - h. Life Safety, Tested, Engineer Requirements: Include for each product, data affecting regulatory life safety issues, e.g. fire and structural performances, and any regulatory and specified testing and engineering required for performances.
 - i. Mechanical, Electrical, Electronic Equipment: Insert Services Centers, Maintenance Contracts, user manuals, diagrams, spare parts listing, resting-balancing-adjustment

report, final meter readings, start up performance reports, etc.,
as specified and as

3.04 AS-BUILT DOCUMENTS:

- A. Submittal: Under the conditions related to in the “Quality Assurance” paragraphs herein, submit Drawings; in a legible format, showing the existing conditions that would impact the work as drawn in the Contract Documents. The Drawings shall be in AutoCAD format, unless noted. All drawings shall be clean, neat, and legible with the dimensional information provided and the depiction shown can be correlated with the drawn information in the Contract Documents.
- B. Execution: The Consultants will issue such changes as necessary to conform the Work to his original intent and the Contractor shall proceed in accordance with the requirements indicated.

END OF SECTION

SECTION 01820 – DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section Includes:
 - 1. Administration requirements for demonstration and training.
- B. Related Sections.
 - 1. Division 1 Sections, general.
 - 2. Section 01770 - CLOSEOUT PROCEDURES.

1.02 SUBMITTALS:

- A. Training Materials: Submit appropriate materials for following.
 - 1. For each Owner's participant.
 - 2. Dedicated set of materials as part of Closeout submittals.
- B. Closeout Submittals:
 - 1. General: Refer to Section 01785 - PROJECT RECORD DOCUMENTS.
 - 2. System Manuals: Submit number in accordance with individual Specification Sections, but not less than two (2) complete hard copy set of published manuals and other published documents.
 - 3. DVD Disks and USB: Submit two (2) sets of DVD disks and USB flash drive with electronic PDF and MP4 video files required for manufacturer's demonstration and training session.

1.03 QUALITY ASSURANCE:

- A. Audio-Video Recording: Audio-video recording is not required for all Owner instruction, but is required for all primary product systems; including following.
 - 1. Mechanical related systems.
 - 2. Any system that is software monitored or driven.
 - 3. Other as may be specified.
- B. Training Instructors: Manufacturer's instructors to be technically trained and totally familiar with all aspects of each specific Project product or system for which training required.
- C. Classrooms: Where proper training and instruction is specified or required to be performed in classroom type facilities by Manufacturer, comply with following.

1. Availability of Facilities:
 - a. Owner's Facilities: Verify availability and suitability of Owner's facilities; prior to Bid.
 2. Provide the following, at a minimum.
 - a. Equipment: If not available at the Facility, bring in or rent appropriate equipment, e.g., audio and video equipment, projection screens, marker boards, etc.
 - b. Training Materials: As required for proper instruction of participants, e.g. usual published training handouts, training videos, writing pads, pens, etc.
- D. Training Period:
1. Length of Training: As specified; where not specified, verify prior to Bid and include impacts in Bid; otherwise adequacy of training period to be determined by Engineer based on Owner satisfaction and at no additional cost to Owner.
 2. Training Times: Arrange at Owner's convenience.
- E. Recording Conditions:
1. Manufacturer's standard prerecorded training video tapes or other video formats may be an option to field video recording of instruction; when it can be shown that video instruction is specific to Owner's system and of acceptable quality to Owner. Approval to be in writing.
 2. Regardless of Owner's decision, available prerecorded training video materials are to be submitted as part of Closeout Documents.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

- A. Video Recording Equipment:
1. Primary Recorder: DVD Camcorder; with following minimum capabilities.
 - a. Resolution: 640 x 480 minimum; digital video.
 - b. Image Format: Color; JPEG minimum.
 - c. Zoom: 10X minimum.
 - d. Audio: Dolby digital; with noise reduction technology.
- B. DVD Disks: DVD-R disks.
- C. Accessories: Following is optional; unless required by Manufacturer or required to ensure quality of recording session.
1. Tripod.
 2. Camcorder mounted lighting.
 3. Wireless microphones.
 4. Additional independent lighting.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. General: Ensure all conditions for instruction and audio-video recording are ready.

3.02 INSTRUCTION-GENERAL:

- A. Training Materials: Handout appropriate training materials before instruction begins.
- B. Lessons: Ensure that each participant adequately understands instructions being given. Confirm learning of participants by either or both tests and hands on demonstration of their abilities.
- C. Breaks: Instruction to include adequate breaks to allow participants a break from ongoing instruction.
- D. Question and Answer Period: Allow during instruction; when not considered disruptive to instruction and conclude at end of each instruction session to ensure than any outstanding questions can be answered.

3.03 PROJECT CLOSEOUT:

- A. Submittals: Submit required documents as part of Closeout submittals.

3.04 FOLLOW UP:

- A. Manufacturer Availability: After conclusion of each training, each Manufacturer's Technical and Local Representatives to be readily available to help Owner's personnel; until satisfactory understanding of operation of each system is attained.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15000 - GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS:

- A. As specified in Division 1 - GENERAL REQUIREMENTS of this specifications.
- B. These General Mechanical Requirements govern work specified under all sections of Division 15 - MECHANICAL.

1.02 GENERAL REQUIREMENTS:

- 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 Maluhia 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 one 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 Maluhia 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 SUBMITTALS:

- 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 22 inches by 34 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 Maluhia as covered by modifications. At the time of submission, the Contractor shall inform Maluhia 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 Maluhia 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 Maluhia. 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.
- F. Certificates of Conformance or Compliance: Submit all certificates applicable to all 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 Maluhia at the time of equipment delivery and prior to the commencement of equipment on-site installation.

Warranty shall cover all costs for parts, labor, associated travel, and expenses for a period of one 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 Maluhia documentation as evidence of the respective manufacturers' certification of all personnel responsible for installation, testing, and start-up of the equipment.

1.04 FIELD POSTED AS-BUILT DRAWINGS:

- A. Maintain and submit for all work as specified in Section 01019 - GENERAL SPECIFICATIONS.

1.05 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 International Building code, 2018 as amended by City and County of Honolulu, International Energy Conservation Code, 2018 as amended by the City and County of Honolulu, Uniform Plumbing Code, 2018 with local amendments, Uniform Fire code, NFPA 1 2018 with local amendments, Department of Health, Hawaii Administrative Rules, Title 11, Chapter 39, Air Conditioning and Ventilation, OSHA, and all other codes and standards referenced in these specifications. Where requirements differ in these codes and standards, the more stringent shall apply.

1.06 TRADE NAME:

- A. Mentioning of a trade name in the plans and specifications indicates that the manufacturer is acceptable to Maluhia. 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.

1.07 PERMITS AND INSPECTIONS:

- A. Applications for permits will be done by Maluhia. 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.

1.08 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 Maluhia, he shall make good any resultant damage or defect. All interpretations of Drawings and specifications shall be clarified by Maluhia.

1.09 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.

1.10 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.

1.11 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.

1.12 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.

1.13 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 MATERIALS:

- 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 2 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 SUBSTITUTIONS

- 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 ensure 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 CUTTING AND PATCHING:

- 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 PIPING IDENTIFICATION:

- A. Identification of all new pipe lines 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:
 1. Near each valve and branch connection.
 2. Wherever piping merges or disappears from view from the floor of the room in which it is installed.
 3. 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 2 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 3 days of being notified shall remove said materials from the premises and replace with approved material, at no cost to Maluhia.

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 POSTED OPERATING INSTRUCTION:

- A. Furnish approved operating instructions for each principal item of equipment for the use of the operation and maintenance personnel. Operating instruction shall be printed or engraved and shall be framed under glass or in approved laminated plastic and posted where directed by the Engineer. 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 and weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

3.10 INSTRUCTION TO MALUHIA 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 Maluhia 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.

3.11 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.

3.12 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.

3.13 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 Engineer.
- 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.

3.14 FINAL OBSERVATION:

- A. Final observation shall be requested by the Mechanical Contractor only after submittal of all required certificates. No final observation 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.

3.15 GUARANTEE:

- A. The Mechanical Contractor shall guarantee the installation for a period of one year after 30 consecutive days of trouble-free operation after the date of acceptance of the project by Maluhia 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.

3.16 ONE-YEAR GUARANTEE AND MAINTENANCE SERVICE CONTRACT:

- A. In addition to the Guaranty on materials and workmanship, the Installer shall submit 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 one year after 30 consecutive days of trouble-free operation after 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 Contractor. 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. Heat Pump 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: Contractor
 - 1 copy: DAGS Inspection Branch Engineer Files
 - 2 copies: User (Maluhia)
 - 2 copies: User's Facility Maintenance Agency
 - 1 copy: DAGS, Quality Control Branch
- 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. Water-Source Heat Pump:
 - 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) 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.
- 3) Lubricate and oil all fan and motor bearings and connections of dampers and vanes.
 - 4) Check all drives for wear; adjust belt tension. Replace belt as required.
 - 5) Operate equipment to check for proper operation, unusual noise and vibration; adjust or repair all equipment and controls as required; clean-up all equipment.
 - 6) Check time clock for proper operation and time settings.
 - 7) Certify performance of monthly services and that all discrepancies are reported and corrected.
 - 8) Check compressor oil level and refrigerant sight glass; add oil as needed and change filter/drier if moisture indicated.
 - 9) 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) 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 chilled water coils.
 - 4) Clean and adjust water valve; clean strainer (chilled water) and clean all fan wheels and interior and exterior of equipment housings.
 - 5) Secure all loose housing, seal leaks and touch-up paint after cleaning all rust.
 - 6) Check and calibrate all pneumatic and/or electric temperature controls.
 - 7) Certify performance of annual service and that all discrepancies are reported and corrected.
 - 8) Check compressor coupling alignment; lubricate or replace noisy bearings.
 - 9) Test compressor crankcase oil and replace if contaminated or submit oil test results. Clean or replace strainer and oil filter (open compressor).
 - 10) 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.

- 11) Check and clean all unit housing (inside and outside and components), seal leaks and remove rust from exterior components and touch-up paint.
 - 12) 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.
2. Standby and Lead-Lag Equipment (Pumps, Chillers, Cooling Towers, Etc.) and Time Clocks
 - a. The Contractor shall be responsible for the operational change-over of all standby and lead-lag equipment.
 - b. Monthly: Clean contacts, replace if necessary; check and adjust time setting as directed or required.
 - c. Certify that all discrepancies are reported and corrected.
 3. Valves and Condenser Water Lines, Equipment And Supports
 - a. The Contractor shall exercise all equipment shut-off valves annually for proper operation and tightness.
 - b. Wire brush, prime and paint rust from pipe, equipment and support surface to prevent further rusting.
 - c. Certify that all discrepancies are reported and corrected.
- F. Work Schedule:
- All maintenance work shall be performed between the hours of 9:00 a.m. to 5:00 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.
- The Contractor shall call Maluhia, phone number 497-9350 contact person Ronald Kurasaki, the next working day after being notified of the problem and report the status of repairs.
- 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 to Maluhia, attention: Ronald Kurasaki, 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.

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

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

3.17 OPERATION AND MAINTENANCE MANUAL:

A. Submit 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 manufacturers' 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

SERVICE MAINTENANCE REPORT

Date: SHEET NO.

Name of Service Personal:

Name of Facility and Location:

Date of Service Call:

Time In, Time Out at Site:

Person(s) Contacted:

Nature of Service Call - (Routine Maintenance or Emergency - Explain and Cost Break-down):

Equipment Readings and Maintenance Performed.

Remarks:

Operational Performance Tests:

Facility:

Date:

A/C Equipment Description and Information:

Qty	Tag	Equipment	Manufact	Model	Capacit	Chw or	Area	Locatio
*1	AHU	Air Handling	Carrier	39LD110	19 Tons	Chw	Library	Mech

*Sample

Remarks:

TEST DATA:

Chillers

Chilled Water Supply Temperature Tchws

Chilled Water Return Temperature Tchwr

Chilled Water Pump Discharge Pressure Pchwpd

Chilled Water Pump Suction Pressure Pchwps

Chilled Water Pump Static pressure Pchwpo

1	2

Compressors

Capacity Reduction

Full Load

75%

50%

25%

	1		2		3	
	RLA	Ref	RLA	Ref	RLA	Ref Press

Air Handling Units

Supply Air Temperature

Tsa

Return Air Temperature

Tra

Differential Air Pressure

Pd

Chilled Water Supply
 Temperature

Tchws

Chilled Water Return
 Temperature

Tchwr

Chilled Water Supply
 Pressure

Pchws

Chilled Water Return
 Pressure

sPchwr

	1	2	3	4	5

END OF SECTION

SECTION 15400 - PLUMBING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS:

- A. As previously specified.

1.02 SCOPE:

- A. Provide all labor, materials, equipment, services and related work to complete all plumbing work as shown within 5 feet of building line on the drawings and as specified. The work shall include the following:
 1. Removal of existing equipment and piping as indicated.
 2. Domestic hot and cold water piping and insulation.
 3. Connections to existing utilities and to owner furnished equipment.
 4. Disinfection of water supply lines.
 5. Testing and adjusting.
 6. Manufacturer's literature, shop drawings, and record drawings.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 15650 - HEAT PUMP SYSTEM.
- B. Line voltage wiring and conduit shall be performed as indicated on the electrical drawings.

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 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 the latest edition of the Uniform Plumbing Code 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. All plumbing fixtures and installation shall comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG).
 - d. Contractor shall obtain all permits, licenses, and certificates and pay for all fees.

2. Approval of Materials, Fixtures and Equipment: 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 Engineer. The schedule shall include catalogs, cuts, diagrams, drawings and such other descriptive data as may be required by the Engineer. 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.
3. 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.
 - a. 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.
 - b. 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, plumbing fixtures, equipment installation, elevation, invert, supports and foundations. Contractor shall check project drawings to avoid interferences with structural features and with work of other trades. No plumbing or piping work shall commence until plans have been reviewed by the Engineer. Any deviations from the shop drawings shall require prior approval by the Engineer.
 - c. 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. Reproducible as-builts shall be submitted to the Engineer after final acceptance.

