Invitation for Bids

IFB 20L-0030
Leahi Hospital – AC Replacement

The Hawaii Health Systems Corporation (HHSC) Oahu Region is requesting bids from qualified companies for the replacement of the various air conditioning units at Leahi Hospital located at 3675 Kilauea Ave., Honolulu, HI 96816.

The IFB may be obtained electronically from the following website:
http://leahi.hhsc.org/procurement/notices/

A site visit is scheduled for March 24, 2020 at 9:00 a.m. All interested companies shall meet in the lobby area. The deadline for submission of written/emailed questions pertaining to the IFB is April 7, 2020.

All bids must be received and time stamped by HHSC by April 21, 2020, 2:00 p.m. Hawaii Standard Time. Bids shall be submitted to the Purchasing Office, located on the basement floor of **Maluhia**, at 1027 Hala Dr., Honolulu, Hawaii 96817.

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

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

Purchasing Office
Maluhia
1027 Hala Dr.
Honolulu, Hawaii 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 16, 2020
2.	Pre-Bid Orientation Leahi Hospital lobby area 9:00 a.m.	March 24, 2020
3.	Closing Date for Receipt of Questions	April 7, 2020
4.	Closing Date for Receipt of Bids 2:00 p.m. at **Maluhia**	**April 21, 2020**
5.	Contractor Selection/Award Notification (on/about)	April 22, 2020
6.	Contract Start Date (on/about)	May 22, 2020

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, Oahu Region Senior Contracts Manager
Maluhia, Purchasing Office
1027 Hala Drive
Honolulu, Hawaii 96817
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 Maluhia on the island of Oahu.

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, Scott Kawai, 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. Bid documents will be available upon request from the office of the Chief Executive Officer, at Leahi Hospital, 3675 Kilauea Avenue, Honolulu, HI, 96816.

B. All bids shall be submitted to the Issuing Officer.

C. 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.

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.

SECTION 2
SCOPE OF SERVICES

2.0 INTRODUCTION

LEAHI HOSPITAL – AC REPLACEMENT

Work for this project shall include, but is not limited to various upgrades to the air conditioning units, and miscellaneous associated work.

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 B.

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 22, 2020 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 be an original signature in ink. If the submitted Bid Form letter on Appendix A is unsigned or the affixed signature is a facsimile or a photocopy, 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. Leahi Hospital 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.govicampaign.

(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.

C. The option to extend the Contract will be at the sole discretion of the HHSC. Nothing in this IFB shall be construed or interpreted to mean that the Hospital is obligated to exercise the 12-month option period. The Contract may be extended, without the necessity of rebidding, at the same rates as proposed in the original bid, unless price adjustments are made and agreed upon by HHSC.

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)

APPENDIX A

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 Leahi Hospital – AC Replacement IFB No. 20L-0030, for which fees/costs have been set. The fees/costs offered herein shall apply from XXX, 2020 to XXX, 2022.

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)

APPENDIX B

LEAHI HOSPITAL
AC Replacement
Honolulu, Hawaii
TMK No. 3-2-031:001

PREPARED FOR:
Hawaii Health Systems Corporation
Leahi Hospital
3675 Kilauea Ave.
Honolulu, HI 96816

TECHNICAL SPECIFICATIONS

FINAL SUBMITTAL

February 2020

Prepared By:

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

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DIVISION 6 TO DIVISION 14

NONE

DIVISION 15 - MECHANICAL

DIVISION 16 - ELECTRICAL

INVITATION TO BID

TO

LEAHI HOSPITAL

AC REPLACEMENT

Dated: Feb 2020

Bid Form 2

Bid Pricing

The following bid is hereby submitted by,

_____

(Enter Bidder's Name)

Base Bid: **Young building Nurse In-service Conference Room and 2nd,3rd,4th, and 5th floor Nurse Station, Dining Room, and Solarium.** Provide a separate sheet outlining all costs associated with each phase.

TOTAL LUMP SUM BASE BID of

_____

No/100 Dollars ($000,000), including all applicable taxes.

The projected number of calendar days is _____ needed to complete the project.

Additive Alternate 1: **Young building Adult Day Health.** Provide a separate sheet outlining all costs associated with each phase.

TOTAL LUMP SUM BASE BID of

_____

No/100 Dollars ($000,000), including all applicable taxes.

The projected number of calendar days is _____ needed to complete the project.

Additive Alternate 2: **Young building Occupational and Recreational Therapy and Admin building Conference Rooms.** Provide a separate sheet outlining all costs associated with each phase.

TOTAL LUMP SUM BASE BID of

_____

No/100 Dollars ($000,000), including all applicable taxes.

The projected number of calendar days is _____ needed to complete the project.

		DESCRIPTION				
	Description	QTY	UNIT	CST/ Unit	SUBTOTAL	Total
	BASE BID – YOUNG BUILDING NURSE IN-SERVICE CONFERENCE ROOM AND 2nd,3rd,4th, and 5th FLOOR NURSE STATION, DINING ROOM, AND SOLARIUM	L.S.			L.S.	
	TOTAL – BASE BID					
	ADDITIVE ALTERNATE 1 – YOUNG BUILDING ADULT DAY HEALTH	L.S.			L.S.	
	TOTAL – ADDITIVE ALTERNATE 1					
	ADDITIVE ALTERNATE 2 – YOUNG BUILDING OCCUPATIONAL AND RECREATIONAL THERAPY AND ADMIN CONFERENCE ROOMS	L.S.			L.S.	
	TOTAL – ADDITIVE ALTERNATE 2					
	GRAND TOTAL					

DIVISION 0 – INSTRODUCTORY, BIDDING AND CONTRACTING REQUIRMENTS

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 in 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:	Ms. Chris Li
POSITION OR TITLE:	Project Engineer
TELEPHONE NUMBER:	(808) 529-1211
Email:	cli@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 the Hospital 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 the Hospital 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.

B. 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.

C. The HHSC and/or Hospital 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.

D. 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. The Hospital 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 the Hospital 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 the hospital'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 the Hospital, 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 the Hospital.

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.

E. 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.

F. Furnish or obtain templates, patterns, and setting instructions as required for the installation of all Work. All dimensions shall be verified in the field.

G. 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.

3.03 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.

3.04 ENVIRONMENTAL

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

3.05 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 the Hospital. Additional time required to secure replacements and to make repairs will not be considered to justify an extension in the Contract Time or completion.

3.06 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.

3.07 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.

3.08 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.

3.09 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 the Hospital 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: Various air conditioning upgrades at Leahi Hospital but is not limited to the following areas and general description:
1. Replace existing DX split AC system in Young building 2nd floor Nurse In-service Conference Room with new VRF system.
2. Provide new VRF system with DOAS to serve Nurse Station spaces and Dining Room spaces on 2nd, 3rd, 4th, and 5th floor of Young building.
3. Provide new VRF system to serve Solarium spaces on 2nd, 3rd, 4th, and 5th floor of Young building.
4. Provide new VRF system with DOAS to serve Adult Day Health space on 1st floor of Young Building
5. Provide new VRF system with DOAS to serve Occupational and Recreational Therapy space on 1st floor of Young building.
6. Replace existing DX split AC systems in Admin Building 1st and 2nd floor conference room with new VRF system.

Work shall be priced according to the bid schedule and bid items listed. Bid items are described as follows:

1. <u>BASE BID</u>: Young Building Nurse In-service Conference Room and 2nd, 3rd, 4th, and 5th floor Nurse Station, Dining Room, and Solarium
   a. Replace AC in Young building 2nd floor Nurse In-service Conference Room
   b. Provide new VRF system with DOAS to serve Nurse Stations and Dining Room spaces in Young building 2nd, 3rd, 4th, and 5th floor.
   c. Provide new VRF system to serve Solarium spaces in Young building 2nd, 3rd, 4th, and 5th floor.

2. <u>ADDITIVE ALTERNATE 1</u>: Young Building Adult Day Health

a. Provide new VRF system with DOAS to serve Adult Day Health space in Young building 1st floor.

3. ADDITIVE ALTERNATE 2: Young Building Occupational and Recreational Therapy and Admin Conference Rooms
   a. Provide new VRF system with DOAS to serve Occupational and Recreational Therapy space in Young building 1st floor.
   b. Replace AC in Admin building 1st and 2nd floor conference room.

B. Contract Documents Identification: These are identified as: *HHSC: Leahi Hospital, AC Replacement dated February 28, 2020.*

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 Hospital to minimize conflict and to facilitate Hospital's operations. Coordinate operations with Hospital's Technical Representative (HTR).

G. Access to adjacent floors must be approved in advance by Hospital. 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 the Hospital. 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 the hospital cafeteria.
   3. Smoking is not permitted anywhere on Leahi Hospital 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 HOSPITAL OCCUPANCY

A. The Hospital 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 Hospital'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 Hospital to minimize conflict with, and to facilitate Hospital'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 Leahi Hospital 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 the Hospital.

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 Hospital’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 the Hospital'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 this 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.

7. 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 the hospital. 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 the hospital and/or HHSC Representative. In general, the Contractor will be restricted to work areas as coordinated with the HHSC Representative.

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 1330 - 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 Leahi Hospital 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 by 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.

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 an 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 e 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 warrantees 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.

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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 by 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 warrantees 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, mars, 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 competed 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 Date, 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 date to which changed written information is recorded.

D. Record Support Data: Consultants approved, drawn written, published Manufacturer’s date 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 warrantees.
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 01810 - GENERAL REQUIREMENTS FOR COMMISSIONING

PART 1 - GENERAL

1.1 SUMMARY

A. This project is required to provide general commissioning for the complete HVAC system as installed. A Commissioning Authority (CxA) acting as the Hospital's representative will conduct the Fundamental Commissioning in order to meet this minimum requirement.

B. The Contractor shall provide labor and services to the CxA to accomplish the work specified herein as they apply to the requirements as detailed in the ACG commissioning guidelines.

C. Commissioning Agent Qualifications: The commissioning authority acting as the Owner's representative shall be Insynergy Engineering and is contracted by the Owner for this project. The CxA is a certified commissioning authority in good standing by ACG conforming to all their rules and regulations. The CxA is tasked with additional duties as detailed in these specifications. The GC shall provide labor and services to the CxA to accomplish the work specified herin as they apply of the commissioning of the HVAC, electrical and control systems for the project. The commissioning work shall include the HVAC systems and appropriate electrical systems supported by the responsible parties from other disciplines.

D. Commissioning is a process intended to provide the User with a degree of assurance that the building systems function in compliance set forth and satisfy the User's operational needs based on the drawings and specifications. This section covers the Mechanical HVAC Systems Commissioning and the Electrical Systems Commissioning. The work shall include the new HVAC installation for the Leahi Hospital Air Conditioning System located in Honolulu, Hawaii.

The systems to be commissioned will include:

1. Mechanical HVAC systems

E. Commissioning requires cooperation and direct involvement by all parties throughout the construction process. Successful commissioning requires that installation of all building systems and assemblies not only comply with contract requirements but also that this should be achieved early enough in the construction phase to provide full operational check-out, testing and adjustments prior to Project Acceptance. In addition to fulfilling scheduling and planning requirements, the Contractor is further responsible for documenting the equipment and system installation and operational verification for all systems and assemblies.

F. Quality Assurance/Quality Control (QA/QC): The CxA provides quality assurance and quality control on this project by performing the following tasks:

1. Review of Shop Drawings and material descriptions and certifications.

2. Qualifications and approvals of certain specified sub-tier Contractors and testing agencies or laboratories.

3. Inspection, testing and certifications by agencies provided by the State.

4. Contractor and Contracting Officer checks, inspections, tests and certifications.

5. Commissioning may cover the QA/QC of certain static building elements or assemblies. Some QA/QC activities will be witnessed by the CxA, while other QA/QC activities will be witnessed by the Contractor, and/ or Contracting Officer. In general, the QA/QC activities such as concrete testing, inspection of static building elements, and regulatory or code inspections remain outside of the formal commissioning umbrella. However, compiling the documentation of some of these traditional activities may be within the commissioning scope as specified herein.

G. Commissioning Process Overview: The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.

1. Commissioning during construction begins with a planning meeting where the commissioning process is reviewed with all of the commissioning team members followed by a kick-off meeting where the revised Commissioning Plan is reviewed in detail.

2. Additional meetings will be required throughout construction with appropriate parties attending, to plan, scope, coordinate, schedule future activities and resolve problems.

3. Equipment and assembly documentation is submitted to the Commissioning Authority during normal submittals, including detailed startup procedures and early copies of Operation and Maintenance (O&M) data. Contractor provides additional information as needed by the CxA for preparing the Functional Performance Test (FPT) checklists.

4. Compile and submit startup documentation package data for selected equipment as requested by the CxA.

5. The CxA compiles the pre-functional checklist (PFT) forms to be included in startup documentation.

6. The CxA performs periodic construction observation.

7. Provide execution and documentation of the startup documentation packages. The Contractor and CxA should provide documentations to ensure the checklists are completed with CxA reviewing and spot witnessing Contractor's functional and performance tests and witnessing all functional testing. The functional and performance tests shall proceed from simple to complex; from component level to equipment to systems and intersystem levels with functional testing being completed before performance testing.

8. Items of noncompliance in material, installation or setup are corrected by the Contractor and the system is re-tested.

9. The CxA reviews the O&M manuals for clarity, accessibility and completeness.

10. The CxA reviews, pre-approves and coordinates the training provided by the Contractor and verifies that it is completed properly in accordance with the specifications and drawings.

11. Commissioning is completed before the Project Acceptance Date, except for trend log monitoring, verification of controls systems training sessions.

12. Deferred testing and near-warranty-end activities are conducted as specified.

H. All general references to equipment in this document refer only to equipment that is to be commissioned. The responsibility for developing and reviewing forms, overseeing, documenting and witnessing execution and reviewing reports of checks and tests is distributed among contractors, designers and State representative.