1.05 WARRANTY AND CERTIFICATE:

- A. Warranty: All work and materials executed under this section shall be under warranty to be free from defects of materials and workmanship for one year from date of final acceptance of project as a whole by the Engineer. All work of repair and replacement required, including other

work damaged by this work's defects shall be performed without cost to the Owner.

- B. 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 MATERIALS:

- 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 K for buried underground piping and Type L for above ground piping, with ANSI B16.18 or B16.22 solder joint fittings.
 - 2. Exposed piping in finished areas shall be chromium plated brass pipe to the shut off or stop valve of each fixture.
- C. Water Valves: Bronze body, 125 lb. pressure rated valves, with solder joint ends. Nibco, Stockham, Crane, Lunkenheimer, or approved equal.
- D. Drainage System Specialties: Josam, Zurn, or Smith.
- E. Insulation: Pre-molded fiberglass pipe insulation, 1" thick, with all-service jacket, Owens-Corning 25 ASJ/SSL or approved equal. Provide nested insulation segments on fittings, valves, and flanges. Seal ends with vapor barrier mastic. Provide 0.016 inch thick aluminum jacket on piping exposed to the weather.
- F. 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 one-piece escutcheon plates of pressed steel with heavy coating of copper, nickel or chromium.
 - 4. Solder: 95-5 tin antimony or 10% silver solder.
 - 5. 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. Maximum spacing shall be as specified in SP-69.

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.
- G. Fire Stopping: Provide materials classified by UL to provide Fire Barrier equal to time rating of construction being penetrated. Provide asbestos-free materials that comply with applicable codes and have been tested in accordance with UL 1479 or ASTM E-814. 3M, Linkseal, Proset, or approved equal.

2.02 CHILLED WATER PUMP:

- A. Provide pump with capacities as indicated of a horizontal, in-line circulator type. Suitable for 250 degrees F operation at 175 psig working pressure. The pump must be single stage with flanged piping connections. The pump internals must be capable of being serviced without disturbing piping connections.
- B. Motors must meet scheduled horsepower, speed, voltage, and enclosure design. Motors must be drip proof, maintenance free, premium efficiency and meet NEMA MG 1 specifications.

PART 3 - EXECUTION

3.01 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. Galvanized sheet metal thimbles shall be provided where pipes pass through masonry, and cutting shall be avoided as much 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 Engineer, applicable certificates of inspections.

3.02 EXCAVATION, BACKFILL AND CONCRETE WORK:

- A. All excavation and backfill in connection with plumbing work and mechanical work shall be accomplished in accordance with the Plumbing Code. Excavation shall be provided under a separate section. Provide proper support along the pipe length where rocks are encountered, provide a minimum of 3" of backfill properly tamped for pipe. Coral shall not be used as backfill material for underground piping. Pipes shall be buried a minimum of 12" below grade.

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 CUTTING AND REPAIRING:

- 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 Owner. Written permission from the Engineer's representative 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 CHLORINATION:

- 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 Engineer. After a contact period of not less than 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 Engineer evidencing proper performance of sterilizations.

3.07 PIPE INSTALLATION:

- A. No pipe shall be closed up, furred in, buried or otherwise hidden until it has been inspected, tested and approved by the Engineer.
 - 1. Drain pipes shall be run with easy bends and long radius turns. Offsets shall be made at an angle of 45-degrees or less except where cleanouts are provided for shorter turns.
 - 2. All copper water piping joints shall be 95-5 soldered or 10% silver solder.
 - 3. 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.
 - 4. 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.
 - 5. 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.
 - 6. 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 2 layers of plastic tape.
 - 7. Provide dielectric unions where copper piping is connected to ferrous pipe.

3.08 PIPE INSULATION:

- A. Provide insulation on all hot water piping and chilled 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.

3.09 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. Sanitary shall be tested with a minimum of 10 feet of water for 15 minutes. Water piping shall be tested at 150 psi.

3.10 CLEAN UP:

- 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.

END OF SECTION

SECTION 15650 - HEAT PUMP SYSTEM

PART 1 - GENERAL

1.01 GENERAL CONDITIONS:

- A. As previously specified.

1.02 SCOPE:

- A. Provide a complete and operating heat pump system. "Provide" shall mean "Furnish and Install" when used herein. The heat pump system 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. Chilled water piping and accessories.
 - 2. Refrigerant piping and accessories.
 - 3. Insulation.
 - 4. Controls and control wiring.
 - 5. Corrosion protection.
 - 6. Adjusting, balancing and testing.
 - 7. Painting and finishing.
 - 8. Operating and maintenance instructions.
 - 9. Manufacturer's literature, shop drawings, record drawings.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 15400 - PLUMBING.
- B. Line voltage wiring and conduit is specified in the provided electrical drawings.

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 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 applicable ordinances and codes of the County of Honolulu 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 Engineer with reproducible drawings of each installation showing the exact location of all items which are different from the original drawings.

1.05 WARRANTY:

- A. All work in this Section shall be under warranty for a period of one year from the date of acceptance of the work as a whole by the Engineer. 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 one year after the final acceptance of the work as a whole.

PART 2 - PRODUCTS

2.01 MATERIALS:

- 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. Chilled Water Piping, and Accessories:
 - a. Pipe (4" and Smaller): Black steel, schedule 40, ASTM 120, or copper tubing, hard drawn, Type L, ASTM B88.
 - b. Fittings, Steel Pipe: Threaded for 2" and smaller, malleable iron, 125 pound class, ANSI B16.3. Threaded or welded for 2" and 3". Butt-weld type over 3", ANSI B16.9. Flanges for steel pipe shall be welded neck type, ANSI B16.5. Fittings shall be suitable for 125 psi cold water service.
 - c. Fittings, Copper Tubing: Cast brass or wrought copper, solder joint type, ANSI B16.18 or B16.22. Solder shall be Type 95/5 tin-antimony, ASTM B32.
 - d. Valves: Valves 2 inches and smaller shall be bronze body, with threaded connections for black steel pipe and soldered connections for copper tubing. Valves 2-1/2 and 3 inches shall be either bronze or cast iron with threaded, soldered, or flanged ends as required. Valves 4 inches and larger shall be iron body bronze mounted with flanged ends. Valves shall be designed for 125 psi or 150 psi service and 250^o F. Bronze gate valves and check valves shall conform to MSS SP-80. Cast iron gate valves shall conform to MSS SP-70.
 - 1) Butterfly valves shall be cast iron body, lug type, bubble-tight shut off, 150 pound class. Valves shall have corrosion resistant steel stems and corrosion resistant or bronze discs with molded elastomer seats. Operators shall be manual throttling handles with minimum seven locking positions.
 - 2) Check valves shall be cast iron body silent check type, wafer style, spring actuated, bronze trim, 125 pound class.
 - e. Strainers: Bronze body Y-pattern type with monel, stainless steel, or brass screen and blowoff connection fitted with a bronze hose bibb.

- f. Flexible Connections: Flexible neoprene connectors with control rods, Mason Type MFNC or approved equal.
 - g. Hangers: 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. Maximum spacing shall be as specified in SP-69.
 - h. Thermometers: Dial type, 3-1/2 inch diameter, chrome plated case, white face with black digits, 2-degree increments, 0 – 100 degree F range.
 - i. Pressure Gages: Bronze bourdon tube, 4-1/2 inch round face, scale 0-100 lbs. with bronze gage cocks.
 - j. Dielectric Unions: Provide dielectric unions between ferrous and non-ferrous piping.
 - k. Pressure Reducing Valve: Bronze body direct acting type, 150 psig maximum inlet pressure, and adjustable outlet pressure 10 to 50 psig. Watts Model U5B or approved equal.
 - l. Automatic flow control valves shall be factory set at indicated flows, designed to limit the rate of flow to the set value regardless of system pressure fluctuations. Valves shall have body tappings suitable for connecting instruments for verifying flow control performance. Valve bodies shall be brass or bronze with solder joint ends. Griswold, or approved equal. Provide with valve kit located outside of insulation, and hose fittings.
2. 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 degree 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 temperature range 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. 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.
 - l. 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.

3. 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. Chilled Water Piping:
 - 1) Cellular Glass: ASTM C552, Type II, Class 1 or 2, preformed.
 - 2) Flexible Unicellular: ASTM C534, Type 1.
 - 3) Polystyrene: Closed cell type, for outdoor use only.
 - 4) Mineral Fiber: ASTM C547 Class 1.
 - b. Refrigerant Suction Piping
 - 1) Flexible Unicellular: ASTM C534, Type 2.
 - 2) Polystyrene: Closed cell type, for outdoor use only.
 - c. 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.
 - d. 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.
 - 3) Cellular Glass, ASTM C 552, Type I.

2.02 EQUIPMENT:

- A. Water-Source Heat Pump: The heat pump water heater shall be packaged water source equipment, factory assembled and charged. The heat pump shall be suitable for heating potable water and have the capability of producing no less than 80C (176F) water, with heating capacity and C.O.P. as indicated on the drawings.
 1. Heat Pump Unit: Heat pump unit shall consist of compressors, condenser, evaporator, hot water circulating pump, piping, and

controls, factory piped and charged. The heat pump shall contain the following components, and features:

- a. Evaporator: Shall be single-wall brazed plate type constructed with stainless steel plates.
- b. Refrigerant: Refrigerant shall be R-134A.
- c. Expansion valve: Valves shall be specifically designed for heat pump use with field adjustable superheat feature. Expansion valve shall have MOP (Maximum Operating Pressure) type power element to effectively limit saturated suction temperature to 18C (65F).
- d. Compressor: Hermetic scroll type by Copeland Corp., suitable for high temperature operation with R513A refrigerant.
- e. Compressor Controls: Compressor controls/accessories must include the following:
 - 1) High and Low Refrigerant Pressure Safety Switches
 - 2) Indicator Lights for Power On, Hot Water Demand, High Pressure Fail, Low Pressure Fail
 - 3) Multi-function Phase Failure Relay
 - 4) Crankcase Heater and Relay
- f. Condenser: Stainless steel brazed plate vented double wall type. Single wall condenser construction shall not be allowed. UL Listed and suitable for high temperature operation with potable water.
- g. Refrigerant accessories:
 - 1) Filter-driers: Non-Replaceable Core Type
 - 2) Sight Glass: Moisture Indicating Type
- h. Anti-Short Cycle Control: Units shall be factory wired to allow a maximum of twelve compressor starts per hour to prevent compressor short cycling and allow time for suction and discharge pressures to equalize permitting the compressor to start in an unloaded condition.
- i. Hot Water Circulating Pumps: Shall be factory installed in-line all bronze or stainless steel body centrifugal type able to deliver rated flow against the external head shown on the drawings.
- j. Controls: The heat pump unit shall be factory wired for fully automatic operation. Safeties shall include compressor motor thermal overload protection, manual reset pressure stats, anti-cycling compressor relays, plus standard items recommended by the equipment manufacturer.
- k. Constant Leaving Water Temperature Control: The heat pump unit shall be factory equipped with electronic temperature control valve (e-TCV) which automatically maintains constant leaving water temperature regardless of entering water temperature. Leaving water temperature is set by the heat pump operator/user via a field adjustable electronic temperature controller.

2.03 CONTROLS:

- 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. Automatic Dampers: Opposed blade type, galvanized or aluminum, with flanged frame for duct mounting. Provide replaceable neoprene edge seals on the top, bottom, and sides of the frame and each blade.
- C. Automatic Valves: Sized by manufacturer for indicated flow and pressure drop, 125 psi rated, with close-off ratings exceeding maximum upstream pressure. Valves shall be 2-way or 3-way, modulating or 2 position, as indicated. Modulating valves shall have valve-stem indicators.
- D. Valve and Damper Operators: Sized by manufacturer for the conditions to be encountered, full-proportioning or 2-position type, with spring return to normal position. Electric and electronic modulating operators shall be hydraulic or oil-immersed gear-train type.
- E. Thermostats: Full proportioning or two-positioning type, as indicated. Thermostats shall respond to a change of not over 1-1/2 degree.
 - 1. Space thermostats shall have exposed 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.
- F. Humidistats: Space type, with accuracy of plus or minus 5 percent, set point range of 20 to 80 percent relative humidity.
- G. 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.
- H. Time Delay Relays: Pneumatic type, Agastat 7000 Series, or approved equal.
- I. 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.
- J. 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.

- K. 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 WATER PIPING INSTALLATION:

- A. Piping: Pipe and fitting installation shall conform to the requirements of ANSI B31.1. Pipe shall be cut accurately to measurements established at the jobsite, and worked into place without springing or forcing, completely clearing all windows, doors, and other openings. Pipe or tubing shall be cut square, shall have burrs removed by reaming, and shall be so installed as to permit free expansion and contraction. Changes in direction shall be made with fittings. Horizontal mains shall be sloped to drain not less than 1 inch in 40 feet. Reducing fittings shall be used for changes in pipe sizes. Open ends of pipelines and equipment shall be capped or plugged during installation to keep foreign materials out of the systems. Connections to equipment shall be made with malleable iron unions for steel pipe 2-1/2 inches or less in diameter, and with flanges for pipe 3 or more inches in diameter. Unions for copper pipe or tubing shall be brass or bronze. Connections between ferrous and copper piping shall be electrically isolated from each other with dielectric unions.
- B. Joints between sections of pipe and between pipe and fittings shall be threaded, flanged, or welded as specified.
 - 1. Threaded joints shall be made with tapered threads and made tight with a stiff mixture of graphite and oil or polytetrafluoroethylene tape or equivalent thread joint compound or material, applied to the male threads only.
 - 2. Joints in copper tubing shall be cut square, ends shall be reamed, and all filings and dust wiped from interior of pipe. Joints shall be soldered with solder applied and drawn through the full fitting length. Excess solder shall be wiped from joint before solder hardens.
 - 3. Welded joints shall be fusion-welded unless otherwise required. Beveling, alignment, heat treatment, and inspection of weld shall conform to ANSI B31.1. Weld defects shall be removed and repairs made to the weld, or the weld joints shall be entirely removed and rewelded. Electrodes shall be stored and dried in accordance with AWS D1.1 or as recommended by the manufacturer. Electrodes that have been wetted or that have lost any of their coating shall not be used.
- C. Flanges and unions shall be faced true. Flanges shall be provided with 1/16-inch gasket and made square and tight.

- D. Dielectric unions shall have metal connections on both ends threaded to match adjacent piping. Metal parts of dielectric unions shall be separate with nylon insulator to prevent current flow between dissimilar metals.
- E. Hangers and Supports: Hangers used for support of piping of 2 inches nominal pipe size and larger shall be fabricated to permit adequate adjustment after erection while still supporting the load. Pipe guides and anchors shall be installed, as indicated, to keep pipes in accurate alignment, to direct the expansion movement, and to prevent buckling, swaying and undue strain.
- F. Pipe Penetrations Thru Walls: Pack annular space between pipe and wall with a fire seal of mineral wool or similar non-combustible material. Seal with silicone sealant or caulking.

3.03 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 caulking.

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 pre-cut insulation segments, same thickness as adjoining pipe.
 - 1. Pipe Insulation: Insulate all hot water, chilled water, and 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) Hot Water and Chilled Water Piping:
 - a) Cellular Glass and Polystyrene: 1-1/2" thick on pipes up to 3 inches; 2" thick on pipes over 3 inches.
 - b) Mineral Fiber (Fiber Glass) and Flexible Unicellular: 1" thick on pipes to 1 inch; 1-1/2" thick on pipes to 3 inches; 2" thick on pipes over 3 inches.
 - 2) Refrigerant Suction Piping and Condensate Drain Piping
 - a) Flexible Unicellular: 3/4" thick on pipes up to 2 inches and 1" thick on pipes over 2 inches.
 - b) Polystyrene: 1-1/2" thick on pipes up to 2 inches and 2" 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.

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.

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. Temporary bypass shall be provided for all water coils to prevent flushing water from passing through coils. 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:
 1. Refrigerant Piping: The system shall be subjected to a pneumatic test. 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.
2. Water Piping: After cleaning, water piping shall be hydrostatically tested at a pressure equal to 1-1/2 times the total system operating pressure for a period of time sufficient for inspection of every joint in the system and in no case less than 2 hours. No loss of pressure will be allowed. Leaks found during tests shall be repairing by tightening, rewelding joints, or replacing pipe or fittings. Concealed piping shall be tested in place before concealing.
- 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: Water piping systems shall be balanced to produce water quantities as indicated with all manual and automatic control valves open.
- 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. Balance:
 - 1) Coils: Size, face velocity in fpm; air temperature entering coil and air temperature leaving coil, wet-bulb and dry-bulb in degrees F.; water temperature entering coil and water temperature leaving coil, degrees F.
 - 2) Pumps: Size, type, pump speed in rpm, total head in feet of water, flow rate in gpm, and motor load in amperes.

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. All additional specification of apparatus provided on electrical plan.

3.07 PAINTING AND FINISHING:

- A. 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.
- B. 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 Owner's representative in the operation and maintenance of the system. These field instructions shall cover all the items contained in the bound instructions.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16010 - ELECTRICAL

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. The work covered by this section of the Specifications shall include furnishing all labor, materials, equipment and services to construct and install the complete electrical system shown on the accompanying Drawings and specified herein. This work shall include but is not necessarily limited to:
 - 1. Power systems, including panelboards, branch circuits, wiring devices and outlets.
 - 2. Power wiring for air conditioning, ventilation, plumbing, and other motorized or electrically-operated equipment including providing safety disconnect switches and the mounting of starters/controllers furnished by the mechanical or other system contractor.
 - 3. Wiring and connecting of all electrical equipment supplied for installation and use in this contract and not specifically listed as work by others, including the furnishing of disconnects for all motors.
 - 4. Test the completed installation.

1.02 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 of the Owner 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. Before bidding on this work, carefully examine each of the drawings and the site. By submitting a proposal of the work included in this contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.
 - 2. Standards:
 - a. The entire installation shall be made in strict accordance with the latest rules and regulations of the National Electrical Code, the National Board of Fire Underwriters, NFPA, ANSI, NEMA, and IPCEA, and the local ordinances, rules and regulations of the County and State.
 - b. The Electrical Contractor shall obtain and pay for the required permits as required by local laws and rules. All work shall be

inspected by the proper local authorities as it progresses. The Electrical Contractor shall pay all inspection fees and shall deliver certificates of completion and inspection to the Owner before final payment will be made. Cost of permit and inspection fees shall be included in the Electrical Contractor's quoted price for the installation.

3. Drawings:

- a. Contract Drawings: These specifications are accompanied by floor plans of the building and diagrammatic electrical layouts showing the approximate location of the outlets, switches, devices and other equipment. The wiring layouts and schedules show the approximate locations of all outlets, switch controls, service and feeder runs and other electrical apparatus. These locations are approximate and before installing, the Contractor shall study the accompanying plans and details and make the installation in most logical manner. Before the start of construction, any device or equipment may be relocated within 10'-0" before installation at the direction of the Owner, whose decision shall be final and at no additional cost to the project.
- b. Shop Drawings: Submit 6 copies of shop drawings, manufacturer's technical brochures and catalog cuts accompanied by a letter of transmittal from the Electrical Contractor. Each submittal shall be prepared with a summary sheet attached to each copy identifying all items included in the submittal. Submittals which fail to provide sufficient information for evaluation, will be returned to the Contractor for resubmittal without extensions of time or waiver. Shop drawings and/or catalog cuts, of the following equipment shall be submitted:
 - 1) Safety switches
 - 2) Manual motor starter(s)

Shop drawings and catalog cut submittals processed by the Owner shall not be construed to be Change Orders. The purpose of the submittals by the Contractor is to demonstrate to the Owner that the Contractor understands the design concept, that the Contractor demonstrates an understanding by indicating which equipment and material are intended to be furnished and installed, and by detailing the fabrication and installation methods intended for the use.

- c. As-Built 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. Above reference to deviations shall not be construed to allow deviations without prior approval. A

reproducible As-Built drawing set shall be submitted after final acceptance to Owner.

1.03 QUALITY ASSURANCE:

- A. For actual fabrication, installation and testing of the work of this section, use only thoroughly trained and experienced workmen completely familiar with the items required and with manufacturers' recommended methods of installation. In acceptance or rejection of installed work, no allowance will be made for lack of skill on the part of the trades-persons.
- B. Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the installed work and materials of all other trades.

1.04 WARRANTY:

- A. All work and materials executed under this Section shall be under warranty to be free from defects of materials and workmanship for one year from date of final acceptance of project as a whole, except lamps, which shall be warranted for 50% of the rated life as published by the manufacturer. All repair and replacement work required, including other work damaged by this work's defects shall be performed without cost to the Owner. Should any equipment or material fail within this period, the Contractor shall replace or repair that item at no cost to the Owner for material and/or services, if such is due to faulty workmanship or quality of material furnished. The Contractor shall be responsible for all damages to any part of the premises caused by failure in the equipment furnished under this section for a period of one year after the final acceptance of the work as a whole.

PART 2 - PRODUCTS

2.01 GENERAL:

- A. All materials shall be new and of the best quality available in their respective kinds, free from all defects, comply with applicable provisions of recognized standards such as ASTM, ANSI, NEMA, UL and the NEC. Those items listed by the Underwriters' Laboratories shall bear the "UL" label of approval and shall be of the make and types specified for approval.
- B. Brand names and catalog numbers indicate standards of design and quality required. In case of obsolescence, supersedure, or error in catalog number, the associated description and intent implied by the application shall govern. Requests for substitutions shall comply with applicable sections. Substitute materials may be used if qualified by

written permission from the Owner prior to bidding. A listing of substitute materials together with qualifying data shall be submitted for approval prior to bidding.

Example:

<u>Item</u>	<u>Specified Manufacturer & Catalog Number</u>	<u>Substitute Manufacturer & Catalog Number</u>
Cable	Joe Doe - No. 3200	King - No. 3200

Failure to obtain approval of substitute materials prior to bidding shall mean that materials as specified shall be provided. Qualifying data shall include catalog data sheets, shop drawings, and specifications to show equality with the material specified herein and in drawings. The decision of the Owner shall govern as to what materials or equipment may be substituted for that specified. The burden of proof as to the equality of any proposed substitution shall be upon the Contractor.

2.02 MATERIALS:

A. Raceways:

1. Rigid Metal Conduit: Rigid steel, hot-dipped galvanized inside and outside, zinc-coated, round bore for use with threaded fittings, 3/4-inch minimum diameter, except as noted. Other sizes to conform to NEC requirements, based on THW wires. Install in accordance with NEC requirements.
2. Flexible Metallic Tubing: Flexible, galvanized steel used in conjunction with factory approved fittings. Install in accordance with NEC requirements.
3. Electrical Metallic Tubing (EMT): Zinc coated or galvanized, round bore, thin walled metal tubing, 1/2-inch minimum diameter. Install in accordance with NEC requirements.
4. Intermediate Metal Conduit: Steel conduit, zinc-coated inside and outside with additional silicone epoxy-ester lubricating coating inside; 3/4" minimum diameter. Install in accordance with NEC requirements.
5. Aluminum conduits are not allowed.

B. Wires:

1. Conductors shall be copper, 600 volts, No. 12 AWG minimum. Conductors No. 10 and smaller shall be solid or stranded. Copper conductors No. 8 and larger, 7 or 19 strands, concentric. All conductors No. 6 and smaller shall be NEC Type TW, XHHW, THHN/THWN, or THW. All conductors No. 4 and larger shall be NEC Type XHHW or THWN. Fixture wiring shall be NEC Type RHH or THHN/THWN, suitable for the applicable operating temperature. Exterior underground conductors shall be Type XHHW or RHW.
2. Color Coding: Provide for service, feeder, branch, control, and signaling circuit conductors. Conductors to be color coded

throughout the project with the same color applying to the same phase throughout.

Color codes are as follows for the 208/120 volt, 3 phase, 4 wire system:

A - phase	black
B - phase	red
C - phase	blue
Neutral	white; except where neutrals of more than one system are installed in the same raceway or box, other neutrals shall be white with colored (not green) stripe
Equipment Ground	green
Isolated Ground	green with yellow stripe

- C. Disconnect Switch: Heavy duty fusible or heavy duty non-fusible safety switch shall be horsepower rated. When for use with fuses, conventional or of current limiting type, blades shall be rejection type. Enclosures shall have the provision for padlocking. Provide NEMA 1 enclosure for interior locations and NEMA 4X stainless steel for exterior locations.
- D. Circuit Breakers: Individual breakers shall be molded plastic case, with toggle operated mechanism and thermal-magnetic overload trips. Interchangeable trip shall be provided when available. Toggle positions "ON", "TRIPPED" and "OFF", engraved on body of toggle. Enclosed in NEMA style steel box ratings as indicated on drawings. Boxes shall be NEMA 1 for interior locations and NEMA 4X stainless steel for exterior locations.
- E. Nameplates: Nameplates for identification or instruction on equipment enclosures shall be engraved laminated phenolic plastic, screw mounted. Plates shall be 3 layered, black-white-black. Plates shall be engraved to show 3/8" high engraved commercial single stroke gothic white letters on black background. Nameplate all feeder breakers, switches, panels, cabinets and large junction boxes.

Breakers and Switches:	By panels or loads served
Panels:	By designation, voltages, phase & wires
Cabinets:	By use (such as telephone, TV, etc.)
Boxes:	By use and voltages

- F. Pullboxes: Pullboxes shall be provided where required by the NEC or Utility Company requirements. Boxes shall be code gauge steel with screw cover and NEMA 1 construction when installed indoors and NEMA 4X Stainless Steel in locations exposed to rain.

- G. Enclosures and Cabinets: Enclosures and cabinets for panelboards, breakers, and switches shall be fabricated from galvanized steel, prime painted and enamel finished according to NEMA specifications.
- H. Outlet Boxes: Outlet boxes shall be of size and type best suited to particular use or location, but in all cases shall be of sufficient size to contain, without crowding, all conductor and connections which may be required in any outlet box. Install in accordance with NEC requirements.
 - 1. Concealed boxes shall be pressed from NEC gauge steel; galvanized 4" square x 1-1/2" deep minimum. Boxes in interior locations shall be code gauge galvanized steel, not less than 14 gauge, not less than minimum size required by Code. Pressed galvanized steel boxes: In ceilings and dry walls, 4" square by 1-1/2" deep minimum. For mounting of single device such as a switch or receptacle, 2" by 3" by 1-1/2" deep minimum.
 - 2. Exterior mounted boxes and boxes otherwise exposed to the weather, recessed boxes, including lighting outlets, on exterior surfaces, shall be galvanized cast metal or alloyed aluminum with threaded hubs for conduit connections. Aluminum boxes shall be prime painted and enamel finished. Boxes for exterior locations shall be provided with gasketed covers and threaded hubs. In exposed and wet locations, 4" square by 1-1/2" deep with threaded hubs, prime painted, gasketed covers.
- I. Devices: Approved equivalent products manufactured by Arrow-Hart, Bryant, Cooper, Hubbell, Leviton, Pass & Seymour, Eaton.
 - 1. Manual Motor Starter: NEMA ICS 2, AC general-purpose Class A manually operated, full voltage controller with horsepower rated overload element, red pilot light, NO/NC auxiliary contacts and push button operator.
- J. Hardware, Supports, Backing, Etc.: All hardware, supports, backing, and other accessories necessary to install electrical equipment shall be provided. Wood materials shall be "wolmanized" treated against termites; iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be brass or bronze. All wood screws shall be brass or galvanized steel.
- K. Other Materials:
 - 1. Work incidental to the contract and necessary to complete the project, although not specifically referred to in the contract documents, shall be furnished and performed by the Contractor at no additional cost to the project. An example of such incidental work is the provision and installation of outlet, junction and pull boxes required for the installation of light fixtures, electrical devices and other similar equipment. All incidental work shall be furnished and installed in accordance with the National Electrical Code.