I. Commissioning will be witnessed by the CxA under the direction of the Owner.

1.2 RELATED SECTIONS

A. Section 15992 – COMMISSIONING OF HVAC SYSTEMS: Commissioning requirements for the mechanical HVAC systems including the component testing requirements.

1.3 DEFINITIONS

A. The common abbreviations used in this document are outlined:

1. CxA: Commissioning Authority

2. Cx: Commissioning

3. EC: Electrical Contractor

4. FPT: Functional Performance Test

5. GC: General Contractor

6. MC: Mechanical Contractor

7. MFR: Manufacturer

8. PFT Pre-Functional Testing

9. TAB: Testing, Adjusting and Balancing

10. PC: Plumbing Contractor

B. Approval: Acceptance that a piece of equipment, system or issue related to it complies with the Contract Documents.

C. A/E: The prime consultant (Architect) and sub-tier consultants who comprise the design team, generally the Mechanical Engineer and the Electrical Engineer.

D. Basis of Design (BOD): Design program prepared by the A/E for design purposes only.

E. Commissioning: Commissioning is a process intended to provide the owner with a greater degree of assurance that building systems function in compliance with criteria set forth in the Owner's requirements to satisfy the Owner's operational needs.

F. Commissioning Authority (CxA): An independent party, not otherwise associated with Contracting Officer or the Contractor. The CxA witnesses the day-to-day commissioning activities of the Contractor.

G. Commissioning Plan: An overall plan provided by the CxA to the owner prior to the start of construction that details the CxA's scope of work.

H. Design Basis: The basis and assumptions for calculations, decisions, schemes and product selections to meet the User's requirements and objectives and to satisfy applicable regulatory requirements, standards and guidelines.

I. General Contractor: The prime construction Contractor for this Project.

J. Issues Log: Ongoing record of the issues identified during the commissioning process that require or did require correction. For each entry the log includes a unique identification number, identification date, identification party, a short description of the issue, the equipment or assembly it is associated with, a long description of the issue, including cause, implications of the issue, recommendations for correction, assignment of responsibility for correction, an issue closed date and the

name of the party verifying the correction. The CxA is responsible to maintain the log.

K. User's Requirements: Documentation of the functional requirements of the facility and the expectations of how it will be used and operated. This includes project and design goals, measurable performance criteria, budgets and schedules and supporting information. This document is analogous to what has traditionally been referred to as the User's Program.

L. Startup Report: Original equipment manufacturers or service provider's checklist and summary form used for the startup of equipment.

M. Trending: Monitoring using the building control system.

1.4 SUBMITTALS

A. Provide the CxA with information required to facilitate the commissioning process.

B. Standard Equipment and Assembly Submittals:

1. Prior to standard equipment and assembly submittals being issued provide the CxA with a submittal register. The Commissioning Authority will check which submittals they desire to review and comment on and which they need only copies of the approved submittals.

2. Submittal review may be done in parallel with A/E reviews or in series with them, depending on protocol set by the Contracting Officer.

3. Provide a reasonably complete first draft of the control drawings and sequences submittal for review and use during controls integration meetings.

C. Other Equipment and Assembly Information: When not included with the standard submittals, provide to the CxA requested shop drawings, the manufacturer's printed installation and detailed startup procedures, full sequences of operation, O&M data, performance data, performance test procedures, control drawings and details of State-contracted tests. In addition, provide installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms for use by the factory or field technicians to the CxA. This documentation will be required prior to the normal O&M manual submittals.

D. Provide the startup documentation as indicated in the Commissioning Plan.

E. Provide equipment and assembly documentation requested by the CxA in the O&M manuals.

1.5 QUALITY ASSURANCE

A. Test Equipment:

1. Provide testing equipment required to perform installation, startup and initial checkout and required testing.

2. Provide special tools and instruments, only available from vendor, specific to a piece of equipment, required for testing equipment.

3. Provide data logging equipment for setting up and testing required to perform specified electrical equipment testing.

B. Test Equipment Calibration Verification:

1. Within ninety (90) days of notice to proceed and thirty (30) days before testing is performed, provide documentation of the calibration requirements specified below.

2. Electrical equipment testing instruments must be calibrated in accordance with the following frequency:

a. Field Instruments: Analog, six (6) months maximum, digital, twelve (12) months maximum.

3. Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance ‘with the tolerances specified in the Specifications.

a. If not otherwise given, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5 degree F and a resolution of plus or minus 0.1 degree F. Pressure sensors shall have an accuracy of plus or minus 2 percent of the value range being measured (not full range of meter) and have been calibrated within the last year. Calibrate equipment according to the manufacturer’s recommended intervals and when dropped or damaged. Provide calibration tags affixed to equipment or certificates demonstrating calibration and serial number of device.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

A. Provide commissioning of the following equipment, systems, assemblies and features as itemized in Paragraph 1.1.C.1 (Mechanical HVAC Systems).

B. Integrate commissioning requirements into the overall construction schedule.

C. Alert the CxA of deficiencies in compliance with the contract documents identified through the commissioning process or other means.

D. Provide additional requested documentation, prior to normal O&M manual submittals, to the CxA for development of installation, startup and testing procedures. Typically this will include detailed manufacturer installation, startup, operating, troubleshooting and maintenance procedures, full details of State-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the State to keep the warranty in force clearly identified. In addition, provide the installation, startup and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians to the CxA.

E. In each purchase order or subcontract written, include requirements for submittal data, O&M data, commissioning tasks and training that will meet the requirements of the Specifications.

F. Respond to notices of issues identified during the commissioning process. Make required corrections or clarifications and return prompt notification to the CxA.

G. When completion of a task or other issue has been identified as holding up commissioning process, particularly functional testing, within four (4) days of identification of the issue, notify the CxA and provide an expected date of completion. Notify the CxA within one (1) day of completion. It is not the responsibility of the CxA to obtain this status information through meeting attendance, asking questions or field observation.

H. Planning Meeting: Attend a commissioning planning meeting to be held within fourteen (14) days prior to start of construction with the full Commissioning Team in attendance. During this meeting, the CxA will describe the overall scope and process of the commissioning effort for this project, address issues and suggestions from all parties, finalize management and reporting protocols, present the project schedule discussed and the draft commissioning plan thoroughly.

I. Kick-off Meeting: Attend the commissioning kick-off meeting with the entire commissioning team in attendance. One (1) week prior to this meeting, the

updated commissioning plan will be distributed to all members for their review. The commissioning plan, the overall commissioning process and general responsibilities of each team member, reporting and communication protocols and next steps will be discussed.

J. Temporary or Early Startup of Equipment. When equipment will be used, in a temporary mode prior to operating the equipment permanently, develop a plan to address the issues surrounding indoor environmental quality, moisture intrusion, building pressurization, duct and equipment cleanliness, checkout of safeties and fire alarm and protection, etc. Obtain plan approval from Contracting Officer prior to such startup.

K. Miscellaneous Meetings: Attend the weekly meetings conducted by the CxA to address deficiencies, status, and coordination and planning. Require members of the commissioning team to attend commissioning meetings as requested by the CxA or necessary to address specific systems.

L. Controls Integration Meetings: Attend two (2) controls integration meetings conducted by the CxA to go over the control drawings, sequences of operation, points list and database and controls submittal requirements. These meetings are held prior to a formal control drawing submittal and before programming. The intent is to clarify control related issues for the controls contractor and mechanical contractor, Users, and CxA prior to final point database development, programming and the formal control drawing submittal.

1. Require the controls sub-contractor to attend all meetings. Require the mechanical sub-contractor, electrical sub-contractor, and the General Contractor to attend when issues regarding equipment they are responsible for are discussed. Invite the mechanical and electrical designers to attend as needed.

2. Provide complete control drawing submittals and sequences to CxA and Contracting Officer. These drawings are not preliminary in content or accuracy.

3. Parties will review the drawings and sequences and provide formal written comments on forms provided by the CxA. The CxA will submit these comments to the Contractor who shall respond in writing to each comment on forms provided. The comments and responses will be distributed by the CxA prior to the meeting(s).

4. Primary issues discussed and clarified are:

a. Unresolved issues from the controls review.

b. New issues from meeting attendees.

c. Issues and clarifications needed from the controls contractor.

d. Control drawing content and format.

e. Point database (monitored points, software points, naming conventions, alarms, and report format).

f. Sequences of operation and set points (clarity, completeness, design intent, functionality, and enhancements for control, energy and O&M).

g. Interlocks to packaged controls and other systems, including filling in the fire alarm and emergency power response matrices.

h. Field sensor and panel locations.

5. Conduct a site walk-through with the Controls Contractor, CxA and Contracting Officer to identify precise locations of panels, sensors and central controllers.

3.2 CONSTRUCTION STARTUP DOCUMENTATION PACKAGE & CHECKLISTS

A. The following documents and related procedures apply to all equipment and assemblies to be commissioned.

1. For dynamic systems and static assemblies so designated in the Commissioning Plan, prior to startup provide a proposed startup documentation package, using the manufacturer's installation and startup procedures, consisting of the following:

a. Construction Checklist.

b. Startup Report

2. Existing written testing requirements and procedures in accepted or required standards, guidelines or Specifications will suffice as the test procedures for the following: Regulated tests such as fire alarm, fire suppression, elevators, NETA electrical equipment tests, test procedures within these specifications and common Contractor tests such as duct and piping tests.

3. All commissioned equipment will require the Construction Checklist:

a. In general, larger more complex equipment may require the startup report.

b. In addition to the Construction Checklist defined in Item "a.".

4. Provide trend logs to the CxA as requested and in the specified format.

5. Provide assistance to the CxA in interpreting apparent system performance problems from monitored and test data.

6. Provide time in selected construction meetings to cover commissioning-related issues.

7. Construction Checklists:

    a. On each Construction Checklist, identity which trade or contractor is responsible for executing and documenting each line item.

    b. Assist in clarifying the operation and control of commissioned equipment or assemblies in areas where the Specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.

8. Functional Performance Test Procedures:

    a. Prior to execution, test procedures developed by the CxA are provided to the Contractor who shall review the tests for feasibility, safety, and equipment and warranty protection.

    b. Prior to execution, test forms developed by the Contractor are reviewed and approved by the CxA.

    c. Schedule functional performance testing with the CxA at least fourteen (14) days prior to executing the functional performance tests.

    d. Perform tests following the approved test procedures, witnessed by the CxA.

B. Test Procedure Format: Test forms for commissioned mechanical equipment are provided as a supplement to this Section. Test procedure forms include (but not be limited to) the following information:

1. System and equipment or component name(s).
2. Equipment location and ID number.
3. Unique test ID number and reference to unique construction checklist and startup documentation ID numbers for the piece of equipment.
4. Date.
5. Project name.
6. Participating parties.

7. A copy of the specific sequence of operations or other specified parameters being verified.
8. Formulas used in calculations.
9. Required pm-test field measurements.
10. Instructions for setting up the test.
11. Special cautions, alarm limits, etc.
12. Specific step-by-step procedures to execute the test for each sequence or feature being verified, in a clear, sequential and repeatable format.
13. Acceptance criteria of proper performance with a “Yes/No” check box to allow for clearly marking whether or not proper performance of each part of the test was achieved.
14. A section for comments.
15. Signatures and date block for the CxA.
16. Execution of Startup:

    a. Provide a full construction startup and checkout by the following the procedures included and approved in the Startup Document Package. Use no sampling strategies. Allow only individuals that have direct knowledge and have witnessed the corresponding line item task on included checklists to initial or check completion of that item.

    b. Complete all pro-start procedures in the Startup Document Package prior to starting equipment, including, but not limited to, verification of completion of wiring, safeties, lubrication, drive rotation and proper electrical test readings. Notify the CxA at least five (5) days in advance of equipment startup to allow the Commissioning Authority to witness.

    c. The CxA will observe installation, startup and checkout of selected systems. Procedures in the Startup Documentation Package will be reviewed by the CxA prior to Functional Testing.

    d. At the completion of the successful startup of the system or equipment (no issues outstanding), provide the completed, signed and dated Startup Documentation Package to the CxA within five (5) days after startup, and at least three (3) days prior to Functional Testing or testing, adjusting and balancing of the equipment.

    e. Operate each commissioned device or assembly to the full extent of its capability, from minimum to maximum, under automatic and manual control and verify that the equipment, system and assembly is functioning according to the specifications, manufacturer’s recommendations and good operating practice.

f. Where final balancing of a system or particular components thereof are not specifically indicated to be performed by the State or State's consultants, provide final balancing arid adjustments for operation within specified tolerances prior to testing and demonstration of such system.

g. The CxA will review installation, startup and checkout documentation and identify incomplete areas.

h. Correct all areas that are deficient or incomplete in the checklists in a timely manner. Provide progress submittals detailing the corrective measures to be taken and indicate issues that may impact testing schedules.

3.3 PHASED STARTUP

A. Project will require startup and initial checkout to be executed in phases. Plan and schedule the phasing in coordination meetings. Results will be added to the master schedule.

B. Provide a written plan to the Contracting Officer and CxA for temporary startup of equipment to be used for space conditioning during construction. Obtain Contracting Officer approval of this plan prior to implementation.

C. Notify the Contracting Officer and the CxA, when the installation will begin for static assemblies that are being commissioned, dates for pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and starting of testing adjusting and balancing. Notify the Contracting Officer and CxA ahead of time, when commissioning activities are not yet performed or are not yet scheduled to avoid any delay in construction.

D. Re-test equipment started up or tested and later modified to confirm that the entire system including sequences and interlocks or assembly functions properly.

3.4 TESTING AND STARTUP

A. Remedy outstanding A/E "punch list" items that may affect equipment operation before testing. Complete air and water adjusting and balancing and remedy discrepancies and problems before testing of the respective air or water related systems.

B. Review test procedures developed by the Commissioning Team for feasibility, safety, and equipment and warranty protection. Provide alarm limits to be used during the tests for personal safety and equipment protection.