2. All other materials not specifically described but required for a complete and operable electrical installation, shall be new, first quality of their respective kinds, and as selected by Contractor subject to approval by the Owner.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP:

- A. Perform all work in accordance with the equipment manufacturer's requirements, National Electrical Code, and applicable NFPA standards. Install equipment and materials in a workmanlike manner conforming to recognized national standards.
- B. Construction Methods:
 1. Comply with local ordinances and regulations of the County. Workmanship subject to approval of the Owner, who shall be afforded every opportunity to determine skill and competency. Concealed work may be required to be re-opened at random during formal inspection by the Owner without additional charge to the Project.
 2. Construction shall conform to construction practices as recommended by American Electricians Handbook by Croft (latest edition) Edison Electric Institute, National Electrical Code, National Electrical Safety Code and applicable instructions of manufacturers of equipment and materials supplied for project.

3.02 SURFACE CONDITIONS:

- A. Inspection: Prior to work of this section, carefully inspect installed work of other trades and verify that all such work is complete to point where this installation may properly commence.
- B. Discrepancies: In event of discrepancy, immediately notify the Owner. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.03 PREPARATION:

- A. Coordination: Coordinate installation of electrical items with schedules for work of other trades to prevent unnecessary delays in overall progress of work. Where electrical items are shown in conflict with locations of structural members and mechanical or other equipment, furnish and install required supports and wiring to clear encroachments.
- B. Accuracy of Data: The data indicated on drawings and in specifications are as exact as could be secured during the design period but their

absolute accuracy is not guaranteed. Exact locations, distances, levels and other conditions will be governed by job decisions of the Owner.

3.04 INSTALLATION OF RACEWAYS AND FITTINGS:

- A. All conduits within the building line shall be rigid steel conduits or electrical metallic tubing. Electrical metallic tubing may be used in dry locations above the floor line. All exterior conduits or conduits otherwise exposed to the weather shall be rigid steel conduits.
- B. Conduits shall be of ample size to allow drawing in or removing of wires and cables without undue strain and suitable bushings shall be installed on each end of every run of conduit where wires are installed.
- C. Conduit system shall be continuous from outlet to outlet or fitting to fitting so that electrical continuity is obtained between all conduits of the system.
- D. Cut raceways square, and ream inner edges. Adjoining lengths shall butt together evenly in couplings to provide passage for installing conductors. Factory threads shall be cleaned with die before installation of conduit. Use of running threads not permitted. Where conduits cannot be joined by standard threaded couplings, approved watertight conduit unions shall be used.
- E. Bends, offsets, and crossing of conduits shall be avoided wherever possible. When necessary, make bends and offsets with hickey or conduit bending machine. Do not use vise or pipe tee. Flattened or crushed conduit are not acceptable. Bends shall be made so that interior cross-sectional area will not be reduced. Radius of curve of inner edge of field bend shall be not less than 10 times internal diameter of raceway.
- F. Cap raceways during construction with plastic or metal-capped bushings to prevent entrance of dirt or moisture. Swab all raceways out and dry before wires or cables are pulled in.
- G. Mount raceways free from other pipes, valves, or mechanical equipment. Keep all conduits at least 6" away from the outer insulation covering on hot water pipes and 18" away from kitchen exhaust ducts.
- H. Fish wires, cords, strings, chains or the like shall not be placed or inserted in the conduit system during installation of the conduits.
- I. After conduit system has been installed, empty conduits shall be left with a nylon drag wire or pull string.
- J. Install insulating bushings and 2 locknuts on each end of every run of metal conduit at enclosures and boxes. Provide grounding bushings as required to connect conduits to service ground, per the NEC.

- K. Run exposed raceways parallel with or at right angles to structural or architectural elements.
- L. Securely fasten raceways with galvanized conduit straps with screws or bolts and spaced as allowed per NEC, with approved beam clamps, or approved single or gang conduit hangers spaced as allowed per NEC, and as conditions require. Vertical runs shall be supported at intervals as specified in NEC, by approved clamp hangers. Support raceways from the building structure. Do not support raceways from or on mechanical pipes, ducts or ceiling suspension wires. Plastic tie-wraps are not allowed for securing or supporting of electrical conduit.
- M. Conduit runs with more than 360 degrees (4-90s) of bends require pullboxes per NEC.

3.05 INSTALLATION OF CONDUCTORS:

- A. Except for cables and wires otherwise called for, install all conductors in conduit, wireway or cable tray.
- B. Color Coding: Wires shall be color-coded in accordance with the requirements of this specification and the NEC.
- C. Tag all feeders for identification.
- D. Splicing:
 - 1. Wires shall be formed neatly in enclosures and boxes. Conductors, #10 and smaller shall be twisted and made secure with wirenuts suitable for the purpose. Splice conductors #8 through #4/0 with high pressure compression (indent) copper sleeve connectors. Do not use bolt-on connectors.
 - 2. Insulate all splices with a minimum of two half-lapped layers of vinyl-plastic electrical tape where insulation is required.
 - 3. Splice insulation shall be 200% in thickness of original wire insulation and of same electrical and mechanical characteristics.
- E. Lubricants: Chemically neutral to insulation and sheath. Apply liberally during pulling. Other means of lubricating shall be allowed with written approval of Owner prior to commencing with the cable pulling work.
- F. Pulling Conductors: Mechanical means for pulling to be torque limiting type and not to be used for No. 2 AWG and smaller wires. Pulling tensions shall not exceed manufacturer's recommendations. Form neatly in enclosure for minimum of cross-overs.

3.06 INSTALLATION OF OUTLET BOXES:

- A. Provide outlet boxes to suit conditions encountered. Provide outlet boxes with extension or raised rings of such depth that metal will be flush with surrounding surfaces of opening. When 2 or more switches are installed at single location, mount in gang box under single device plate. Close all unused knockouts and hubs.

3.07 GROUNDING:

- A. All metallic enclosures, raceways, and electrical equipment shall be grounded according to the requirements of the National Electrical Code.
- B. Motors, metallic enclosures, raceways and electrical equipment shall be grounded according to the requirements of the National Electrical Code. Ground connection to equipment, raceways, motors, grounding type receptacles and other metallic parts directly exposed to ungrounded electric conductors shall be made by continuous metal raceways or insulated, green copper conductor sized in accordance with the NEC.
 - 1. All stand alone grounding wire runs within buildings shall be in PVC conduits. Otherwise, all ground wires shall be run together with the circuit conductors.

3.08 DRY TYPE TRANSFORMER INSTALLATION:

- A. Install dry type transformers on external vibration isolation pads at points of support. Provide minimum of 18" of flexible conduit for wiring connections to isolate vibrations from the structure of the building. Provide ventilation clearances from adjacent surfaces in accordance with the manufacturer's recommendation but not less than 6" clear.

3.09 EQUIPMENT CONNECTIONS:

- A. Connect all electrically energized equipment and appliances. Make power connections to motors with short section of flexible conduit. Provide disconnect switches for all motorized equipment if none is furnished with the equipment as supplied by other trades.

3.10 MISCELLANEOUS DETAILS:

- A. Cut, core and patch as required to install electrical system. Repair any surface damaged or marred by notching, coring or any other process necessary for installation of electrical work. Cutting, repairs and refinishing shall be subject to the approval of the Owner. Need for remedial work determined by the Owner as attributable to poor coordination and workmanship shall be cause for reconstruction to the satisfaction of the Owner at no cost to the Project.

3.11 FINISHING:

- A. Patch, repair and restore all structural and architectural elements cut or drilled for installation of electrical system. Drilling, cutting, patching, repairing and restoring shall be finished by suitable trades subject to approval of the Owner.
- B. Attach electrical equipment to wood by wood screws and attach to concrete by embedded or expansion inserts and bolts. Powder actuated fasteners shall not be used on precast concrete. Do not use powder activated fasteners to attach enclosures and boxes to the building. Power-driven charge may be used in certain cases with prior approval only and anchor depth shall not exceed 3/4". Close unused knock-outs on boxes or enclosures with metal cap or closure.
- C. Wipe clean all exposed raceways and enclosures with rag and solvent. Priming, painting and finishing of unfinished raceways and enclosures shall conform to the Painting Section. Factory finished enclosures shall not be painted. Panelboard, disconnect switches, circuit breakers, junction boxes, and equipment shall be identified by engraved plastic nameplates affixed to the enclosure cover or door. Voltage and phase shall be indicated on nameplates for panelboards, disconnect switches and circuit breakers.
- D. Connect equipment, devices and luminaires utilizing circuit assignments as shown on the drawings. Provide neatly typewritten circuit directory for all panelboards in accordance with the NEC. Circuit directory shall indicate location of loads served by each circuit. For example: "LTS - PARKING, RECEP - OFFICE."
- E. An adhesive vinyl label shall be provided for all switches, receptacles, disconnect switches, motor starters and other miscellaneous devices requiring power. The label shall indicate the panelboard serving the device and the corresponding circuit assignment. Lettering shall be a minimum of 1/4" high. Utilize Brother "P-Touch" label maker or approved substitute.
- F. Mark all fire alarm wires with wire markers attached to conductors in all enclosures.

3.12 TESTING AND INSPECTIONS:

- A. After the installation has been completed, the Contractor shall conduct all tests required to secure approval of the installation from all agencies having jurisdiction and an operating test for Owner approval. All equipment shall be demonstrated to operate in accordance with the requirements of this section of the specifications. If so requested, any and all tests shall be performed in the presence of the Owner. All tests

shall be subject to the approval of the Owner. The Contractor shall furnish the necessary instruments and personnel required for the tests and the Owner will furnish the necessary electrical power.

1. All wiring shall be tested to ensure proper operation according to functions specified. All wiring systems shall test free from short circuits and grounds and shall be free from mechanical and electrical defects. All wiring systems shall show proper neutral connections.
2. Interior wiring installations, 600 volts and less, shall be tested for insulation resistance after the wiring is completed and ready for connection to equipment. With a 500V megger, measure and record the insulation resistance from phase to phase, and phase to neutral. If requested, the above tests shall be witnessed by the Owner and resistances of feeder cables shall be recorded and 4 copies submitted to the Owner.
3. Proper operation of all electrical devices shall be demonstrated at request of Owner during final inspection.

- B. The Contractor shall re-insulate/re-tape splices which have been bared for inspection.
- C. Wherever test or inspection reveals faulty equipment or installation, the Contractor shall take corrective action, at his own expense, repairing or replacing equipment and installation as directed and required to meet the intent of the drawings and specifications.
- D. If the Owner (or his representative) discovers any of the following errors, the Contractor, at his own expense, shall go over all similar portions of the entire job, taking the necessary or directed remedial action.
 1. Loose connections.
 2. Impaired clearance.
 3. Improper finish.
 4. Improper adjustment.

3.13 CLEAN UP:

- A. Upon completion of all installation, lamping and testing, thoroughly inspect all exposed portions of the electrical installation and completely remove all exposed labels, soil, markings and foreign material.

END OF SECTION

CHILLED WATER SOURCE HEAT PUMP UPGRADE

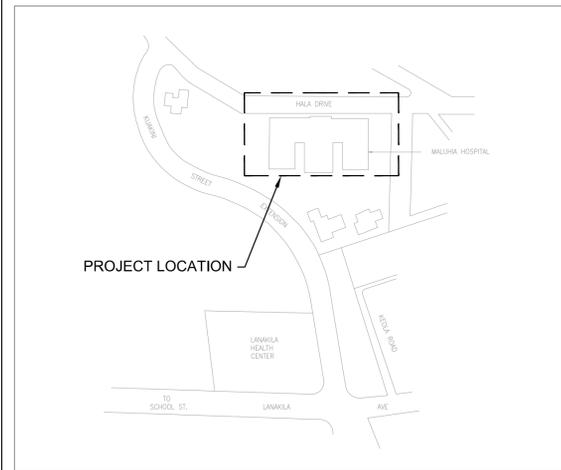
FOR
MALUHIA
1027 HALA DRIVE
HONOLULU, HAWAII 96817
T.M.K.: 1-6-009:004

MECHANICAL GENERAL NOTES:

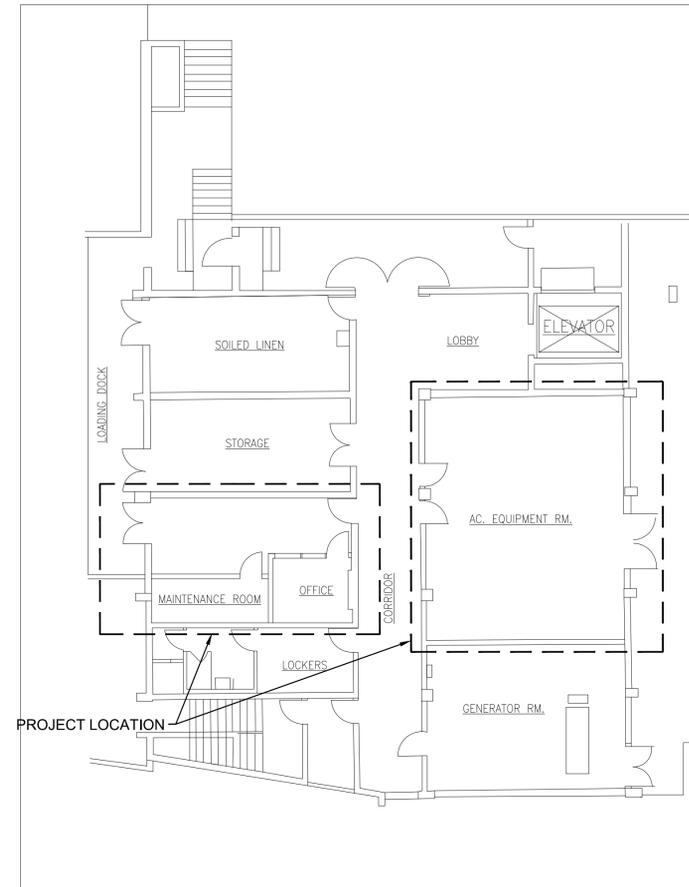
- THE CONTRACTOR SHALL NOTIFY AND COORDINATE WITH THE ENGINEER ANY MAJOR DEVIATIONS FROM THE PLANS DUE TO UNFORESEEN OR VARYING FIELD CONDITIONS.
- THE ENTIRE INSTALLATION SHALL COMPLY WITH ALL APPLICABLE REQUIREMENTS OF THE BUILDING CODE OF THE COUNTY OF HONOLULU, THE STATE HEALTH DEPARTMENT REGULATIONS, THE LATEST EDITION OF THE UNIFORM PLUMBING CODE, HAWAII STATE MODEL ENERGY CODE, NFPA 13, AND ALL AGENCIES HAVING JURISDICTION.
- THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL AND EQUIPMENT INCLUDING CUTTING AND PATCHING AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM.
- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, FEES, LICENSES AND INSPECTIONS.
- SUBMIT FOR REVIEW SIX COPIES OF MANUFACTURER'S LITERATURE ON ALL ITEMS FURNISHED FOR THIS WORK, INCLUDING OPERATION AND MAINTENANCE MANUALS.
- INSTALL ALL EQUIPMENT AND MATERIALS IN A FIRST CLASS MANNER CONFORMING TO RECOGNIZED COMMERCIAL STANDARDS.
- PAINT ALL EXPOSED MATERIALS TO MATCH ADJACENT SURFACES.
- CONTRACTOR SHALL PATCH AND FINISH ALL EXPOSED MATERIALS AND NEW CONSTRUCTION TO MATCH EXISTING SURFACES OR AS INDICATED.
- ALL PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS OR PARTITIONS SHALL BE PROPERLY FIRESTOPPED WITH APPROVED MATERIALS APPROPRIATE FOR THE PENETRATION TYPE.
- INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. PROVIDE ADEQUATE CLEARANCES FOR MAINTENANCE.
- PROVIDE CONTROL DEVICES AND CONTROL WIRING AS INDICATED.
- COORDINATE CONNECTIONS TO EQUIPMENT SUPPLIED BY OTHERS AND MAKE ALL CONNECTIONS FOR CW, HW, DRAIN AND WASTE PIPING.
- WARRANTY:
 - ALL WORK IN THIS SECTION SHALL BE UNDER WARRANTY FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF THE WORK AS A WHOLE BY THE ENGINEER. SHOULD ANY EQUIPMENT OR MATERIAL FAIL WITHIN THIS PERIOD, THE CONTRACTOR SHALL REPLACE/REPAIR THAT ITEM AT NO COST TO THE OWNER FOR MATERIAL AND/OR SERVICES, IF SUCH IS DUE TO FAULTY WORKMANSHIP OR QUALITY OF MATERIAL FURNISHED.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO ANY PART OF THE PREMISES CAUSED BY FAILURE IN THE EQUIPMENT UNDER THIS SECTION FOR A PERIOD ON ONE YEAR AFTER THE FINAL ACCEPTANCE OF THE WORK AS A WHOLE.

MECHANICAL INSTALLATION NOTES:

- THE CONTRACTOR SHALL PLUMB THE WATER PIPING AND STORAGE TANKS AS INDICATED IN THE APPROPRIATE DIAGRAMS IN ACCORDANCE WITH LOCAL AND NATIONAL CODES THAT APPLY.
- INSULATION: ALL HOT WATER AND CHILL WATER PIPING SHOULD BE INSULATED WITH FIBERGLASS AND PAPER SHEATHING.
- EXISTING HOT WATER STORAGE TANKS SHOULD HAVE ACCUMULATED SCALE DEPOSITS REMOVED PRIOR TO STARTING THE HEAT PUMP SYSTEM. USING EXISTING TANKS WITHOUT PROPER CLEANING CAN RESULT IN FOULING OF THE INTERNAL HEAT PUMP WATER PIPING AND MAY CAUSE DAMAGE TO TO THE WATER CIRCULATING PUMP.
- POSITION THE HEAT PUMP AT LEAST 24" TO ANY WALL.
- SET THE DIFFERENTIAL TEMPERATURE LARGE ENOUGH SO THAT THE HEAT PUMP RUNS FOR AT LEAST 10 MINUTES ONCE IT STARTS TO ALLOW PROPER OIL CIRCULATION AND EXPANSION VALVE MODULATION.
- ENSURE THAT THE WATER SYSTEM VALVE LINE-UP TO ENSURE THAT THE HEAT PUMP IS NOT ISOLATED FROM THE SYSTEM AND THAT THERE IS MAKE-UP WATER AVAILABLE.
- AT STARTUP, CHECK COMPRESSORS FOR PROPER ROTATION. ON STARTUP, THE DISCHARGE PRESSURE WILL RISE AND THE SUCTION PRESSURE FALL AS INDICATED BY THE INSTALLED SERVICE GAUGES.



LOCATION MAP
SCALE: NTS



SITE PLAN
SCALE: NTS



INDEX OF DRAWINGS

DWG NO.	SHEET NO.	DESCRIPTION
1	M-1	MECHANICAL LEGEND, SPECS, SITE PLAN
2	M-2	MECHANICAL REMOVAL AND NEW FLOOR PLANS
3	M-3	HEAT PUMP NEW PIPING DIAGRAM
4	M-4	HOT WATER SCHEMATIC
5	M-5	MECHANICAL DETAILS AND SCHEDULES
6	E-1	ELECTRICAL ABBREVIATIONS, POWER LEGEND, REFERENCE SYMBOLS, GENERAL NOTES
7	E-2	ELECTRICAL PLANS, ONE-LINE DIAGRAM

MECHANICAL LEGEND

SYMBOL	ABBRV.	DESCRIPTION
		CHECK VALVE
	CHWP	CHILLED WATER PUMP
	CHWR	CHILLED WATER RETURN
	CHWS	CHILLED WATER SUPPLY
	EXST	EXISTING
	GWH	GAS WATER HEATER
	HP	HEAT PUMP
	HWR	HOT WATER RETURN
	HWS	HOT WATER SUPPLY
	NTS	NOT TO SCALE
	POC	POINT OF CONNECTION
	POR	POINT OF REMOVAL
	ST	STORAGE TANK

PHASING NOTES:

- MAINTAIN EXISTING HOT WATER SYSTEM OPERATIONAL TO THE MAXIMUM EXTENT POSSIBLE. PRE-INSTALL NEW HEAT PUMP, CHILLED WATER PUMP, PIPING AND VALVES, AND ELECTRICAL EQUIPMENT AND WIRING. OUTAGES SHALL NOT EXCEED MORE THAN 2 HOURS.
- COORDINATE WITH MALUHIA FOR OUTAGES TO CHILLED WATER, HOT WATER, AND POWER. SCHEDULE CHILLED WATER OUTAGE SEPARATE FROM HOT WATER AND POWER OUTAGES.

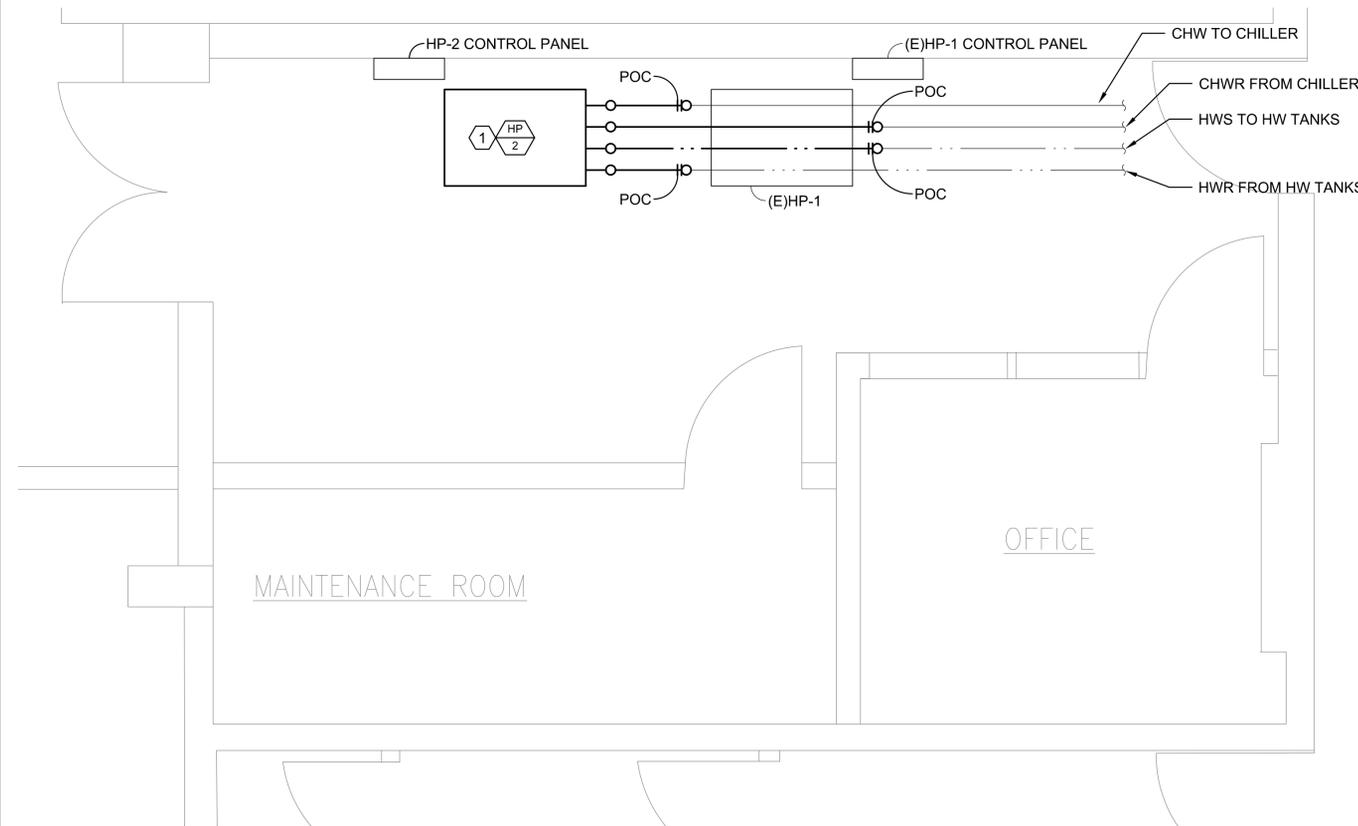
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Joel P. Yuen
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 LICENSED PROFESSIONAL ENGINEER
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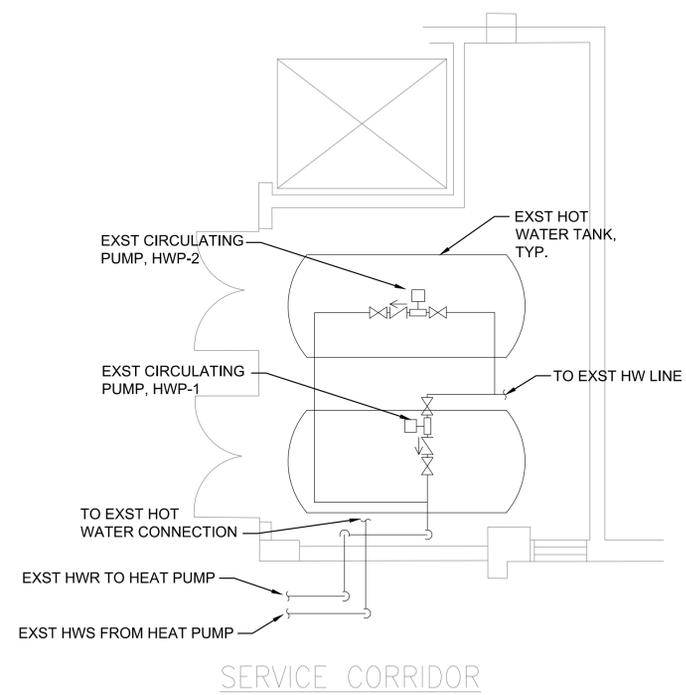
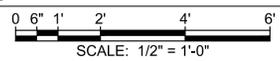
INSYNERGY ENGINEERING
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 Phone: (808) 521-3773 Fax: (808) 521-3995

CHILLED WATER SOURCE HEAT PUMP UPGRADE FOR MALUHIA
 1027 HALA DRIVE, HONOLULU, HI 96817
 T.M.K.: 1-6-009:004
 MECHANICAL LEGEND, SPECIFICATIONS, SITE PLAN

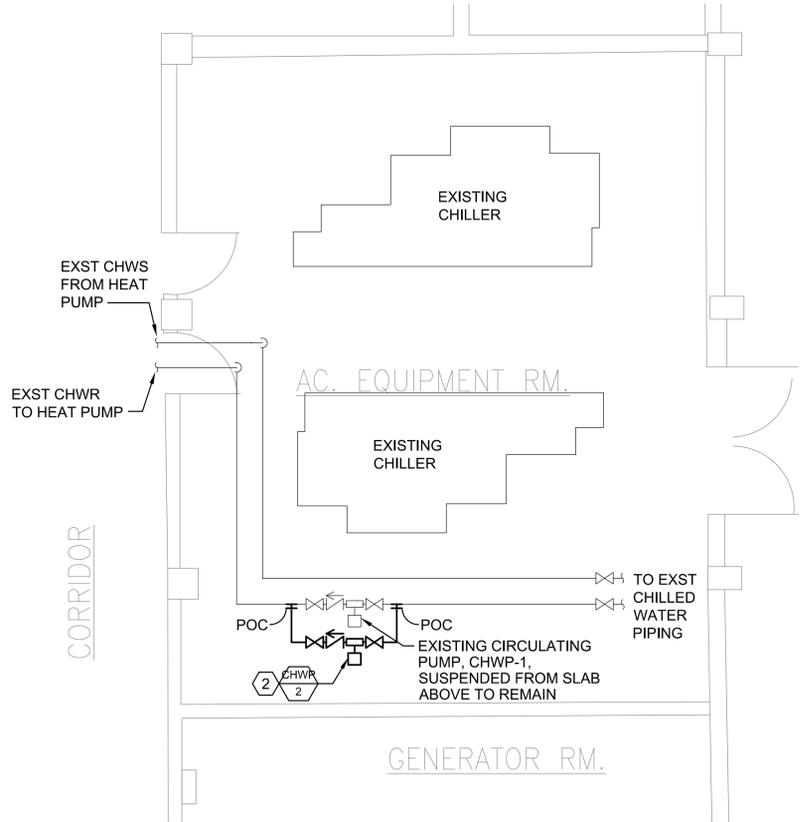
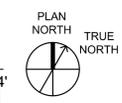
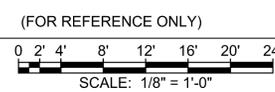
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Drawn	RB
Checked	JY
Date	10-31-23
Job No.	23-054
Sheet	M-1
1 Of 7	Sheets



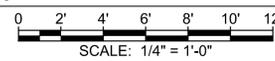
1 MECHANICAL NEW SUB-BASEMENT FLOOR PLAN
SCALE: 1/2" = 1'-0"



3 HOT WATER TANK ROOM BASEMENT PLAN
SCALE: 1/8" = 1'-0"



2 AC EQUIPMENT ROOM SUB-BASEMENT PLAN
SCALE: 1/4" = 1'-0"



KEYNOTES:

- 1 PROVIDE NEW CHILLED WATER SOURCE HEAT PUMP AND ASSOCIATED CONTROL PANEL, WIRING, AND CHILLED WATER AND HOT WATER PIPING UP TO POC.
- 2 PROVIDE NEW CHILLED WATER PUMP SUSPENDED FROM SLAB ABOVE. RECONNECT TO EXISTING CHILLED WATER PIPING.