C. Provide testing and startup of equipment and systems in accordance with the Commissioning Plan.

D. Provide all tools to start, checkout and functionally test equipment and systems.

E. Provide testing under the direction of skilled technicians for equipment and assemblies specified for testing in this Section. For example, provide an individual tasked with operating the HVAC control system during testing who is familiar with this building and control program. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete necessary tests, adjustments and problem-solving.

F. Provide documentation of installation, startup and initial checkout for selected systems and assemblies, as listed in the Commissioning Plan provided as a supplement to this Section, by parties having direct knowledge of each item being checked off and provide a copy to the CxA. Use forms developed and contained within the Startup Documentation Packages for this purpose.

G. Schedule Commissioning activities to enable the CxA to make efficient use of its time to witness and sign off on the test forms provided in the Supplement. Provide a minimum of two (2) weeks' notice prior to the date of testing to the Contracting Officer and CxA. Notify Owner and CxA three (3) days in advance if tests are canceled or rescheduled.

H. Maintain a daily diary in which to record all issues identified from testing and balancing work, such as damaged or missing duct or insulation, sensors, wiring, valves, dampers, controls, programming, equipment, components, etc. or items that will reduce the effectiveness of the installation or prevent accurate air balancing or systems or building controls. During balancing, provide the CxA this list of issues once a week within one (1) day of the end of the reported week.

I. Correct areas that fail to meet the acceptance criteria and retest.

J. Provide tests for a given systems or assemblies only after they are fully operational under normal and reliable control with control calibrations, programming and control system graphics complete and checked out.

K. Objectives and Scope:

1. The objective of testing is-to demonstrate that each system is operating according to the documented User's Objectives and Contract Documents. For dynamic systems, testing facilitates bringing the systems from a state of initial operation to full dynamic operation. For static elements, testing verifies the performance of the assembly in its installed state under conditions specified in the testing requirements. Additionally, during the testing process, areas of deficient performance are identified and corrected.

2. Test each sequence in the sequence of operation, other significant modes, sequences and control strategies not mentioned in the written

sequences; including, but not limited to startup, shutdown, unoccupied and manual modes, modulation up and down the units range of capacity, power failure, alarms, component staging and backup upon failure, interlocks with other equipment, and sensor and actuator calibrations. Test all interlocks and interactions between systems. Test all larger equipment individually.

L. Test and Verification Methods:

1. Provide testing and. verification for most dynamic equipment by an appropriate combination of active testing (persons manipulate the equipment and observe its function) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. Document tests with photographs where appropriate. Use methods described in the Functional Performance Test Plans included as a Supplement for each test. Include additional or substituted test methods recommended by the CxA and approved by the DOR.

2. Simulated Conditions: Test systems under actual conditions when possible. Simulate conditions by overwriting values when necessary.

3. Overwritten Values: Whenever possible, avoid overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is. Only when absolutely necessary use this method with caution. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable, e.g., for the above case, by heating the outside air sensor with a hair blower rather than overwriting the value or by altering the appropriate set point to see the desired response. Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.

4. Altering Set Points: Rather than overwriting sensor values, and when simulating conditions is difficult, altering set points to test a sequence is acceptable. For example, to see the AC compressor lockout work at an outside air temperature below 55 degrees F, when the outside air temperature is above 55 degrees F, temporarily change the lockout set point to be 2 degrees F above the current outside air temperature.

5. Indirect Indicators: Rely on indirect indicators for responses or performance only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification is completed during construction checklists and calibrations.

6. Setup: Perform each function and test under conditions that simulate actual conditions as close as is practically possible. Provide all necessary materials, system modifications, etc., to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.

7. Sampling: Multiple pieces of similar non-life-safety or otherwise noncritical equipment may be functionally tested using a sampling strategy. Significant application differences and significant sequence of operation differences in equipment invalidates their common similarity. The specific recommended sampling rates and retesting samples are specified in this Section. It is noted that no sampling by the Contractor is allowed in construction checklist execution. The procedure for sampled testing is:

   a. If a specified number of the same individual function fails among the sample of tested equipment, systems or assemblies, then the test individual function on another specified number of wilts. If a specified number of functions fail in the second sample, test and document results of all remaining units on their own and submit the test results to the CxA.

   b. The following is a sampling strategy for the equipment to be commissioned:

System Description	Sample Size
VRF Systems	100 percent
VRF FCU’s	100 percent
Exhaust Fans	100 percent
OAF	100 percent

8. Testing Order: In. general, testing is conducted after construction check listing and startup has been satisfactorily completed. The control system is sufficiently tested and approved by the CxA before it is used for testing, adjusting and .balancing or to verily performance of other components or systems. The air balancing and water balancing is completed and debugged before testing of air-related or water- related equipment or systems. Testing generally proceeds from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is verified.

9. Trend Logs and Monitoring: Provide a minimum of one week of trend logs in all occupied spaces to be analyzed by the CxA. Monitoring using data loggers will be conducted by the CxA. Trend logs and monitoring are normally conducted after active testing and

subsequent trouble-shooting are complete and systems are in normal operation without frequent service shutdowns, etc.

a. Trending and monitoring will verify if the interior conditions are being met by the new HVAC systems. The intended conditions are assumed to be 75 F +/- 2 F, 50% RH +/- 5%.

10. Problem Solving: The burden of problem solving is on the Contractor. The Owner and the DOR actin as his representative and/or the CxA may offer solutions to assist in the problem solving effort.

3.5 ISSUES AND NONCONFORMANCE

A. Issue Management:

1. Provide troubleshooting of identified deficiencies.

2. Provide written reports as often as commissioning meetings are being scheduled concerning the status of each outstanding issue. Present explanations of disagreements and proposals for resolution.

B. Approval and Acceptance: The CxA will note each satisfactorily demonstrated function on the test form. However, formal approval of an entire test form is not normally given. Functional approval or acceptance of a system is indicated after all testing and monitoring is complete and there are no outstanding issues for that equipment or assembly in the CxA's Issues Log.

3.6 DOCUMENTATION

A. Provide the following Documentation:

1. Final commissioning Report.

2. Completed functional test forms with approved record of successful completion of all tests.

3. Record of all manufacturer equipment startup sheets and warranties.

4. Verify a complete set of record drawings from the DOR.

a. Show the basic performance Specifications (flow rates, pressure drops, motor horsepower, break horsepower, power requirements, spring ranges, normal position, etc.) for each load and prime mover on the drawings. Show all service valves, control valves, drain valves, expansion tanks, specialty fittings, gauges, thermometer wells, flow meters and any other specialty equipment that is not simply a piece of pipe. Indicate valve position for manually positioned valves that have special functions.

b. Provide diagrams for the Following Systems: fan coil units, ACCU's, exhaust fans, outdoor air units, submittals, controls, etc.

B. O&M Documentation Completion and Review: Review deficiency list provided by the CxA and provide additional data.

C. Summary of Written Work Products: Written work products generated as part of the commissioning process are described in various parts of the Specifications and in the Commissioning Plan. In summary, the written products are:

	Product	**Developed By**
1.	Owner's requirements and objectives	DOR
2.	Design narratives and design basis	DOR
3.	Final commissioning plan	CxA
4.	Record Drawings	DOR and CxA
5.	Startup Documentation Package	Contractor and CxA
6.	Startup Documentation Package filled out by Contractor	Contractor and CxA
7.	Issues Log	CxA
8.	Warranty Forms	
9.	PFT and FPT Test forms	CxA
10.	Filled out tests	CxA and Contractor
11.	Commissioning Record	CxA
12.	Control Diagrams and Sequences of Operations	CxA and DOR

3.7 WARRANTY PERIOD

A. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty during occupancy. Provide this information to the CxA.

B. Execute deferred testing, witnessed by the CxA, according to the Specifications.

C. Correct deficiencies and make necessary adjustments to O&M manuals and Record Documents for applicable issues in warranty period testing.

END OF SECTION 01810

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 01170 - 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 breads 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 5 – METALS

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

A. Comply with the GENERAL CONDITIONS “Shop Drawings and Other Submittals” section and “Material Samples” section.

B. This Section includes the following: Structural steel shapes, plates, and pipes.

1.03 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.04 SUBMITTALS

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

B. Product Data: For each type of product indicated.

C. Shop Drawings: Show fabrication of structural-steel components.
1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts.
5. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified Professional Engineer licensed in Hawaii.

D. Welding certificates.

E. Qualification Data: For Installer and fabricator.

F. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
1. Structural steel including chemical and physical properties.

2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Shop primers.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer specializing in performing the work of this section with minimum 5 years documented experience.

B. Fabricator Qualifications: A qualified fabricator specializing in performing the work of this section with minimum 5 years documented experience.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."

D. Comply with applicable provisions of the following specifications and documents: AISC's "Code of Standard Practice for Steel Buildings and Bridges." AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.07 COORDINATION

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.01 STRUCTURAL - STEEL MATERIALS

A. Structural Steel Shapes, Plates, and Bars: Carbon Steel: ASTM A 36, typical; ASTM A 992 for W-Shapes.

B. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B.

C. Steel Pipe: ASTM A 53, Type E or S, Grade B.

1. Weight Class: Standard.

2. Finish: Galvanized.

D. Shear Connectors: ASTM A 108, Grade 1015 through 1020, headed-stud type, cold-finished carbon steel, AWS D1.1, Type B.

E. Anchor Rods, Bolts, Nuts, and Washers: As follows:

1. Unheaded Rods: ASTM A 36, galvanized.

2. Headed Bolts: ASTM A 307, Grade A, (ASTM F 568, Property Class 4.6); carbon-steel, hex-head bolts; and carbon-steel nuts, galvanized.

3. Washers: ASTM A 36, galvanized.

F. Nonhigh-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbon-steel, hex-head bolts; carbon-steel nuts; and flat, unhardened steel washers.

1. Finish: Hot-dip zinc-coating, ASTM A 153, Class C.

G. Welding Electrodes: Comply with AWS requirements.

2.02 BOLTS, CONNECTORS, AND ANCHORS

A. Bolts, Nuts, and Washers: ASTM A 307 (galvanized), hex steel structural bolts; and ASTM F 436 hardened carbon-steel washers.

B. Headed Anchor Rods: ASTM F 1554, Grade 36, weldable, straight.
1. Nuts: ASTM A 563 hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436 hardened carbon steel.
4. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.

C. Threaded Rods: ASTM A 193 Grade B7.
1. Nuts: ASTM A 563 hex carbon steel.
2. Washers: ASTM A 36/A 36M carbon steel.
3. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.

2.03 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer.

B. Galvanizing Repair Paint: SSPC-Paint 20 or ASTM A 780.

2.04 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges."
   1. Camber structural-steel members where indicated.
   2. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
   3. Mark and match-mark materials for field assembly.
   4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
   Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning".

F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

G. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces.
   2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
   3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.05 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
   1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.

2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

2.06 SHOP PRIMING

A. Shop prime steel surfaces except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials.
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to SSPC-SP 2, "Hand Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2. Apply 2 coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

D. Primer: Fabricator’s standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer.

2.07 SOURCE QUALITY CONTROL

A. The Contractor will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
1. Liquid Penetrant Inspection: ASTM E 165.

2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

D. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:
1. Bend tests will be performed if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.

2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

1.08 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application, and for a 30-minute working time.

1.09 FABRICATION

A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this section and in shop drawings.

1. Mark and match-mark materials for field assembly.

2. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.

3. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.

4. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible. Plane thermally cut edges to be welded.

C. Finishing: Accurately mill ends of columns and other members transmitting loads in bearing.

D. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings:

1. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2. Weld threaded nuts to framing and other specialty items as indicated to receive other work.

1.10 GALVANIZING

D. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel indicated for galvanizing according to ASTM A 123.

A. W-Shapes: ASTM A 992, Grade 50.

B. Channels, Angles: ASTM A 36.

C. Hollow Structural Steel: ASTM A 500 Grade B.

D. Plate and Bar: ASTM A 36 unless indicated otherwise on Structural drawings.

E. Welding Electrodes: Comply with AWS requirements.

F. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds and repair painting galvanized steel, with dry film containing not less than 93 percent zinc dust by weight, and complying with DOD-P-21035A or SSPC-Paint 20.

2.10 Painting

Apply a one-coat, non-asphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify elevations of concrete bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

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

3.02 PREPARATION

Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.03 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Load and Resistance Factor Design Specification for Structural Steel Buildings."

B. Base and Bearing Plates: Clean steel bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
   1. Set base and bearing plates for structural members on supporting members. Steel shims may be used as required.
   2. Snug-tighten bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure.
   2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

G. Do not use thermal cutting during erection unless approved by the Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.

H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.04 FIELD CONNECTIONS

A. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
   1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Load and Resistance Factor Design Specification for Structural Steel Buildings" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
   2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
   3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.05 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
   1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
   2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

3.06 FIELD QUALITY CONTROL

A. Testing and Inspection Agency: The Contractor will engage a qualified independent testing and inspecting agency to perform the test and inspection report for Field Welding.

B. Welded Connections: Field welds will be visually inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
   1. Liquid Penetrant Inspection: ASTM E 165.
   2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
   3. Ultrasonic Inspection: ASTM E 164.
   4. Radiographic Inspection: ASTM E 94.

END OF SECTION

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
1. Steel framing and supports for mechanical and electrical equipment.
2. Aluminum framing and connections for outdoor louvers at windows.
3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
4. Steel weld plates and angles for casting into concrete not specified in other Sections.
5. Miscellaneous steel trim including steel angle corner guards.

B. Products furnished, but not installed, under this Section include mechanical connectors, such as anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

C. Related Sections include the following:
1. Section 05120 Structural Steel.

1.03 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.04 SUBMITTALS

A. Product Data: For the following:
1. Steel framing and supports

B. Shop Drawings: Show fabrication and installation details for metal fabrications and component systems to be installed.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
2. Provide templates for anchors and bolts specified for installation under other Sections.
3. Retain subparagraph below if products are required to withstand specific design loads and design responsibilities have been delegated to Contractor or if structural data are required as another way to verify products' compliance with performance requirements.
4. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

D. Qualification Data: For professional engineer.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

B. Installer Qualifications: Arrange for installation of metal fabrications specified in this section by same firm that fabricated them.

C. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."

D. Engineer Qualifications: Professional engineer licensed to practice in the State of Hawaii and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fabrications similar in material, design, and extent to that indicated for this Project.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

1.07 COORDINATION

A. Coordinate installation of anchorages for metal fabrications and component systems to be installed. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection: Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2.02 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.03 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, cold-formed steel tubing.

C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads, finish type as follows:
1. Black finish, unless otherwise indicated.
2. Galvanized finish for exterior installations and where indicated.

D. Uncoated Steel Sheet: Commercial quality, product type (method of manufacture) as follows:
1. Cold-Rolled Steel Sheet: ASTM A 366.

E. Galvanized Steel Sheet: Quality as follows:
1. Commercial Quality: ASTM A 526, G90 coating designation unless otherwise indicated.

2.04 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

2.05 STATIONARY BLADE LOUVER

A. Fabrication: Extruded Aluminum stationary horizontal chevron louver style.

1. Design: Double drainable blades shall be contained within the frame with double downspouts in jambs and mullions. Louver design shall limit span between visible mullions to 120 inches (3048 mm).

2. Frame:
   a. Frame Depth: 2 inches (50 mm).
   b. Material: Extruded aluminum, Alloy 6063-T6.
   c. Wall Thickness: 0.060 inch (1.5 mm), nominal.

3. Blades:
   a. Style: Horizontal.
   b. Material: Extruded aluminum, Alloy 6063-T6.
   c. Exterior Wall Thickness: 0.045 inch (1.1 mm), nominal.

4. Fabrication:
   a. Mullion Style – Design incorporates visible mullions or frames at the perimeter of the louver and also at certain intervals within the louver perimeter to support the louver blades. Louver blade sightlines are interrupted at the mullion locations. No rear-mounted blade supports are utilized.

5. Minimum assembly size: 6 inches wide by 6 inches high (102 mm x 02 mm).

6. Maximum Factory Assembly Size: Single sections shall not exceed 120 inches wide by 90 inches high (3048 mm x 2286 mm) or 90 inches wide by 120 inches high (2286 mm x 3048). Louvers larger than the maximum single size shall be require field assembly of smaller sections.

7. Recycled Content: 18% post-consumer. 55% pre-consumer, post-industrial, total 73% by weight.

B. Performance Data:
1. Performance Rating: AMCA Licensed.
   a. Based on testing 48 inch by 48 inch (1219 mm by 1219 mm) size unit in accordance with AMCA 500.
2. Free Area: 43 percent, nominal.

3. Maximum Recommended Air Flow through Free Area: 680 feet per minute (3.5 m/s)
4. Air Flow: 4665 cubic feet per minute (2.2 m^3/s).

C. Model is rated for higher velocities with different effectiveness classes – B, C, D.

D. Wind Driven Water Penetration Performance:
1. Based on testing 39 inches x 39 inches (1 m x 1m) core area, 41 inches x 44 inches (1.04 m x 1.12m) nominal size unit in accordance with AMCA 500-L.
2. Wind velocity: 29 mph (47 kph).
   a. Rainfall Rate: 3 inches/hour (76 mm/hour).
   b. Free Area Velocity: 1209 feet per minute (6.1 m/sec).
   c. Water Resistance Effectiveness: 99.3% (AMCA Class A).

E. Design Windload: Per Code.

F. Louvers shall be factory engineered to withstand the specified seismic loads.
1. Minimum design loads shall be calculated to comply with ASCE – 7, or local requirements of Authority Having Jurisdiction (AHJ).

2.06 FASTENERS

A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide aluminum fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

B. Aluminum Bolts and Nuts: ASTM F 468M for bolts and ASTM F 467 for nuts.

C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.

E. Anchor Bolts: ASTM F 1554, Grade 36. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

F. Eyebolts: ASTM A 489.

G. Machine Screws: ASME B18.6.3.

H. Plain Washers: Round, ASME B18.22.1.

I. Lock Washers: Helical, spring type, ASME B18.21.1.

J. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

K. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
   1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
   2. Material for Anchors in Exterior Locations: Alloy Group 2 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.07 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primers: Provide primers that comply with Division 9 painting Sections. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

D. Concrete Materials and Properties: Comply with requirements in Division 3 Section " Structural Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2.08 FABRICATION, GENERAL

A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication. Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations.

Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated. Coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8- by 1-1/2-inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.09 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated

and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items. Furnish inserts if units are installed after concrete is placed.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

D. Fabricate aluminum frames and supports for exterior louvers.

E. Fabricate inverted U-shaped steel channel frames to support fluid delivery reels for vehicle maintenance shop. Provide mitered joints at channel corner connections. Channels shall be C 12 x 20.7.

F. Galvanize miscellaneous framing and supports where indicated.

G. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.10 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
   1. Provide mitered and welded units at corners.
   2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.

B. Hot dip galvanize shelf angles located in exterior walls.

C. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.11 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

2.12 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim and interior miscellaneous steel trim, where indicated.

2.12 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

D. Hot dip galvanize steel and iron assemblies after fabrication as noted below. Provide touch up of field welds and damaged galvanizing with a zinc rich paint.

2.13 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.14 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.02 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

3.03 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 painting Sections.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OFMEASUREMENT AND PAYMENT

A. All work specified in this Section shall be paid under the “Construction all work (Base Bid)” contract lump sum price. The contract price paid shall be full compensation for all labor, tools, equipment and all other incidentals necessary to complete the work.

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 Leahi Hospital 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 Leahi Hospital 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 Leahi Hospital as covered by modifications. At the time of submission, the Contractor shall inform Leahi Hospital 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 Leahi Hospital 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 Leahi Hospital. 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 Leahi Hospital 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 Leahi Hospital 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, 2006 as amended by City and County of Honolulu, International Energy Conservation Code, 2015 as amended by the City and County of Honolulu, Uniform Plumbing Code, 2006 with local amendments, Uniform Fire code, NFPA 1 2012 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 Leahi Hospital. 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 Leahi Hospital. 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 Leahi Hospital, he shall make good any resultant damage or defect. All interpretations of Drawings and specifications shall be clarified by Leahi Hospital.

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 two or more items of the same class of equipment are required these items shall be products of a single manufacturer; however, the component parts of the items need not be the products of the same manufacturer. Each item of equipment shall have the

manufacturer's name, address, model number and serial number on the nameplate.

C. The mechanical contractor shall provide all necessary options and/or accessories to comply with the applicable equipment specification requirements. Installation of the options and/or accessories shall be in accordance with the manufacturer’s requirements and the complete assembly shall be warranted by the respective equipment manufacturer.

D. The Mechanical contractor shall provide certified manufacturer’s representatives and/or service technicians for any field modification to mechanical equipment. The Contractor shall ensure that any modification to the equipment will not invalidate the manufacturer’s warranty.

2.02 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:

Near each valve and branch connection.

Wherever piping merges or disappears from view from the floor of the room in which it is installed.

Labels shall not be more than 50 feet apart.

3.05 EQUIPMENT IDENTIFICATION

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

3.06 COORDINATION OF WORK AS SPECIFIED IN OTHER SECTIONS

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

3.07 INSPECTIONS

A. All work and materials are subject to field observation at any and all times by the Engineer.

B. Contractor shall notify the Engineer a minimum of two days prior to testing any piping which must be witnessed and approved before they are

covered up or enclosed. Should the Contractor fail to notify the Engineer at the times prescribed, it shall then be the Contractor's responsibility to make accessible any concealed lines, or demonstrate the acceptability of any part of the system. Any extra cost caused by the removal of such work shall be borne by the Contractor.

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

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 LEAHI HOSPITAL 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 Leahi Hospital 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 Leahi Hospital 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 seven (7) copies of the Maintenance Service Contract, countersigned by the Contractor, that will validate the Guaranty.

B. The Guarantee and maintenance service shall extend for a period of one year after 30 consecutive days of trouble-free operation after the Project Acceptance Date, or the Air Conditioning Equipment Acceptance Date if earlier than the Project Acceptance Date, and shall include all labor, materials, equipment and parts necessary to service the complete system, in accordance with the subsection 3.16 E. Maintenance Schedule, so as to assure proper operation and function of the system. All costs for the periodic maintenance, including emergency calls, shall be borne by the 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. Air conditioning system acceptance date.
   3. Service contract expiration date.
   4. Monthly inspection schedule for the maintenance period.

5. Itemized listing of the equipment covered under the service contract, including a description of the equipment identified, its model and serial number(s) and manufacturer's name(s).

   Maintenance service contractor shall have a local office, staffed with competent and qualified manufacturer's factory trained and certified field service personnel and stocked with full inventory of replacement repair parts, to perform specified service and maintenance tasks on all equipment in accordance with the One-Year Maintenance Service Contract and terms and conditions of all equipment manufacturer's warranties and recommendations. Field service personnel shall be fully capable of providing technical assistance instruction, routine maintenance and emergency maintenance service on all system equipment components.

D. The Maintenance Service Contract shall be submitted along with the Operations and Maintenance Manual on/or before the Project Acceptance Date.
Distribution of submittal:
1 copy: Contractor
1 copy: DAGS Inspection Branch Engineer Files
2 copies: User (Leahi Hospital)
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. AIR HANDLING UNIT/FAN COIL UNIT

   a. Monthly Service

      i. 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.)
      ii. Change all disposable air filters at least once a month; provide as indicated on drawings.
      iii. 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.
      iv. Lubricate and oil all fan and motor bearings and connections of dampers and vanes.
      v. Check all drives for wear; adjust belt tension. Replace belt as required.
      vi. Operate equipment to check for proper operation, unusual noise and vibration; adjust or repair all

equipment and controls as required; clean-up all equipment.

vii. Check time clock for proper operation and time settings.

viii. Certify performance of monthly services and that all discrepancies are reported and corrected.

b. Annual Service

i. Adjust alignment of bearings and sheaves; lubricate fan and motor bearings. Replace worn or noisy bearings or sheaves.

ii. Clean cooling coils of dirt accumulation using nitrogen, high pressure air/water, steam or chemical coil cleaner solution.

iii. Check pressure and temperature differential across cooling coils and log readings. Clean strainers, check vents and drains on chilled water coils.

iv. Clean supply and return air grilles, registers and diffusers and fresh air intake grilles and dampers and repair or replace deteriorated bird screens.

v. Clean and adjust water valve; clean strainer (chilled water) and clean all fan wheels and interior and exterior of equipment housings.

vi. Secure all loose housing, seal leaks and touch-up paint after cleaning all rust.

vii. Check and calibrate all pneumatic and/or electric temperature controls.

viii. Certify performance of annual service and that all discrepancies are reported and corrected.

2. TEMPERATURE CONTROLS

a. Quarterly Service

i. Check control devices for proper operation, sticking stems, and calibration; repair/replace weak or broken springs and all other parts.

ii. Check automatic dampers for tightness in closing, bent blades and defective linkage; lubricate connections for free movement and repair as required.

iii. Adjust thermostat to maintain 75°F room temperature.

iv. Certify performance of quarterly maintenance service and that all discrepancies are reported and corrected.

3. PACKAGE AND SPLIT VARIABLE REFRIGERANT AIR-COOLED AIR CONDITIONER

a. Monthly Service

i. Perform the tasks of Item a. Air Handling Unit/Fan Coil Unit.
ii. Check compressor oil level and refrigerant sight glass; add oil as needed and change filter/drier if moisture indicated.
iii. 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

i. Perform the tasks of item a. Air Handling Unit/Fan Coil Unit.
ii. Check compressor coupling alignment; lubricate or replace noisy bearings.
iii. Clean cooling and condenser coils of dirt accumulation using nitrogen, high pressure air/water, steam or chemical coil cleaner solution.
iv. Test compressor crankcase oil and replace if contaminated or submit oil test results. clean or replace strainer and oil filter (open compressor).
v. 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.
vi. Check and clean all unit housing (inside and outside and components), seal leaks and remove rust from exterior components and touch-up paint.
vii. Megger (electrical test to measure wire insulation resistance, i.e. condition) compressor motor and submit report and recommendation; check starter, relays, and control contacts and electrical connections for tightness and clean as required.

F. WORK SCHEDULE

All maintenance work shall be performed between the hours of 9:0 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 Leahi Hospital, 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 Leahi Hospital, 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 three (3) hard bound copies of the Operating and Maintenance Manual on all equipment and the system as a whole. The manual shall identify project name and number, contractor, consultant, date and all equipment provided, It shall include the equipment manufacturer's name, model and serial number, tag no., capacity, quantity of units, their location and area (room) served and shall include the manufacturer's operation and maintenance manuals including control and wiring diagrams and source of service and replacement parts. When standard manufactures' brochures are used, adequately indicate (highlight, arrow, etc.) the project related information and delete (X or cross-out) the non applicable information.

B. Distribution of submittal:

1 copy: User

2 copies: User's Facility Maintenance Agency

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		1	2
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		

Compressors	**1**		**2**		**3**	
Capacity Reduction	**RLA**	**Ref P**	**RLA**	**Ref P**	**RLA**	**Ref Press**
Full Load						
75%						
50%						
25%						

Air Handling Units		**1**	**2**	**3**	**4**	**5**
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					

END OF SECTION 15000

SECTION 15650 AIR CONDITIONING AND VENTILATION

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The General Conditions and Special Conditions preceding shall govern this section of the specifications.

1.02 SCOPE OF WORK

A. Ducts and fittings

B. Diffusers, registers, and grilles

C. Duct accessories

D. Fans

E. Split variable refrigerant flow (VRF) systems

F. Insulation

G. Refrigerant piping and accessories

H. Condensate drain piping

I. Controls and control wiring

J. Testing, adjusting, and balancing

1.03 GENERAL REQUIREMENTS

A. Furnish ductwork, piping offsets, fittings and accessories as required to provide a complete installation. Coordinate the work of the different trades to avoid interference between piping, equipment, structural and electrical work. Provide complete, in place, all necessary offsets in piping and ductwork, and all fittings, and other components, required to install the work as indicated and specified.