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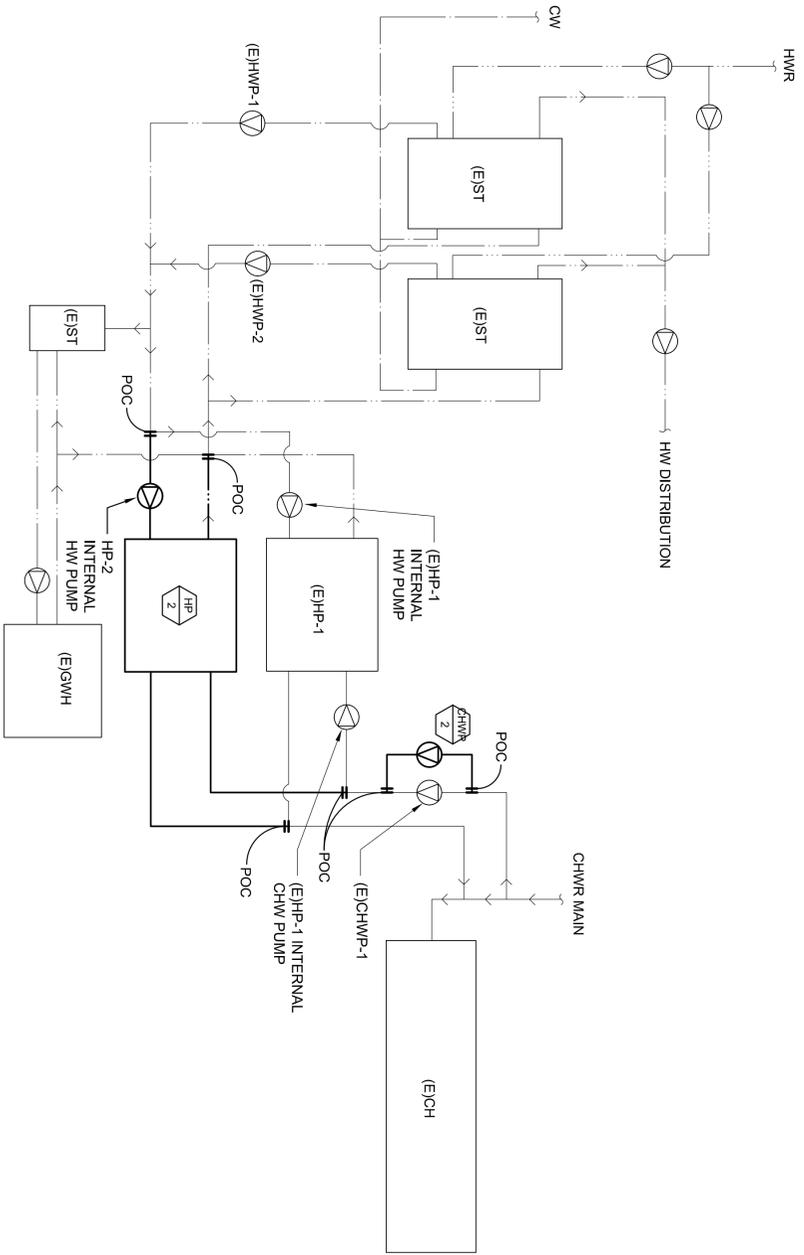
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CHILLED WATER SOURCE HEAT PUMP UPGRADE FOR MALUHIA

1027 HALA DRIVE HONOLULU, HI 96817
TMK: 1-6-009-004

MECHANICAL REMOVAL AND NEW FLOOR PLANS

Designed	KT
Drawn	RB
Checked	JY
Date	10-31-23
Job No.	23-054
Sheet	M-2



1 HOT WATER SCHEMATIC
M-4 SCALE: NTS

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**CHILLED WATER SOURCE HEAT PUMP
UPGRADE FOR MALUHIA**
1027 HALA DRIVE, HONOLULU, HI 96817
TMK: 1-6-009:004

HOT WATER SCHEMATIC

Designed	KT
Drawn	RB
Checked	JY
Date	10-31-23
Job No.	23-054

NEW CHILLED WATER-SOURCE HEAT PUMP SCHEDULE

UNIT	DESCRIPTION	REFRIGERANT	TOTAL HEATING CAPACITY (MBH)	TOTAL COOLING CAPACITY (MBH)	CONDENSER SIDE			EVAPORATOR SIDE			COMPRESSER SIDE	ELECTRICAL								MAKE & MODEL OR APPROVED EQUAL	REMARKS	
					ENT WATER (DEG. °F)	LVG WATER (DEG. °F)	GPM	ENT WATER (DEG. °F)	LVG WATER (DEG. °F)	GPM		HTG C.O.P.	CLG C.O.P.	V	PH	HZ	KW	FLA	MCA			MOCP
HP-2	HEAT PUMP	R-134A	96.4	71.2	120	140	9.6	55	50	24	1	2.5	1.8	208	3	60	11.4	46.19	57	90	COLMAC CXW-10 OR APPROVED EQUAL.	PROVIDE WITH DOUBLE WALL HEAT EXCHANGERS AND INTEGRAL HOT WATER CIRCULATION PUMP.

EXISTING CHILLED WATER-SOURCE HEAT PUMP SCHEDULE (FOR REFERENCE ONLY)

UNIT	DESCRIPTION	REFRIGERANT	TOTAL HEATING CAPACITY (MBH)	TOTAL COOLING CAPACITY (MBH)	CONDENSER SIDE			EVAPORATOR SIDE			COMPRESSOR SIDE			ELECTRICAL			MAKE & MODEL OR APPROVED EQUAL	REMARKS		
					ENT WATER (DEG. °F)	LVG WATER (DEG. °F)	GPM	ENT WATER (DEG. °F)	LVG WATER (DEG. °F)	GPM	NO. OF COMPRESSOR	RLA (EA.)	LRA (EA.)	HTG C.O.P.	CLG C.O.P.	V			PH	HZ
HP-1	HEAT PUMP	R-134A	72	60	120	140	7.2	55	50	24	2	18.6	128.0	4.5	3.5	208	3	60	COLMAC COIL HPW8M	

NEW CIRCULATING PUMP SCHEDULE

UNIT	SERVICE	GPM	TDH FT. H2O	HP	RPM	VOLTS	PH	HZ	REMARKS
CHWP-2	CHILLED WATER TO HP-2	42	20	1/2	1760	115	1	60	TACO 1915 OR APPROVED EQUAL

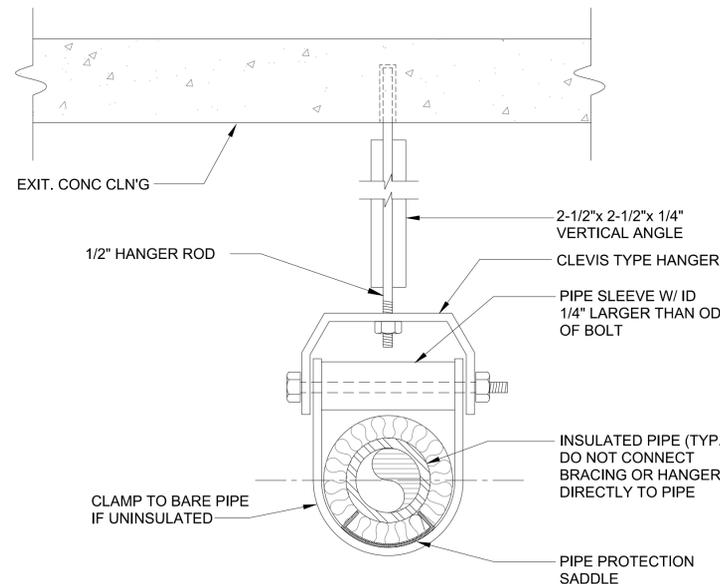
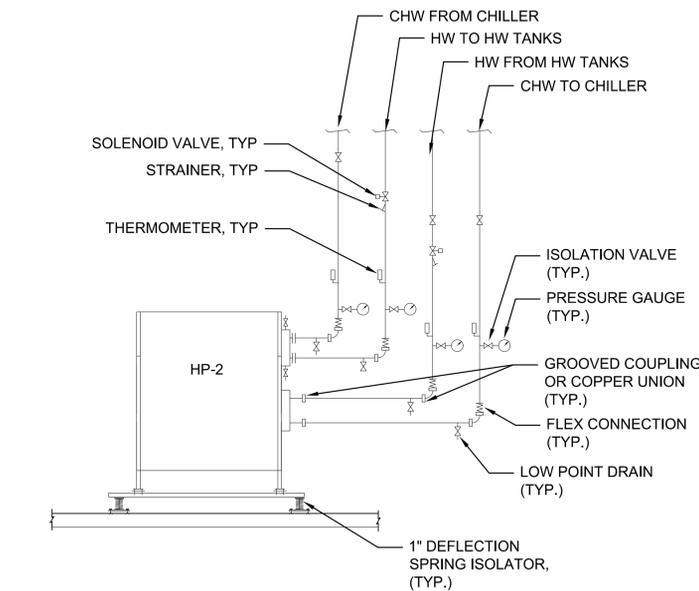
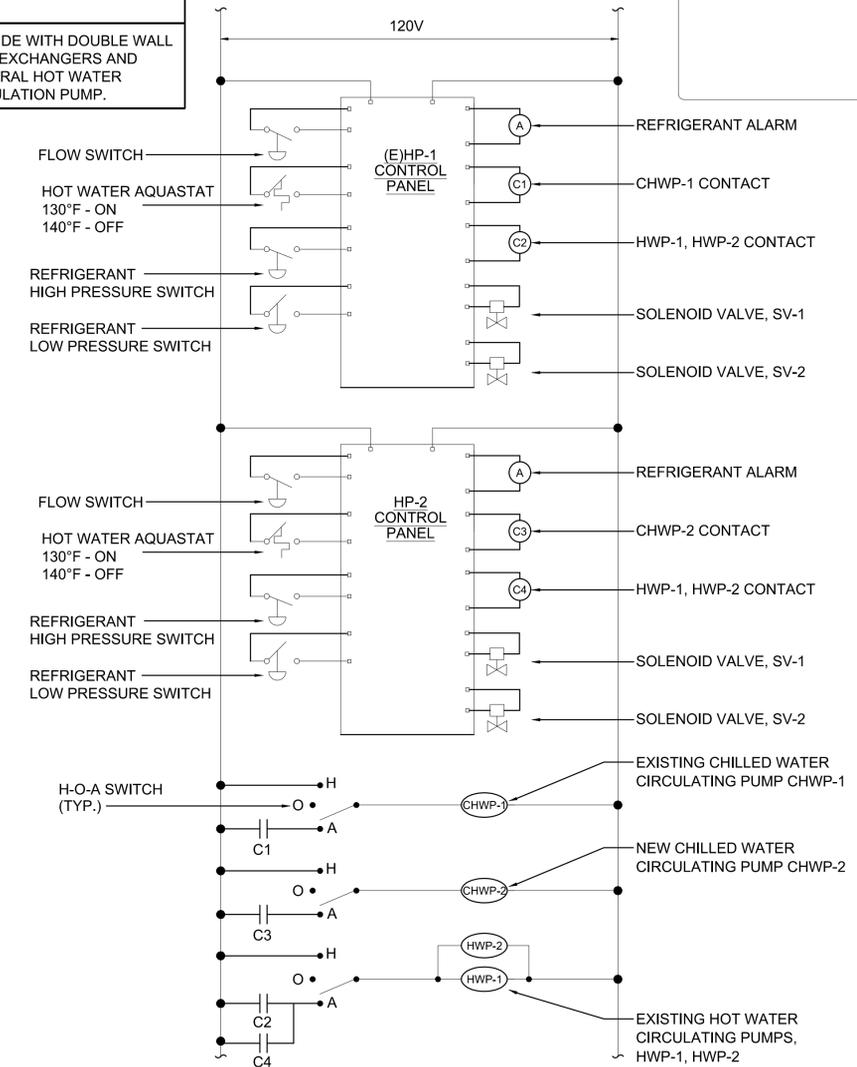
EXISTING CIRCULATING PUMP SCHEDULE (FOR REFERENCE ONLY)