B. All work shall be done in accordance with the International Building code, 2006 as amended by City and County of Honolulu, International Energy Conservation Code, 2015 as amended by the City and County of Honolulu, Uniform Plumbing Code, 2006 with local amendments, Uniform Fire code, NFPA 1 2012 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.

C. 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-latest edition.

D. Contractor shall obtain all permits, licenses and certificates and pay for all fees.

E. The drawings and specifications are intended to cover the complete installation of systems to function as described. The omission of reference to any necessary item of labor or material shall not relieve the Contractor from providing such labor or material. Drawings do not attempt to show exact details of piping and ductwork. Provide offsets as necessary to avoid local obstructions or interferences with other trades.

1.04 QUALITY ASSURANCE

A. Except as otherwise specified, approval of materials and equipment is based on manufacturer's published data.

1. Where materials and equipment are specified to conform to the standards of the Underwriters Laboratories, the label of or listing with reexamination in UL Bld Mat Dir, and UL 6 is acceptable as sufficient evidence that the items conform to Underwriters Laboratories requirements. In lieu of such label or listing, submit a written certificate from any nationally recognized testing agency, adequately equipped and competent to perform such services, stating that the items have been tested and that the units conform to the specified requirements. Outline methods of testing used by the specified agencies.

2. Where materials or equipment are specified to be constructed or tested, or both, in accordance with the standards of the ASTM International (ASTM), the ASME International (ASME), or other standards, a manufacturer's certificate of compliance of each item is acceptable as proof of compliance.

3. Conformance to such agency requirements does not relieve the item from compliance with other requirements of these specifications.

B. Electrical components, devices and accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency.

1.05 SUBMITTALS

Unless otherwise noted, six sets of all submittals shall be submitted.

A. Shop Drawings:

1. Duct layout indicating sizes, configuration, liner materials and static pressure classes. Include elevation of top of ducts, fittings, hangers/supports, typical support details, vibration isolation, penetrations through smoke barriers and fire-rated construction, locations of duct accessories (dampers, turning vanes, access doors and panels). Include any information required to demonstrate that the system has been coordinated and functions properly as a unit on the drawings and show equipment relationship to other parts of the work, including clearances required for operation and maintenance.

B. Record Drawings:

1. 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.

C. Product Data:

1. Diffusers, registers and grilles
2. Manual balancing dampers
3. Fire dampers
4. Smoke dampers
5. Louvers
6. Air vents, penthouses and goosenecks
7. Centrifugal fans
8. VRF Systems

D. Operation and Maintenance Data:

1. Diffusers, registers and grilles

2. Manual balancing dampers

3. Fire dampers

4. Louvers

5. Air vents, penthouses and goosenecks

6. Centrifugal fans

7. VRF Systems

E. Guarantee/Warranty:

1. Provide to owner all manufacturer guarantee certificates and warranties for all equipment.

1.06 CORROSION

A. Protect metallic materials against corrosion. Manufacturer shall provide rust-inhibiting treatment and standard finish for the equipment enclosures. Do not use aluminum in contact with earth, and where connected to dissimilar metal. Protect aluminum by approved fittings, barrier material, or treatment. Ferrous parts such as anchors, bolts, braces, boxes, bodies, clamps, fittings, guards, nuts, pins, rods, shims, thimbles, washers, and miscellaneous parts not of corrosion-resistant steel or nonferrous materials shall be stainless steel 316L for exterior locations and cadmium-plated in conformance with ASTM B 766 for interior locations.

1.07 HOISTING AND RIGGING REQUIREMENTS

A. The Contractor shall retain licensed crane lift and hoisting and rigging contractors for the transport of equipment and materials. The Contractor shall ensure the life and safety of his personnel and the public is not endangered during the lifting and transport of the equipment. All such work shall be carefully coordinated with the facility to ensure protection of life and property and minimize disruption to the facility and surrounding properties. All cost necessary for the transport, hoisting, and rigging of materials and equipment shall be included in the Contractor’s base bid price.

1.08 COORDINATION

A. Contractor shall coordinate work with all trades to ensure the proper fit of equipment and materials within the spaces indicated. Due to the limited space available for equipment and material installation, particular care

must be given to coordinate equipment installation with ductwork, controls, and electrical work. Contractor will be required to correct all defective work resulting from lack of coordination of his work with other trades to the satisfaction of the Contracting Officer at no additional cost to the owner.

1.09 WARRANTY

A. All work in this Section shall be under manufacturer's and contractor's parts and labor warranty for a period of one (1) 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 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 project as a whole.

PART 2 - PRODUCTS

2.01 IDENTIFICATION PLATES

A. In addition to standard manufacturer's identification plates, provide engraved laminated phenolic identification plates for each piece of mechanical equipment. Identification plates are to designate the function of the equipment. Submit designation with the shop drawings. Identification plates shall be three layers, black-white-black, engraved to show white letters on black background. Letters shall be upper case. Identification plates 1-1/2-inches high and smaller shall be 1/16-inch thick, with engraved lettering 1/8-inch high; identification plates larger than 1-1/2-inches high shall be 1/8-inch thick, with engraved lettering of suitable height. Identification plates 1-1/2-inches high and larger shall have beveled edges. Install identification plates using a compatible adhesive.

2.02 EQUIPMENT GUARDS AND ACCESS

A. Fully enclose or guard belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts exposed to personnel contact according to OSHA requirements. Properly guard or cover with insulation of a type specified, high temperature equipment and piping exposed to contact by personnel or where it creates a potential fire hazard.

2.03 METAL DUCTS

A. Sheet Metal Ductwork: galvanized steel sheets, ASTM A 653/653M. Construction, gages and reinforcement shall comply with SMACNA HVAC Duct Construction Standards, latest edition.

B. Fittings: Vaned elbows, take-offs, branch connections, transitions, volume dampers, and flexible connections shall comply with SMACNA standards. Provide radius type elbows with a centerline radius of 1.5 times the width or diameter of the duct where space permits. Otherwise, elbows having a minimum radius equal to the width or diameter of the duct or square elbows with factory fabricated turning vanes are allowed.

C. Turning Vanes: Curved blades of galvanized sheet steel, support with bars perpendicular to blades set; set into vane runners suitable for duct mounting. Comply with SMACNA's HVAC Duct Construction Standards. Vanes shall be single wall for ducts up to 48 inches wide and double wall for larger dimensions.

D. Sealants: Provide sealants and gaskets that have a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723. Do not use pressure sensitive tape as a sealant.

E. Supports: Galvanized steel straps or hanger rods in accordance with SMACNA Duct Construction Standards. Seismic supports shall be rated for Risk Category 3, Seismic Zone 1.

F. Flexible Connections: Neoprene coated glass fabric weighing a minimum of 26 ounces per square yard. Coatings and adhesives shall comply with UL 181, Class I. Minimum tensile strength of 480 lbf/inch in the warp and 360 lbf/inch in the filling. Flame retardant or noncombustible fabric.

For outdoor connections provide glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays, with a minimum weight of 24 ounces per square yard.

G. Duct Insulation: Flexible fiberglass blanket, ASTM C 553, Type 1, class B-4, 1-1/2 pcf.

H. Duct Insulation Finishes: Multi-Purpose Jacket: Provide factory applied jacket with integral vapor barrier.

2.04 DIFFUSERS, REGISTERS AND GRILLES

A. Rectangular and Square Ceiling Diffusers

1. Aluminum, baked enamel white finish diffuser. Diffuser shall be suitable for variable flow rate conditions. Flow pattern, neck size and diffuser size shall be as indicated on the drawings. Fully adjustable pattern. Provide with radial opposed blade damper. T-bar and surface mounting, louvered face style, fixed flow pattern.

B. Fixed Face Register

1. Aluminum, baked enamel, white finish diffuser. Register shall be suitable for variable flow rate conditions, neck size and register size shall be as indicated on the drawings. Fixed louver core. Countersunk screw mounting. Provide with adjustable opposed blade damper.

C. Fixed Face Grille

1. Aluminum, baked enamel, white finish diffuser. Register shall be suitable for variable flow rate conditions, neck size and register size shall be as indicated on the drawings. Fixed louver, single deflection, 3/4” blade spacing] core. Countersunk screw mounting.

2.05 MANUAL BALANCING DAMPERS

A. Standard Manual balancing damper shall be suitable for horizontal or vertical applications. Standard leakage rating, aluminum frames with flanges for attaching to walls and flangeless frames for installing in ducts. Multiple or single aluminum blade, opposed blade design. Stainless steel blade axles. Stainless steel bearings.

B. Low Leakage Manual balancing damper shall be suitable for horizontal or vertical applications. Low leakage rating, aluminum frames with flanges for attaching to walls and flangeless frames for installing in ducts. Multiple or single aluminum blade, opposed blade design. Stainless steel blade axles. Stainless steel bearings. Include locking device to hold single blade dampers in a fixed position without vibration. [Neoprene] blade seals, [aluminum] jamb seals, [aluminum] tie bars and brackets.

2.06 VENTILATION FANS

A. Centrifugal Fans

1. Airfoil centrifugal fans

2. Backward-inclined centrifugal fans

3. Forward-curved centrifugal fans

B. In-Line Centrifugal Fans

1. Provide in-line direct driven centrifugal type fans with backward inclined, non-overloading aluminum wheel, complete with housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, mounting brackets and accessories.

2. Housing shall be removable, constructed of heavy gauge aluminum.

3. Fan shall be listed by UL 705 and shall bear the AMCA certified ratings seal for sound and air performance. Unit shall bean an engraved aluminum nameplate, indicating design CFM, static pressure, maximum fan RPM, make and model number.

4. Bearings shall have a L50 average life at minimum of 500,000 hours at maximum operating speed. Bearings shall be permanently sealed bearings.

5. For direct-driven units the motor shall be mounted in the airstream. For belt driven units the motor shall be mounted on an adjustable base. Motor enclosure shall be totally enclosed fan cooled.

6. Provide with duct collars, access panels, epoxy coating, extended lube lines, inlet and outlet guards for units not connected to ductwork.

7. Isolation as shown on drawings.

2.07 AIR FILTERS

A. Pleated Panel Filters

1. Provide factory fabricated, self supported, flat, pleated panel type disposable air filters coated with adhesive with holding frames. Filter unit class, UL 900. Class 2. 2” thick fibrous glass media pad supported by galvanized steel metal grid sealed to the media. Frame shall be equipped with quick opening mechanism for changing filter media. The filter shall have a rated initial resistance no greater than .30[in-wg at 500 feet per minute (fpm). It shall have an average resistance @ 300 fpm of 80-85% when tested according to ASHRAE 52.1. Adhesive shall have a low VOC content.

B. Pleated Filter Box

1. Provide factory fabricated, 2 inch depth, sectional disposable type filter of the size indicated with a MERV of 4, 8 or 13, refer to equipment schedule. Provide initial resistance at 500 fpm that does not exceed 0.36 in-wg. Provide UL Class 2 filters and synthetic fiber mat media. The media shall be bonded to the frame at all points of contact.

2. Install each filter in a factory preassembled, side access housing or a factory-made sectional frame bank.

2.08 VARIABLE REFRIGERANT FLOW (VRF) SPLIT SYSTEMS

A. Indoor Units

1. Ceiling-recessed cassette

a. General: The ceiling-recessed indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function, a test run switch, and the ability to adjust airflow patterns for different ceiling heights. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.

b. Unit Cabinet:

i. The cabinet panel shall have provisions for a field installed filtered outside air intake.

ii. Branch ducting shall be allowed from cabinet.

iii. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.

iv. The grille vane angles shall be individually adjustable from a wired remote controller to customize the airflow pattern for the conditioned space

c. Fan:

i. The indoor fan shall be an assembly with a statically and dynamically balanced turbo fan direct driven by a single motor with permanently lubricated bearings.

ii. The indoor unit shall include an AUTO fan setting capable of maximizing energy efficiency by adjusting the fan speed based on the difference between controller set-point and space temperature. The indoor fan shall be capable of five (5) speed settings, Low, Mid1, Mid2, High and Auto.

iii. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.

iv. The indoor unit fan logic must include multiple setting that can be changed to provide optimum airflow based on ceiling height and number of outlets used.

v. The indoor unit vanes shall have 5 fixed positions and a swing feature that shall be capable of automatically swinging the vanes up and down for uniform air distribution.

vi. The vanes shall have an Auto-Wave selectable option in the heating mode that shall randomly cycle the vanes up and down to evenly heat the space.

vii. Grille shall include a factory-installed “i-see” sensor, or equal, to work in conjunction with indoor unit control sequence to prevent unnecessary cooling or heating in unoccupied areas of the zone without decreasing comfort levels. Sensor must detect occupancy (not simply motion) and location of occupants by measuring size & temperature of objects within a 39’ detecting diameter (based on 8.8ft mounting height) with 1,856 or more measuring points.

d. Filter:

i. Return air shall be filtered by means of a removable 2” pleated MERV 13 filter. Tested in accordance with ANSI/ASHRAE 52.2 Standard. Rated class 2 under UL Standard 900.

e. Coil:

i. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.

ii. The coils shall be pressure tested at the factory.

iii. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water 33 inches above the condensate pan.

f. Electrical:

i. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.

ii. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

g. Controls:

i. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.

ii. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8°F – 9.0°F adjustable deadband from set point.

iii. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies.

iv. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.

h. A factory-installed drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan. Should this occur the control shuts down the indoor unit before an overflow can occur. A thermistor error code will be produced should the sensor activate indicating a fault which must be resolved before the unit re-starts.

2. Ceiling-concealed ducted

a. General:

i. The ceiling-concealed ducted indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.

b. Unit Cabinet:

i. The unit shall be ceiling-concealed, ducted—with a 2-position, field adjustable return and a fixed horizontal discharge supply.

ii. The cabinet panel shall have provisions for a field installed filtered outside air intake.

c. Fan:

i. Indoor unit shall feature multiple external static pressure settings ranging from 0.14 to 0.60 in. WG.

ii. The indoor unit fan shall be an assembly with statically and dynamically balanced Sirocco fan(s) direct driven by a single motor with permanently lubricated bearings.

iii. The indoor fan shall consist of three (3) speeds, High, Mid, and Low plus the Auto-Fan function

d. Filter:

i. Removable return filter box (rear or bottom placement) with high-efficiency MERV 13 filter as noted on equipment schedule. Tested in accordance with ANSI/ASHRAE 52.2 Standard. Rated class 2 under UL Standard 900.

e. Optional Filter Frame and Filter:

i. Filter frame shall be constructed of 20 gauge G-60 galvanized steel. Knurled thumb screws on access door allow filter replacement. Foam gasket provides air-tight connection to indoor unit and access door. Filter frame shall be configurable for rear or bottom return.

ii. Filter shall be rated MERV 13 when tested in accordance with ANSI/ASHRAE 52.2 Standard Rated Class 2 under U.L. Standard 900.

f. Coil:

i. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.

ii. The coils shall be pressure tested at the factory.

iii. Coil shall be provided with a sloped drain pan. Units without sloped drain pans which must be installed cockeyed to ensure proper drainage are not allowed.

iv. The unit shall be provided with an integral condensate lift mechanism able to raise drain water 27 inches above the condensate pan.

g. Electrical:

i. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.

ii. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

h. Controls:

i. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.

ii. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8°F – 9.0°F adjustable deadband from set point.

iii. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies.

iv. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.

3. CEILING-SUSPENDED INDOOR UNIT

a. General:

i. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. The unit shall have an auto-swing function for the horizontal vane. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

b. Unit Cabinet:

i. The casing shall have a white finish.

c. Fan:

i. The indoor unit fan shall be an assembly with two, three, or four fan(s) direct driven by a single motor.

ii. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.

iii. The indoor fan shall consist of four (4) speeds, Low, Mid1, Mid2, and High, and Auto fan function.

d. Filter:

i. Return air shall be filtered by means of an easily removable, washable filter.

e. Coil:

i. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.

ii. The coils shall be pressure tested at the factory.

f. Electrical:

i. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.

ii. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz)

g. Controls:

i. Units shall have the ability to control supplemental heat via connector CN24 and a 12 VDC output.

ii. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8°F – 9.0°F adjustable deadband from set point.

iii. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies.

iv. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.

v. Manufacturer to provide drain pan level sensor powered by a 20-year life lithium battery. Sensor shall require no external power for operation and shall have an audible indication of low battery condition.

vi. The drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan. Should this occur the control shuts down the indoor unit before an overflow can occur. A thermistor error code will be produced should the sensor activate indicating a fault which must be resolved before the unit re-starts.

4. DUCTED DOAS INDOOR UNITGENERAL:

a. General:

i. The DOAS indoor unit shall be a ducted indoor fan coil that mounts with a fixed rear return and a horizontal discharge supply, primary coil, and two modulating linear expansion devices. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.

ii. The indoor unit shall be factory assembled, wired and run tested. Indoor units which require field-mounted and/or configured controllers which are not tested as an assembly are not allowed. Contained within the unit shall be all factory wiring, cooling/heating coil, temperature and humidity sensors, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

b. Unit Cabinet:

i. The cabinet shall be ducted on both the supply and return

ii. The cabinet panel shall have provisions for a field installed filtered outside air intake.

i. Fan:

iii. The indoor unit fan shall be a statically and dynamically balanced assembly with two Sirocco fan(s) direct driven by a single motor with permanently lubricated bearings.

iv. To allow for proper balancing, indoor unit shall include multiple external static pressure settings up to 0.80 in. WG.

j. Filter:

v. Outside air shall be filtered by a field-supplied filter. Unit shall have sufficient external static pressure to operate with a MERV-13 filter installed.

k. Coil:

vi. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange and all tube joints shall be brazed with phos-copper or silver alloy.

vii. The coils shall be pressure tested at the factory.

viii. A sloped condensate pan and drain shall be provided under the coil. Units without sloped condensate pan which must be installed cockeyed to ensure proper drainage are not allowed.

ix. A condensate lift mechanism shall be factory installed capable of providing up to 21-11/16” of lift.

l. Electrical:

x. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.

m. Controls:

xi. The system shall utilize VRF heating/cooling with intake air temperature ranging from -4° F WB up to 95° F WB (109 ° F DB).

In order to maximize efficiency of VRF (reverse cycle) heating operation, unit shall be capable of intake of unmixed or untreated -4° F WB air directly to the primary coil.

Leaving air temperature set point range shall be adjustable from 50° F to 70° F in one degree increments. The unit shall be capable of providing active coil operation in cooling mode down to 50° F WB. Unit must not allow for fan mode or thermal off operation when the entering air is more than 2° F off the primary coil cooling mode set point; thermal off range between active cooling and active heating operation shall vary based on LAT set point.

Indoor unit shall be shipped with a wall-mountable controller to define set point control. Unit shall also be capable of scheduling and set point control via manufacturer centralized controllers or BACnet interfaces.

5. Outdoor Units

a. GENERAL:

xii. The outdoor unit modules shall be air-cooled, direct expansion (DX), multi-zone units used specifically with VRF components described in this section and Part 5 (Controls). The outdoor unit modules shall be equipped with a single compressor which is inverter-driven and multiple circuit boards—all of which must be manufactured by the branded VRF manufacturer. Each outdoor unit module shall be completely factory assembled, piped and wired and run tested at the factory.

xiii. Outdoor unit systems may be comprised of multiple modules with differing capacity if a brand other than basis of design is proposed. All units requiring a factory supplied twinning kits shall be piped together in the field, without the need for equalizing line(s). If an alternate manufacturer is selected, any additional material, cost, and labor to install additional lines shall be incurred by the contractor. Contractor responsible for ensuring alternative brand compatibility in terms of availability, physical dimensions, weight, electrical requirements, etc.

xiv. Outdoor unit shall have a sound rating no higher than 64.5 dB(A) individually or 69.5 dB(A) twinned. Units shall have a sound rating no higher than 52 dB(A) individually or 54.5 dB(A) twinned while in night mode operation. Units shall have 5 levels sound adjustment via dip switch selectable fan speed settings. If an alternate manufacturer is selected, any additional material, cost, and labor to meet published sound levels shall be incurred by the contractor.

xv. Refrigerant lines from the outdoor unit to the indoor units shall be insulated in accordance with the installation manual.

xvi. The outdoor unit shall have the capability of installing the main refrigerant piping through the bottom of the unit.

xvii. The outdoor unit shall have an accumulator with refrigerant level sensors and controls. Units shall actively control liquid level in the accumulator via Linear Expansion Valves (LEV) from the heat exchanger.

xviii. The outdoor unit shall have a high pressure safety switch, over-current protection, crankcase heater and DC bus protection.

xix. VRF system shall meet performance requirements per schedule and be within piping limitations & acceptable ambient temperature ranges as described in respective manufacturers' published product catalogs. Non-published product capabilities or performance data are not acceptable.

xx. The outdoor unit shall be capable of guaranteed operation in heating mode down to -25F ambient temperatures and cooling mode up to 126°F without additional restrictions on line length & vertical separation beyond those published in respective product catalogs. Models with capacity data for required temperature range published as "for reference only" are not considered capable of guaranteed operation and are not acceptable. If an alternate manufacturer is selected, any additional material, cost, and labor to meet ambient operating range and performance shall be incurred by the contractor.

xxi. The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained. Oil return sequences must be enabled only during extended periods of reduced refrigerant flow to ensure no disruption to correct refrigerant flow to individual zones during peak loads. Systems which might engage oil return sequence based on hours of operation risk oil return during inopportune periods are not allowed. Systems which rely on sensors (which may fail) to engage oil return sequence are not allowed.

xxii. Unit must defrost all circuits simultaneously in order to resume full heating more quickly during extreme low ambient temperatures (below 23F). Partial defrost, also known as hot gas defrost which allows reduced heating output during defrost, is permissible only when ambient temperature is above 23F.

xxiii. While in hot gas defrost the system shall slow the indoor unit fan speed down to maintain a high discharge air temperature, systems that keep fan running in same state shall not be allowed as they provide an uncomfortable draft to the indoor zone due to lower discharge air temperatures.

xxiv. The outdoor unit shall be capable of operating in cooling mode down to -10°F with optional manufacturer supplied low ambient kit.

Low ambient kit shall be provided with predesigned control box rated for outdoor installation and capable of controlling kit operation automatically in all outdoor unit operation modes.

Low ambient kit shall be listed by Electrical Laboratories (ETL) and bear the ETL label.

Low ambient kit shall be factory tested in low ambient temperature chamber to ensure operation. Factory performance testing data shall be available when requested.

xxv. The outdoor unit shall be provided with a manufacturer supplied 20 gauge hot dipped galvanized snow /hail guard. The snow/hail guard protects the outdoor coil surfaces from hail damage and snow build-up in severe climates.

xxvi. VRF four-legged outdoor unit mounting systems shall be provided by manufacturer. Stand shall be made from 7 gauge plate steel with thermally fused polyester powder coat finish that meets ASTM D3451-06 standards. Stands shall be provided with galvanized mounting hardware and meets all ASCE 7 overturning safety requirement.

b. Unit Cabinet:

xxvii. The casing(s) shall be fabricated of galvanized steel, bonderized and finished.

i. Outdoor unit components shall be coated with the Seacoast Protection Coating (Brine Spray – BS coating) to protect components from premature corrosion due to a seacoast environment. Coating shall be applied to components before original outdoor unit assembly to ensure manufacturer quality standards are not compromised and shall meet the following minimum requirements:

≥85µm thermoset polyester-resin powder coating on External Front Panel
≥70µm thermoset polyester-resin powder coating on External Panel Base, Pillar, Compressor Cover, Fan Motor Support, Electrical Box
≥1µm cellulose and polyurethane-resin coating on heat exchanger fins
≥10µm polyurethane coating on printed circuit boards

ii. The outdoor unit shall be tested in compliance with ISO9277 such that no unusual rust shall develop after 960 hours of salt spray testing.

iii. Panels on the outdoor unit shall be scratch free at system startup. If a scratch occurs the salt spray protection is compromised and the panel should be replaced immediately.

c. Fan:

xxviii. Each outdoor unit module shall be furnished with direct drive, variable speed propeller type fan(s) only. Fans shall be factory set for operation at 0 in. WG external static pressure, but capable of normal operation with a maximum of 0.32 in. WG external static pressure via dipswitch.

xxix. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.

i. All fans shall be provided with a raised guard to prevent contact with moving parts.

d. Refrigerant and Refrigerant Piping

xxx. R410A refrigerant shall be required for systems.

i. Polyolester (POE) oil—widely available and used in conventional domestic systems—shall be required. Prior to bidding, manufacturers using alternate oil types shall submit material safety data sheets (MSDS) and comparison of hygroscopic properties for alternate oil with list of local suppliers stocking alternate oil for approval at least two weeks prior to bidding.

ii. Refrigerant piping shall be phosphorus deoxidized copper (copper and copper alloy seamless pipes) of sufficient radial thickness as defined by the VRF equipment manufacturer and installed in accordance with manufacturer recommendations.

iii. All refrigerant piping must be insulated with ½" closed cell, CFC-free foam insulation with flame-Spread Index of less than 25 and a smoke-development Index of less than 50 as tested by ASTM E 84 and CAN / ULC S-102. R value of insulation must be at least 3.

iv. Refrigerant line sizing shall be in accordance with manufacturer specifications.

e. Coil:

i. Outdoor Coil shall be constructed to provide equal airflow to all coil face surface are by means of a 4-sided coil.

ii. Outdoor Coil shall be elevated at least 12” from the base on the unit to protect coil from freezing and snow build up in cold climates. Manufacturer’s in which their coil extends to within a few inches from the bottom of their cabinet frame shall provide an additional 12” of height to their stand or support structure to provide equal protection from elements as Mitsubishi Electric basis of design. Any additional support costs, equipment fencing, and tie downs required to meet this additional height shall be responsibility of Mechanical Contractor to provide.

iii. The outdoor heat exchanger shall be of zinc coated aluminum construction with turbulating flat tube construction. The coil fins shall have a factory applied corrosion resistant finish. Uncoated aluminum coils/fins are not allowed.

iv. The coil shall be protected with an integral metal guard.

v. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.

vi. Unit shall have prewired plugs for optional panel heaters when operating below ambient conditions of 1F to prevent any residual ice buildup from defrost.

vii. Condenser coil shall have active hot gas circuit direct from compressor discharge on lowest coil face area to shed defrost condensate away from coil and protect from Ice formation after returning to standard heat pump operation. While in Heat Pump operation this lower section of the Outdoor Evaporator coil shall continually run hot gas from the compressor discharge to protect the coil from ice buildup and coil rupture. Manufacturers who do not have an active hot gas circuit in the lower section of the Outdoor coil to protect coil from freezing shall not be allowed to bid on project in markets where the outdoor unit will see temperatures below freezing.

f. Compressor:

xxxi. Each outdoor unit module shall be equipped with only inverter driven scroll hermetic compressors. Non inverter-driven compressors, which may cause inrush current (demand charges) and require larger generators for temporary power shall not be allowed.

xxxii. Each compressor shall be equipped with a multi-port discharge mechanism to eliminate over compression at part load. Manufacturer's that rely on a single compressor discharge port and provide no means of eliminating over compression and energy waste at part load shall not be allowed.

i. Crankcase heat shall be provided via induction-type heater utilizing eddy currents from motor windings. Energy-wasting "belly-band" type crankcase heaters are not allowed. Manufacturers that utilize belly-band crankcase heaters will be considered as alternate only.