UNIT	SERVICE	GPM	TDH FT. H2O	HP	RPM	VOLTS	PH	HZ	REMARKS
CHWP-1	CHILLED WATER TO HP-1	42	20	1/2	1725	115	1	60	MARATHON ELEC BQD56C17D5536F

HEAT PUMP SEQUENCE OF OPERATION

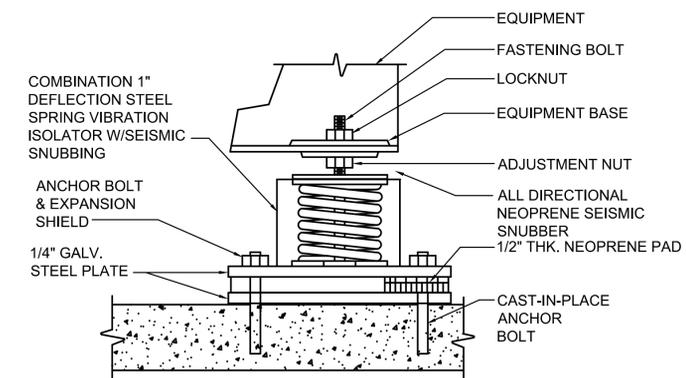
HP-2 SHALL BE THE PRIMARY MEANS FOR HOT WATER PRODUCTION. THE EXISTING HP-1 AND GWH SHALL SERVE AS BACK UP TO THE HP-2. THE HEAT PUMP SEQUENCE OF OPERATION SHALL BE AS FOLLOWS:

- THE HEAT PUMP SHALL OPERATE BASED ON THE HOT WATER TEMPERATURE IN THE CLOSED-LOOP HOT WATER HEATING SYSTEM.
- IF THE HOT WATER IN THE HOT WATER LOOP IS ABOVE 140°F THEN THE HEAT PUMP AND CIRCULATION PUMPS HWP-1, HWP-2, AND CHWP-2 SHALL NOT OPERATE.
- IF THE HOT WATER IN THE HOT WATER LOOP IS BELOW 130°F THEN THE HEAT PUMP AND CIRCULATION PUMPS HWP-1, HWP-2, AND CHWP-2 SHALL ACTIVATE.
- THE HEAT PUMP SHALL BE FACTORY EQUIPPED WITH ELECTRONIC TEMPERATURE CONTROL VALVE WHICH AUTOMATICALLY MAINTAINS CONSTANT LEAVING WATER TEMPERATURE REGARDLESS OF ENTERING WATER TEMPERATURE. LEAVING WATER TEMPERATURE IS SET BY THE USER VIA ADJUSTABLE ELECTRONIC TEMPERATURE CONTROLLER.
- THE HEAT PUMP SHALL ALSO BE PROVIDED WITH HIGH AND LOW REFRIGERANT PRESSURE SAFETY SWITCHES. IF THE CONDENSER PRESSURE IS TOO LOW OR HIGH, THE SWITCH SHALL CLOSE AND SHUT OFF THE HEAT PUMP, CHWP-2, HWP-1, HWP-2, AND CLOSE SOLENOID VALVES, SV-1 AND SV-2.
- IF THE REFRIGERANT MONITOR GOES INTO ALARM, THE HEAT PUMP SHALL SHUT DOWN.
- THE EXISTING HW CIRCULATION PUMPS LOCATED IN THE BOILER ROOM SHALL BE OPERATIONAL WHEN EITHER HP-1 OR HP-2 IS IN OPERATION.



4 WATER HEATING SYSTEM CONTROL DIAGRAM

M-5 SCALE: NTS



1 HEAT PUMP PIPING ELEVATION DETAIL

M-5 SCALE: NTS

2 PIPE HANGER SUPPORT DETAIL

M-5 SCALE: NTS

3 EQUIPMENT SUPPORT DETAIL

M-5 SCALE: NTS

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CHILLED WATER SOURCE HEAT PUMP UPGRADE FOR MALUHIA
1027 HALA DRIVE, HONOLULU, HI 96817
TMK: 1-6-009-004

MECHANICAL DETAILS AND SCHEDULE

Designed	KT
Drawn	RB
Checked	JY
Date	10-31-23
Job No.	23-054
Sheet	

ELECTRICAL GENERAL NOTES:

- ALL WORK SHOWN ON THE ELECTRICAL DRAWINGS IS NEW UNLESS OTHERWISE NOTED. ALL MATERIALS SHALL BE NEW AND "LISTED" OR "LABELED" AS DEFINED BY THE NATIONAL ELECTRICAL CODE (NEC). WORK INCLUDES INSTALLATION OF ALL ELECTRICAL SYSTEMS COMPLETE AND OPERATIONAL AS LIMITED BY THE INTENT OF THE CONTRACT DOCUMENTS.
- ALL WORK SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC), NATIONAL ELECTRICAL SAFETY CODE, AND BUILDING ORDINANCES OF THE CITY AND COUNTY OF HONOLULU. CONSTRUCTION PRACTICES SHALL CONFORM TO THE LATEST EDITION OF AMERICAN ELECTRICIANS' HANDBOOK BY CROFT AND APPLICABLE INSTRUCTIONS OF MANUFACTURERS OF EQUIPMENT AND MATERIAL SUPPLIED FOR THIS PROJECT.
- OBTAIN AND PAY FOR BUILDING / ELECTRICAL PERMIT, ARRANGE FOR PERIODIC INSPECTION BY LOCAL AUTHORITIES, AND DELIVER CERTIFICATE OF FINAL INSPECTION TO THE ARCHITECT.
- RETENTION OF PLANS: ONE SET OF APPROVED PLANS, SPECIFICATIONS, AND COMPUTATIONS SHALL BE RETAINED BY THE BUILDING OFFICIAL FOR A PERIOD OF NOT LESS THAN 90 DAYS FROM DATE OF COMPLETION OF THE WORK COVERED THEREIN, AND ONE SET OF APPROVED PLANS SHALL BE RETURNED TO THE APPLICANT, AND SAID SET SHALL BE KEPT ON THE SITE OF THE BUILDING OR WORK AT ALL TIMES DURING WHICH THE WORK AUTHORIZED THEREBY IS IN PROGRESS.
- THE DRAWINGS DO NOT REFLECT ALL THE EXISTING CONDITIONS THAT MAY BE ENCOUNTERED DURING CONSTRUCTION. VISIT THE PROJECT SITE AND BECOME FAMILIAR WITH THE READILY OBSERVABLE EXISTING CONDITIONS, THE EXTENT OF ANY DEMOLITION, RELOCATION, RECONNECTION, AND THE NEW WORK PRIOR TO BIDDING. REPORT ANY READILY OBSERVABLE DISCREPANCIES AND/OR DIFFERENCES BETWEEN THE EXISTING CONDITIONS AND THE CONSTRUCTION DOCUMENTS TO THE ARCHITECT. RESOLVE ALL READILY OBSERVABLE DISCREPANCIES AND QUESTIONS PRIOR TO THE START OF WORK. BID SUBMISSION SHALL BE CONSIDERED AS EVIDENCE THAT THE CONTRACTOR HAS VISITED THE SITE AND RESOLVED ALL READILY OBSERVABLE DISCREPANCIES AND QUESTIONS AND NO EXTRA PAYMENT WILL BE AUTHORIZED FOR WORK REQUIRED BY THE CONTRACTOR'S FAILURE TO DO SO.
- EXISTING DEVICE AND EQUIPMENT LOCATIONS, CIRCUIT ASSIGNMENTS, WIRING CONNECTIONS, AND CONDUIT RUNS INDICATED WERE DERIVED FROM AVAILABLE REFERENCE DOCUMENTS AND LIMITED FIELD INVESTIGATION. FIELD VERIFY ALL EXISTING CONDITIONS AND MAKE ANY NECESSARY ADJUSTMENTS TO SATISFY THE INTENT OF THE DRAWINGS AND SPECIFICATIONS.
- RE-ROUTE ALL EXISTING CONDUIT, WIRING, AND CABLING TO REMAIN WITHIN THE PROJECT AREA AS NECESSARY TO FACILITATE THE INSTALLATION OF ALL NEW EQUIPMENT. REMOVE AND RE-INSTALL ELECTRICAL EQUIPMENT, INCLUDING LIGHTS, TO REMAIN AS REQUIRED.
- WORK INCIDENTAL TO THE CONTRACT AND NECESSARY TO COMPLETE THE PROJECT, ALTHOUGH NOT SPECIFICALLY REFERRED TO IN THE CONTRACT DOCUMENTS, SHALL BE FURNISHED AND PERFORMED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT. AN EXAMPLE OF SUCH INCIDENTAL WORK ARE OUTLET BOXES, JUNCTION BOXES, AND PULL BOXES REQUIRED FOR THE INSTALLATION OF ELECTRICAL DEVICES, LIGHTING FIXTURES, AND EQUIPMENT. ALL INCIDENTAL WORK SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE NEC.
- ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL CONDUIT AND WIRING FOR THE POWER CONNECTION TO ALL EQUIPMENT AS INDICATED IN THE DRAWINGS AND SPECIFICATIONS. ALL INCIDENTAL CONDUIT AND WIRING REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM MAY NOT BE SHOWN IN THE DRAWINGS OR SPECIFICATIONS. CONTRACTOR SHALL COORDINATE INCIDENTAL CONDUIT AND WIRING REQUIREMENTS BETWEEN ALL TRADES TO ENSURE THE INCIDENTAL CONDUIT AND WIRING IS PROVIDED AND THE AFFECTED SYSTEMS OPERATE AS INTENDED.
- THE LOCATION OF ALL ELECTRICAL APPARATUS AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND BEFORE INSTALLING, STUDY THE ARCHITECTURAL, STRUCTURAL, AND MECHANICAL DETAILS, THEN MAKE INSTALLATION IN THE MOST LOGICAL MANNER. CIRCUIT ROUTING IS TYPICAL AND MAY BE VARIED IN ANY MANNER. ANY PIECE OF EQUIPMENT/DEVICE MAY BE RELOCATED WITHIN 10' BEFORE INSTALLATION AT THE DIRECTION OF THE ARCHITECT WITHOUT ADDITIONAL CHARGE TO THE PROJECT.
- SHOULD PROJECT CONDITIONS REQUIRE REARRANGEMENT OF THE PROJECT'S WORK, THE CONTRACTOR SHALL MARK SUCH CHANGES ON THE AS-BUILT DRAWINGS. IF THESE CHANGES REQUIRE AN ALTERNATE METHOD TO THOSE SPECIFIED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL SUBMIT DRAWINGS TO REFLECT THE PROPOSED ALTERNATE METHODS TO THE ARCHITECT FOR REVIEW AND APPROVAL. THE CONTRACTOR SHALL NOT PROCEED UNTIL APPROVAL IS OBTAINED. REARRANGEMENT OF WORK FOR THE PURPOSE OF COORDINATION SHALL NOT BE CONSIDERED AN ITEM FOR EXTRA COST.
- THE EXISTING ELECTRICAL, TELECOM, FIRE ALARM, AND OTHER ELECTRICALLY-RELATED SYSTEMS IN AREAS ADJACENT TO, OUTSIDE OF, AND/OR OTHERWISE PASSING THROUGH THE PROJECT LIMITS, MUST REMAIN OPERATIONAL DURING THE CONSTRUCTION PERIOD AND POST-CONSTRUCTION. THE CONTRACTOR SHALL EXERCISE DUE CARE AND CAUTION WHEN WORKING NEAR ANY EXISTING EQUIPMENT, DEVICES, OR CABLING/CIRCUITING. PROVIDE NEW JUNCTION BOXES, CONDUITS, WIRING, AND THE LABOR REQUIRED TO FACILITATE THE REQUIRED OPERATIONAL CONTINUITY. BOXES, CONDUITS, AND WIRING SHALL BE IN ACCORDANCE WITH THE NEC. ANY DAMAGE TO THE EXISTING EQUIPMENT,

DEVICES, OR CABLING/CIRCUITING RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE IMMEDIATELY REPAIRED OR OTHERWISE RESTORED TO ITS ORIGINAL WORKING CONDITION AT NO ADDITIONAL COST TO THE PROJECT.