ii. Compressor shall have an inverter to modulate capacity. The capacity for each compressor shall be variable with a minimum turndown not greater than 15%.

iii. The compressor shall be equipped with an internal thermal overload.

iv. Field-installed oil equalization lines between modules are not allowed. Prior to bidding, manufacturers requiring equalization must submit oil line sizing calculations specific to each system and module placement for this project.

v. Manufacturers that utilize a compressor sump oil sensor to equalize compressor oil volume within a single module shall not be allowed unless they actively shut down the system to protect from compressor failure.

g. Controls:

xxxiii. Outdoor unit shall include Variable Evaporator Temperature or comparable method of varying system evaporator (refrigerant) temperature in order to reduce compression ratio and power consumption during light load or mild ambient temperatures. Multiple evaporator refrigerant temperature settings shall be required in order to optimize efficiency within required system-specific performance and installation constraints. System shall reduce compression ratio only when/if all indoor units are within 1.8F of setpoint; reducing compression ratio based solely on ambient temperature risks discomfort and is not allowed. Variable Evaporator Temperature or comparable method shall incorporate override or disable capability based on external signal to allow for space humidity control or load demand.

xxxiv. The unit shall be an integral part of the system & control network described in Part 5 (Controls) and react to heating/cooling demand as communicated from connected indoor e control circuit. Required field-installed control voltage transformers and/or signal boosters shall be provided by the manufacturer.

xxxv. The outdoor unit shall have the capability of 4 levels of demand control for each refrigerant system based on external input.

h. Electrical:

xxxvi. The outdoor unit electrical power shall be 208/230 volts, 3-phase, 60 hertz or 460 volts, 3-phase, 60 hertz per equipment schedule.

xxxvii. The outdoor unit shall be controlled by integral microprocessors.

xxxviii. The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

2.09 REFRIGERATION PIPING

A. Copper Tube and Fittings

1. Copper tube: ASTM B280, Type ACR.

2. Wrought-copper fittings and unions, ASME B16.22.

3. Solder, ASTM B32, use AG-5, 15 percent silver brazing, 1100°F.

4. Flexible connections: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket. Socket ends. Factory tested at a minimum of 500 psig and maximum operating temperature of 250 F.

5. 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.

6. 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.

7. Solenoid valves: Comply with ARI 760 and UL 429. Valves shall be of the 2 position, direct acting, or pilot operated types, opened or closed, electrically. Plated steel body, polytertaluoroethylene seat, threaded end connection, stainless steel solenoid tube, plunger, closing spring and seat orifice.

8. Electronic expansion valves: The expansion valves shall be part of Variable Refrigerant Flow (VRF) equipment.

9. 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.

10. Moisture/liquid indicators: The moisture indicators in the liquid line of refrigerant systems shall contain indicating material that will indicate moisture by varying degrees of color change, based on 100 degrees F and a moisture content in the range of 45 to 180 particles per million in R410A refrigerant. Indicators shall be a brass or bronze or heavily copper plated steel fitting with the indicator material located under a bulls-eye. Indicators shall be capable of withstanding a test pressure of 350 psig without damage.

11. 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.

12. 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.

13. Liquid receiver: Liquid receiver shall be the vertical or horizontal type, designed, fitted and rated in conformity with ARI 495, except as modified herein. The receiver shall be constructed and tested in conformity with Section VIII of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Each receiver shall have a storage capacity not less than 20 percent in excess of that required for fully charged system. Each receiver shall be equipped with inlet, outlet drop pipes, drain plug, purging valve, relief valves of capacity and setting required by ANSI B9.1, and two bulls-eye liquid level sight glasses. Sight glasses shall be in same vertical plane, 90 degrees apart, perpendicular to axis of receiver.

2.10 CONDENSATE DRAIN PIPING

A. Pipe and Fittings: Schedule 40 PVC socket joint pipe and fittings, ASTM D1785, with solvent cement joints.

B. Supports: As specified for refrigerant piping.

2.11 INSULATION

A. Insulation, adhesives, coatings and accessories shall have surface burning characteristics as determined by ATM E84, NFPA 255 and UL 723, not to exceed 25 for lame spread and 50 for smoke developed.

B. Refrigerant Suction Piping and Condensate Drain Piping:

1. Flexible Unicellular: ASTM C534, Typ 2.

2. Polystyrene: Closed cell type, for outdoor use only.

C. Condensate Drain piping: Flexible closed cell insulation, ½" thick, ASTM C534, Type 1- Tubular Grade 1, 25/50 rated, AP Armaflex SS or pre-approved equal.

2.12 PIPE INSULATION FINISHED:

A. 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.

B. Vapor Barrier Material: Fed. Spec. HH-B-100, Type 1.

C. Aluminum Jackets: ASTM C921, Type II, 0.016 inch thick, smooth.

D. Vinyl Lacquer: Provide two coats of vinyl lacquer finish or pre-approved equal on flexible unicellular insulation located outdoors.

PART 3 - EXECUTION

3.01 DUCT SEALING

A. Seal ducts for duct static pressure, seal classes and leakage classes specified in SMACNA HVAC Duct Construction Standards.

B. Seal Classes:

1. Outdoor, Supply-air ducts: Seal Class A

2. Outdoor/Unconditioned space, Exhaust ducts: Seal Class C

3. Outdoor/Unconditioned space, Return-air ducts: Seal Class C

4. Conditioned/Unconditioned space Supply-air ducts (Pressure class 2-in wg and lower): Seal Class B

5. Conditioned/Unconditioned space Supply-air ducts (Pressure class 2-in wg and higher): Seal Class A

6. Conditioned space, Exhaust ducts: Seal Class B

7. Unconditioned space, Return-air ducts: Seal Class B

3.02 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.

Coating System for Finned Coils: Blygold Polual, aluminum impregnated polyurethane coating. The coating product and process shall be performed only by a qualified applicator. Prior to coating, the coil shall be rinsed using a high-pressure warm water spray system and bent fins shall be adjusted using a properly spaced fin comb. The coil shall then be degreased with a pH neutral detergent to remove manufacturing oils and soiling and again rinsed using a high pressure warm water spray system. The coil must be completely dry prior to coating. A chromate-free conversion layer shall then be applied to the coil using an air-assisted spray gun, achieving total coverage and penetration. The coil shall again be completely dry prior to proceeding to the next step. An aluminum-impregnated polyurethane topcoat shall then be applied using air-assisted spray equipment, ensuring total penetration and coverage without bridging or significantly affecting the heat transfer ability of the coil. The total dry film thickness of the top coat shall be 20 to 25 microns (0.020 to 0.025). The coating shall provide inherent protection against ultraviolet radiation

and be temperature resistant up to 365°F (180°C). The coating manufacturers shall be able to document the successful completion of accelerated product testing of a minimum 3000 hours in both salt spray (ASTM B117) and acetic salt spray tests (ASTM B287); and shall be able to provide a 3 year conditional warranty for the coating within the contiguous United States and Hawaii.

D. 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.

E. Primers: Apply a base primer of Heresite P-700.

F. 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.

3.03 DUCTWORK INSTALLATION

A. Ductwork installation shall be in accordance with SMACNA Duct Construction Standards, 1985 Edition. Ducts shall be installed leaktight so that no leakage of air can be detected. Adjust dampers, diffusers, registers, and accessories to deliver air quantities indicated and so that draft and objectionable noise are eliminated. Provide turning vanes at all elbows and tees and extractors at all branch connections.

B. Sizes, runs, and connections of ducts shall be as indicated. Adhere to drawings as closely as possible. Install ductwork in adherence to heights permitted by the structure and consult with other trades, and in conjunction with them, establish necessary space requirements for each trade. Duct sizes shown on drawings are net size.

C. Openings through construction required for ductwork shall be provided; prepare shop drawings locating such duct openings, and obtain approval in ample time to meet building construction schedule. Ductwork specified herein shall have rectangular cross section unless otherwise indicated.

D. Details of construction, metal gauges, reinforcement and materials not specified herein shall be in accordance with SMACNA Low Velocity Duct Construction Standards, NFPA 90A or as approved. Fabricate ductwork in first class manner with airtight joints, presenting smooth surface on the inside, neatly finished on the outside.

E. Where square elbows are used, provide fixed double radius turning vanes. Construct, brace and support ducts in such a manner that they will not sag or vibrate when fans are operating.

F. Ductwork connections to air conditioning unit and exhaust fan shall be flexible duct connector material with 4" of free space between collars connected. Install a sheet metal band completely around collar at each end of connections and fasten to collars with screws through the band and glass fabric. Screws shall be placed no more than 3" on centers.

G. During construction, keep openings in ductwork closed with sheet metal to prevent injury and take all possible precautions to keep interior of ducts, air intake chambers and fan housings free from dirt or dust.

H. Support galvanized horizontal ducts and at changes of direction with hangers in accordance with SMACNA Duct Construction Standards.

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

J. Provide externally adjustable splitter dampers at all tees.

K. Cleaning of Duct System: After completing installation of ductwork, entire system shall be cleaned of rubbish, plaster, dirt, and any other debris. After installation of equipment and connection are made on fan, and before any grilles, outlets or registers are installed, entire system shall be blown out with dampers and outlets wide open.

L. Acoustical Duct Lining: Apply in cut-to size pieces attached to interior of duct with fire resistant adhesive. Top and bottom pieces shall be secured with welded pins. Punctures shall be sealed with adhesive. Exposed edges of the liner shall also be sealed with adhesive. Application shall comply with SMACNA Duct Liner Application Standard.

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 pre-molded or precut insulation segments, same thickness as adjoining pipe.

B. Vapor Barrier Jacket: Insulation shall be covered with vapor barrier jackets.

C. Refrigerant Piping and Condensate Drain Piping

1. Flexible Unicellular: 3/4" thick on pipes up to 2 inches and 1" thick on pipes over 2 inches.

2. Polystyrene: 1-1/2" thick on pipes up to 2 inches and 2" thick on pipes over 2 inches.

D. Insulation shall be applied with joints tightly butted and ends sealed with vapor barrier coating. Jackets shall overlap and be sealed. Factory self-sealing lap systems may be used. All breaks and punctures in jackets shall be sealed

E. Insulation of the same thickness and type shall be placed around the item, either pre-molded 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 pre-molded PVC fitting covers applied over a layer of vapor barrier coating.

F. Piping Exposed to Weather: Provide aluminum jacketing with overlapped joints over the above specified insulation and vapor barrier jacket.

3.05 REFRIGERATION PIPING INSTALLATION

A. Install refrigerant piping according to ASHRAE 15.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Drawings, schematics and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss and other design considerations.

D. Install piping indicated to be exposed at right angles or parallel to building walls.

E. Install piping above accessible ceiling to allow sufficient space for ceiling access.

F. Install piping adjacent to equipment to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install refrigerant piping in protective conduit where installed belowground. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

3.06 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

3.07 ONE-YEAR MAINTENANCE SERVICE CONTRACT

A. The Installer shall provide a one year service contract to maintain the AC equipment after approved installation. The contractor shall submit 2 copies of the Maintenance Service Contract, countersigned by the Contractor that will validate the Guaranty.

B. The Contractor shall submit a copy of the detailed maintenance agreement submittal to the Hospital for approval before it can be accepted as part of this contract.

C. The maintenance service shall extend for a period of one year after 30 consecutive days of trouble-free operation after the Project Acceptance Date, or the Air Conditioning Equipment Acceptance Date if earlier than

the Project Acceptance Date, and shall include all labor, materials, equipment and parts necessary to service all of the installed AC systems, so as to assure proper operation and functions. All costs for the periodic maintenance, including emergency calls, shall be borne by the Contractor. This maintenance period shall run concurrently (same start and end dates). However, should contractor default on maintenance service contract and need to restart, the warranty period shall be extended to match the maintenance service contract. 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.

D. The Installer shall include a listing of the following items along with the Maintenance Service Contract:

1. Names of the servicing contractor.

2. Air conditioning system acceptance date.

3. Service contract expiration date.

4. Service 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).

6. 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.

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

3.08 DISTRIBUTION OF SUBMITTAL

A. Provide 2 copies to the Leahi Hospital maintenance office.

B. 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. For each DX Split Systems: (in lieu of the following maintenance schedule, the contractor may submit and follow the manufacturers' (printed) recommended maintenance procedures)

a. Monthly Service (12 times per year):

i. Check for abnormal noise and vibration. Visually check for air, water, and refrigerant leaks.

ii. Inspect and clean/clear all drip pans and flush all related condensate drain lines. (Contractor may be liable for water damage due to clogged drains.) Install pan tablets to control algae.

iii. Inspect condenser coil condition. Clean condenser coil of dirt and debris accumulation.

iv. Change all disposable air filters at least once a month; use Farr 30/30 or accepted equivalent.

v. 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.

vi. Lubricate and oil all fan and motor bearings and connections of dampers and vanes.

vii. Check all drives for wear; adjust belt tension. Replace belts if frayed or worn as required. (as required)

viii. Check and record refrigerant suction and discharge pressures.

ix. Check and record compressor amperages and voltage.

x. Check and record supply and return air temperatures and return air relative humidity.

xi. Operate equipment to check for proper operation, unusual noise and vibration; adjust or repair all equipment and controls as required; clean-up all equipment.

xii. Inspect ductwork and duct connections.

xiii. Check time clock for proper operation and time settings.

xiv. Certify performance and completion of monthly service and that all discrepancies are reported and corrected. Submit written service report indicating all abnormalities/discrepancies, if any, and actions taken.

b. Annual Service (one time per year):

i. Adjust alignment of bearings and sheaves; lubricate fan and motor bearings. Replace worn or noisy bearings or sheaves. (as applicable)

ii. Clean all cooling coils of dirt accumulation using nitrogen, high pressure air/water, steam, or chemical (non-acid) coil cleaner solution. Contractor shall protect surrounding areas from water overflow and spillage. Provide additional provisions to catch water overflows/spills if necessary.

iii. Check refrigerant pressure and temperature differential across cooling coils and log readings for all systems. Clean strainers, check vents and drain lines on cooling coils. Re-charge system with refrigerant and oil to new specifications.

iv. Clean supply and return grills, registers and diffusers and fresh air intake grilles and dampers and repair or replace deteriorated bird screens.

v. Clean and adjust water valve; clean all fan wheels and interior and exterior of equipment housings.

vi. Secure all loose housing, seal leaks and touch-up paint after cleaning all rust.

vii. Check and calibrate all electronic or electric temperature controls.

viii. Check for refrigerant leaks with leak detector.

ix. Tighten all electrical connections in starter and disconnects.

x. Certify all manufacturer's recommended performance and completion of annual service. Submit written service report indicating all abnormalities/discrepancies, if any, and actions taken. Submit report to Hospital management.