- THE ELECTRICAL DRAWINGS ARE BASED ON PROPOSED EQUIPMENT. VERIFY ALL SYSTEM REQUIREMENTS (ELECTRICAL, MECHANICAL, FIRE ALARM, SPECIALTY SYSTEMS, ETC.) WITH THE SELECTED SYSTEM'S MANUFACTURER OR AUTHORIZED REPRESENTATIVE PRIOR TO COMMENCING WITH ANY WORK. COORDINATE RATINGS OF OVERCURRENT PROTECTION DEVICES, DISCONNECT SWITCHES, CONDUIT, AND WIRING TO MATCH THE ACTUAL EQUIPMENT SUPPLIED FOR THE PROJECT. CORRECT ALL DISCREPANCIES SO AS TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM. RECORD CHANGES ON THE AS-BUILT DRAWINGS.
- ALL EQUIPMENT AND APPARATUS SHALL BE CAPABLE OF FITTING IN THE SPACES SHOWN WHILE MEETING THE MANUFACTURER'S RECOMMENDED ACCESS REQUIREMENTS AND APPLICABLE CODE REQUIREMENTS. REVIEW ALL SPACES WHERE EQUIPMENT IS TO BE INSTALLED PRIOR TO ORDERING OF EQUIPMENT AND NOTIFY THE ARCHITECT OF ANY INADEQUATE CLEARANCES OR CONDITIONS THAT WILL PREVENT THE PROPER INSTALLATION, MAINTENANCE, AND OPERATION OF THE EQUIPMENT.
- ALL EXPOSED CONDUITS IN FINISHED AREAS SHALL BE INSTALLED IN THE LEAST VISIBLE LOCATIONS. CARE SHALL BE TAKEN TO INSTALL CONDUIT IN THE MOST AESTHETICALLY PLEASING MANNER.
- WHERE DEVICES, EQUIPMENT, BOXES, AND OTHER ELECTRICAL MATERIALS ARE INDICATED TO BE OF WEATHERPROOF (WP) CONSTRUCTION, THE INTERCONNECTING RACEWAYS, INCLUDING COUPLINGS AND CONNECTORS, SHALL BE LISTED FOR AND INSTALLED TO PROVIDE A COMPLETE WEATHERPROOF / WET LOCATION INSTALLATION. ALL INCIDENTAL MATERIALS REQUIRED TO COMPLETE THE INSTALLATION SHALL ALSO BE OF WEATHERPROOF / WET LOCATION LISTING.
- PROVIDE TYPEWRITTEN CIRCUIT DIRECTORIES FOR ALL PANELS, NEW OR MODIFIED, REFLECTING THE CIRCUIT ARRANGEMENTS AS THEY WERE ACTUALLY INSTALLED.
- AN ADHESIVE VINYL NAMEPLATE SHALL BE PROVIDED FOR ALL SWITCHES, RECEPTACLES, AND MISCELLANEOUS DEVICES REQUIRING POWER. THE NAMEPLATE SHALL INDICATE THE PANELBOARD SERVING THE DEVICE AND THE CORRESPONDING CIRCUIT ASSIGNMENT. LETTERING SHALL BE A MINIMUM OF 1/4" HIGH. UTILIZE BROTHER "P-TOUCH" LABEL MAKER OR APPROVED SUBSTITUTE.
- A GREEN, EQUIPMENT GROUND CONDUCTOR SIZED IN ACCORDANCE WITH THE NEC ARTICLE 250 SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS WHETHER INDICATED ON CONTRACT DRAWINGS OR NOT. INSTALL THIS CONDUCTOR IN ALL RACEWAYS
- DO NOT USE A COMMON NEUTRAL FOR MULTIPLE BRANCH CIRCUITS INSTALLED IN A COMMON CONDUIT. PROVIDE A DEDICATED NEUTRAL FOR EACH INDIVIDUAL CIRCUIT. WHERE MULTIPLE DEDICATED NEUTRALS ARE INSTALLED IN A COMMON CONDUIT, PROVIDE COLOR CODING OF THE DIFFERENT NEUTRAL CONDUCTORS IN ACCORDANCE WITH THE NEC (WHITE, GRAY, THREE CONTINUOUS WHITE OR GRAY STRIPES, ETC.)
- ALL SURFACE MOUNTED DEVICES SHALL BE INSTALLED UTILIZING FACTORY PAINTED SURFACE MOUNTING ACCESSORIES AND MATCHING DEVICE BOXES FOR THE MOST AESTHETICALLY PLEASING INSTALLATION.
- PENETRATIONS THROUGH FIRE-RATED WALLS, CEILINGS, AND FLOORS SHALL BE SEALED TO MAINTAIN FIRE RATINGS. UTILIZE 3M CP25, PUTTY 303, OR OTHER SUITABLE UL-LISTED SEALING SYSTEM.
- RESTORE/REPAIR ANY DAMAGE TO EXISTING SURFACES RESULTING FROM THE INSTALLATION OF NEW ELECTRICAL ITEMS. THE AREAS REPAIRED SHALL MATCH THE ADJACENT SURFACES IN TEXTURE, FINISH, AND COLOR.

POWER LEGEND		
SYMBOLS		DESCRIPTION
EXIST	NEW	
		EQUIPMENT ELECTRICAL CONNECTION
		DISCONNECT SWITCH, HEAVY DUTY TYPE, HP RATED PROVIDE FUSES PER EQUIPMENT NAMEPLATE UON
		FLEXIBLE METALLIC CONDUIT, LIQUIDTIGHT, WET/DAMP LOCATIONS
		PANELBOARD
		LIGHT SWITCH, WALL MOUNTED, 1P20A, 120/277V, 1HP MAXIMUM
		RECEPTACLE, NEMA 5-20R, UON
		ELECTRICAL RACEWAY & WIRING. HATCHMARKS INDICATE NO. OF CURRENT CARRYING CONDUCTORS. GROUND WIRE NOT INCLUDED IN WIRE COUNT BUT SHALL BE PROVIDED.
		EXPOSED RACEWAY & WIRING
		HOMERUN RACEWAY & WIRING

REFERENCE SYMBOLS	
	DETAIL REFERENCE
	NORTH ARROW

CITY AND COUNTY OF HONOLULU
REVISED ORDINANCES OF HONOLULU 2021
CHAPTER 16B

TO THE BEST OF MY KNOWLEDGE, THIS PROJECT'S DESIGN SUBSTANTIALLY
CONFORMS TO THE BUILDING ENERGY CONSERVATION CODE FOR:

 X ELECTRICAL COMPONENT SYSTEMS

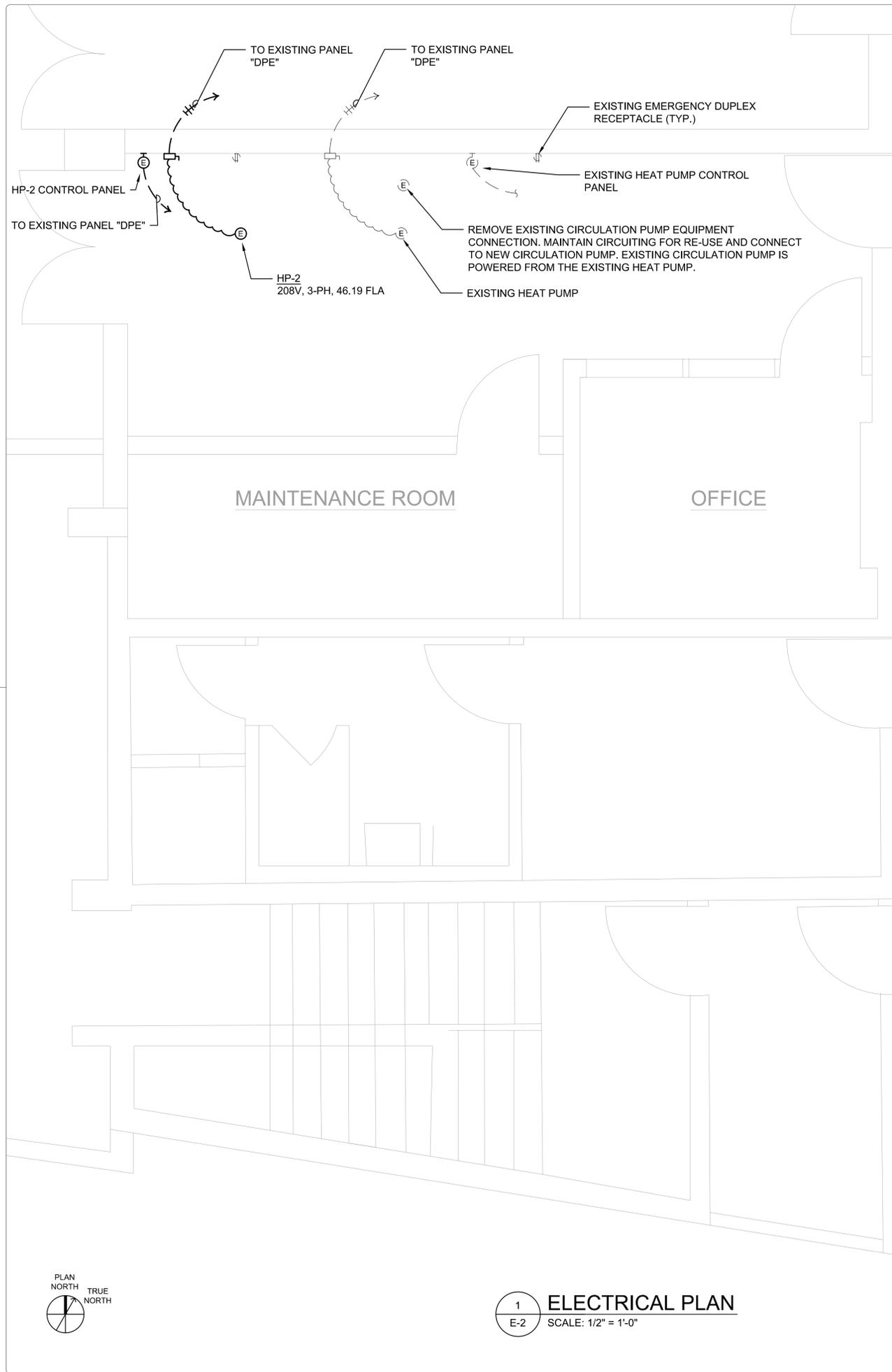
DESIGNED BY: Scott Tomokiyo DATE: 11/14/2023
NAME: SCOTT TOMOKIYO
TITLE: ELECTRICAL ENGINEER
LICENSE No.: 15968-E

REVISIONS	BY

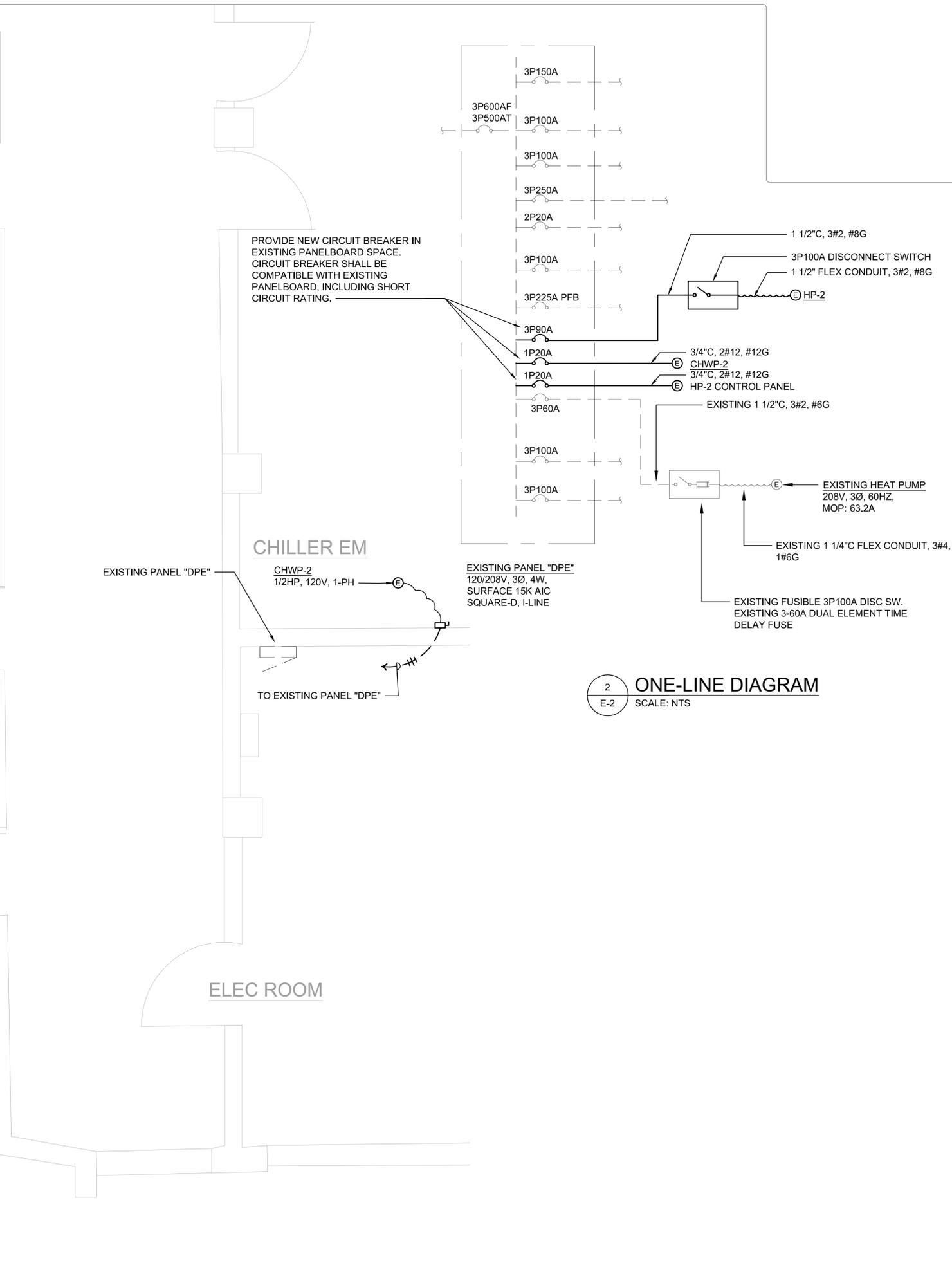


**CHILLED WATER SOURCE HEAT PUMP
UPGRADE FOR MALUHIA**
1027 HALA DRIVE, HONOLULU, HI 96817
TMK: 1-6-009-004
ELECTRICAL ABBREVIATIONS, POWER LEGEND,
REFERENCE SYMBOLS, GENERAL NOTES

Designed SF	
Drawn SF	
Checked ST	
Date	10-31-23
Job No.	23-054
Sheet	E-1
6 Of 7 Sheets	



1 **ELECTRICAL PLAN**
E-2 SCALE: 1/2" = 1'-0"



2 **ONE-LINE DIAGRAM**
E-2 SCALE: NTS

REVISIONS	BY

This work was prepared by me or under my supervision and construction of this project will be under my observation.
Scott Tomasko
EXPIRATION DATE 04/30/2024
LICENSED PROFESSIONAL ENGINEER
No. 15988-E
HAWAII

INSYNERGY ENGINEERING
MECHANICAL • ELECTRICAL • FIRE PROTECTION
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1027 HALA DRIVE HONOLULU, HI 96817
TMK: 1-6-009-004
ELECTRICAL PLANS, ONE-LINE DIAGRAM

Designed	SF
Drawn	SF
Checked	ST
Date	10-31-23
Job No.	23-054
Sheet	E-2
7	Of 7 Sheets