2. Temperature Controls:

a. Quarterly Service (4 times per year at same time as monthly):

i. Check control devices for proper operation, sticking stems, and calibration; repair/replace weak or broken springs.

ii. Test, check and re-calibrate all electronic controls for all systems. Ensure all equipment interlocks are functioning properly. Check and verify all setpoints of the thermostats that controls.

iii. Check all manual and automatic dampers for tightness in closing, bent blades and defective linkage; lubricate connections for free movement and repair as required.

iv. Adjust thermostat to maintain original setpoint conditions.

v. Certify performance of monthly and quarterly maintenance service and that all discrepancies are reported and corrected.

vi. Ventilation Fans:

vii. Quarterly Service (4 times per year in addition to monthly):

viii. Check motor-controlled and back-draft dampers for proper operation; lubricate linkage for free movement.

ix.

x. Lubricate fan motors and bearings.

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

xii. Check sheaves for wear, replace as needed.

xiii. Check fan collar, bearings and shaft for wear, repair as needed.

xiv. Replace air filters where installed; remove and wash intake grille.

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

xvi. Semi-Annual Service (2 times per year in addition to monthly and quarterly):

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

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

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

xx. Work Schedule: All maintenance work shall be performed as arranged with Leahi Hospital management but generally between the hours of 7:30 a.m. to 4:00 p.m., on normal working days, Monday through Friday, excluding State Holidays.

xxi. 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 Hospital Maintenance after being notified of the problem and report the status of repairs.

xxii. Maintenance Service Report/ Checklist:

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

(b) Date maintenance service was performed.

(c) The name of the mechanic who performed said maintenance.

(d) The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.

END OF SECTION 15650

SECTION 15901 TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

The General Conditions and Special Conditions preceding shall govern this section of the specifications.

1.02 SCOPE OF WORK

A. Balancing Air Distribution Systems

1. Constant air volume systems

1.03 GENERAL REQUIREMENTS

A. It is the intent of the plans and specifications to provide a complete installation. Should there be omissions or discrepancies in the plans and specifications such as dampers, gauges, and sensors that will inhibit the proper Testing, Adjusting and Balancing (TAB) process, 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.

B. Standards

1. Applicable standard published by the National Environmental Balancing Bureau (NEBB) and/or the Associated Air Balance Council (AABC).

1.04 QUALITY ASSURANCE

A. Independent TAB Agency and Personnel Qualifications:

To secure approval for the proposed agency, submit information certifying that the TAB agency is a first tier subcontractor who is not affiliated with any other company participating in work on this contract, including design, furnishing equipment, or construction. Further, submit the following, for the agency to the Engineer.

1. Independent AABC or NEBB or TABB TAB agency:

TAB agency: AABC registration number and expiration date of current certification; or NEBB certification number and expiration

date of current certification; or Testing, Adjusting and Balancing Bureau (TABB) certification number and expiration date of current certification.

TAB team supervisor: Employee of the TAB contractor and certified by AABC or NEBB or TABB. Name and copy of the supervisor's certificate and expiration date of current certification.

TAB Technician: Name and documented evidence that each field technician has satisfactorily assisted a TAB team field for not less than one year immediately preceding this contract's bid opening date.

B. TAB Standard:

1. Perform TAB in accordance with the requirements of the standard under which the TAB Firm's qualifications are approved, unless otherwise specified herein. All recommended and suggested practices contained in the TAB Standard are considered mandatory. Use the provisions of the TAB standard including checklists, report forms, etc., as nearly as practical, to satisfy the Contract requirements. Use the TAB standard for all aspects of TAB, including qualifications for the TAB firm and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB standard, adhere to the manufacturer's recommendations.

C. Instrumentation:

List all test equipment to be used, including its manufacturer, model number, calibration date and serial number, as described in ASHRAE 111, Section 5, "Instrumentation".

D. Certified TAB Report:

1. Review field data reports to validate accuracy of data and to prepare certified TAB report.

2. Certify that the TAB team complied with the TAB standard and the procedures specified and referenced in this specification.

1.05 SUBMITTALS

A. Independent TAB Agency and Personnel Qualifications: Within 30 of contractor's notice to proceed, submit documentation that the TAB contractor and this project's TAB team members meet the qualifications specified in "Quality Assurance" article.

B. Certified TAB reports: Within 30 days of contractor's notice to proceed.

C. Instrumentation: Within 30 days of contractor's notice to proceed, submit documentation in accordance with the "Quality Assurance" article.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 PRE-TAB FIELD WORK

A. Examine the contract documents and become familiar with project requirements. Report deficiencies discovered before and during performance of TAB procedures.

B. Ensure the systems are ready and operational. Verify the following:

1. Automatic temperature control systems are operational.

2. Windows and doors are closed.

3. Equipment doors are closed.

4. Electrical wiring is complete.

5. All mechanical equipment is operational.

3.02 TAB FIELD WORK - GENERAL

A. Comply with the requirements of AABC National Standards for Total System Balance, latest edition, NEBB Procedural Standards, latest edition, ASHRAE 111, latest edition, or SMACNA HVAC Systems – Testing, Adjusting and Balancing, latest edition. Comply with ASHRAE 62.1, latest edition, Section 7.2.2, "Air Balancing"

B. Cut insulation, ducts, pipes and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.

2. Install and join new insulation that matches removed materials. Restore insulation coverings, vapor barrier and finish according to Insulation specifications.

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed control levers and similar controls and devices with paint or other suitable permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP).

E. 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.

F. Ductwork: The Engineer will randomly select section of each completed duct system for testing by the Contractor’s TAB firm. The sections selected will not exceed 20 percent of the total measured linear footage of duct systems indicated as subject to Duct Air Leakage Test (DALT). Sections of duct system subject to DALT will include 20 percent of main ducts, branch ducts, branch ducts and plenums for supply, return, exhaust and plenum ductwork. It is acceptable for an entire duct system to be DALT’d instead of disassembling that system in order to DALT only the portion specified above. Use the duct class, seal class, leakage class and the leak test pressure data indicated in the specifications to comply with the procedures specified in SMACNA 1143.

3.03 PROCEDURES FOR CONSTANT AIR VOLUME SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow: Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure Fan Static Pressures As Follows To Determine Actual Static Pressure:

   a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.

   b. Measure static pressure directly at the fan outlet or through the flexible connection.

   c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.

   d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.

5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.

6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.

3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.

2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.04 PROCEDURES FOR MOTORS

A. Test at final balanced conditions and record the following:

1. Manufacturer’s name, model number and serial number

2. Motor HP rating, RPM and efficiency rating.

3. Nameplate and measured voltage/amperage each phase.

4. Starter thermal protection element rating.

B. If the motor is driven by a variable frequency drive, test for proper operation at speeds from minimum to maximum. Test the manual bypass. Record observations including the manufacturer, model number, serial number and nameplate data.

3.05 TOLERANCES

A. Balance the air and water systems until the below tolerances are met:

1. Diffusers, registers and grilles – plus or minus 10%

2. Major duct branches – plus or minus 5%

3.06 CERTIFIED TAB REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

Include a certification sheet, signed and sealed by the certified testing and balancing engineer.

B. General Data

1. Title page

2. Name and address of the TAB contractor

3. Project name, location

4. Engineer and Contractor’s name and address

5. Report date.

6. Notes to explain why final data in the body of reports vary from indicated values.

7. Air System Diagrams: Include schematic layouts of the air distribution systems, with the following information:

a. Quantities of outdoor, supply, return and exhaust airflows.

b. Duct, outlet and inlet sizes

c. Pipe and valve sizes and locations.

d. Position of balancing devices.

C. Test Reports: Complete standard [AABC] [NEBB] [SMACNA] equipment test reports for the following equipment:

1. Dedicated Outside Air Units

2. Motors

3. Fan Coil Units

4. Ducts

5. Condensing Units

6. Booster Fans

END OF SECTION 15901

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. Installation of feeders, feeder risers and distribution panelboards.
   2. Power systems, including panelboards, branch circuits, wiring devices and outlets.
   3. Power wiring for air conditioning, ventilation, 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.
   4. 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.
   5. 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 six (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) Panelboard(s) including circuit breakers
      2) Safety switches
      3) 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 (1) 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:

Item	Specified Manufacturer & Catalog Number	Substitute Manufacturer & Catalog Number
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. 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. Fire alarm conductors shall be Type THWN. MC cable will be allowed for branch circuits 30A and below.
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

Color codes are as follows for the 480/277 volt, 3 phase, 4 wire system:

A - phase	brown
B - phase	orange
C - phase	yellow
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

Color codes are as follows for the 120/240 Volt, 1 phase, 3 wire system:

A - phase	black
B - phase	red

Owner shall determine whether deviation from color coding will be permitted.

C. Disconnect Switch: heavy duty non-fusible safety switch shall be horsepower rated. 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. Inter-changeable 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. Panelboards: Provide as shown on plans. See plans for panel schedules.
   1. General: Panelboards shall be circuit breaker-equipped. Design shall be such that individual breakers can be removed without disturbing adjacent units or without loosening or removing

supplemental insulation supplied as means of obtaining clearances as required by UL. “Specific breaker placement” is required in panelboards to match the breaker placement indicated in the panelboard schedule on the drawings. Main breaker shall be “separately” mounted from branch breakers. Where “provision for breaker (PFB)” is indicated, provide provisions for future installation of breakers. Directories shall indicate load served by each circuit in panelboard. Directories shall also indicate source of service to panelboard (e.g., Panel PA served from Panel MDP). Type directories and mount in holder behind transparent protective covering.

2. Enclosures: Enclosures shall meet the requirements of UL 50. All cabinets shall be fabricated from sheet steel of not less than No. 10 gauge if flush-mounted or mounted outdoors, and not less than No. 12 gauge if surface-mounted indoors, with full seam-welded box ends. Cabinets mounted outdoors or flush-mounted shall be hot-dipped galvanized after fabrication.
3. Main and Branch Devices: Main and branch circuit breakers shall be quick-make, quick break, and trip indicating. All three-pole breakers with ampere ratings greater than 400 amperes shall have interchangeable trips when available. Interrupting rating of circuit breakers shall not be less than the maximum short circuit current available at the incoming line terminals as shown on plans.
   a. Multipole Breakers: Provide common trip-type with single operating handle. Breaker design shall be such that overload in one pole automatically causes all poles to open. Maintain phase sequence throughout each panel so that any 2 adjacent breaker poles are connected to alternate phases in sequence.
4. Bus Bars: Bus bars shall be copper, current density rated and meet UL67 temperature rise limits through actual tests. All copper bus bars shall be silver plated. Bus bar current density rating shall be as recommended by the manufacturer. Bus bars shall be sequenced-phased, and rigidly supported by high impact resistant, insulated bus supporting assemblies to prevent vibration or short circuits. All solderless terminations shall be suitable for either copper or aluminum UL Listed wire or cable and shall be tested and listed in conjunction with appropriate UL standards. The neutral bar shall be fully rated and capable of being located in either corner of the enclosure at the line end to facilitate conductor termination. Ground wire terminations shall be provided in kit form suitable for installation by the panelboard installer without voiding UL label.

F. Nameplates: Nameplates for identification or instruction on equipment enclosures shall be engraved laminated phenolic plastic, screw mounted. Plates shall be three 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

G. 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.

H. 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.

I. 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. Outlet boxes for telephone, telecommunications or data systems shall be 4-11/16” square x 2-1/8” 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.

J. Devices: Approved equivalent products manufactured by Arrow-Hart, Bryant, Cooper, Hubbell, Leviton, Pass & Seymour, Eaton.
   1. GFCI Receptacles: Duplex, 20-amperes, 125 volts, back and side wired, 3 wire, specification grade, plastic body, with parallel and ground U-shaped slots, NEMA 5-20R in ivory color.
   2. Device Plates:
      a. Plates for exposed and weather exposed boxes shall be cast metal with neoprene gasket for sealing against entry of water and moisture into box. Switch plates shall be provided with neoprene cover over handle or raintight lever mechanism.
      b. Weatherproof receptacle safety outlet enclosure shall consist of an outlet plate with a hinged safety cover that shall remain

weatherproof while in use or idle. The enclosure shall have a latching mechanism to allow the enclosure to maintain weatherproof integrity. The enclosure shall have a cord port(s) capable of allowing an appropriate size electrical cord(s) to pass through when the safety cover is closed. The enclosure shall be UL Listed and conform to NEC requirements. Body materials shall be of flame resistant, ultraviolet inhibiting, impact resistant, polycarbonate resin. Gasket materials shall be of sufficient thickness to form a weatherproof seal. Attachment screw shall be stainless steel. TAYMAC Corporation or approved equal.

K. 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.

L. 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 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. Paint steel conduits in or below grade-level floor slabs with asphaltic corrosion resistant base paint or compound. Polyvinyl chloride conduit may be used in below grade, concrete encased installations and within elevated slab locations. Transition from PVC to EMT conduit will be made with an appropriate adapter fitting above the floor line. All incoming utility feeders shall be concrete encased. 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 ten 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 six inches 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 two 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. Pathways (raceways) and pullboxes for telephone,

telecommunications, or data systems shall be provided and installed in accordance with TIA guidelines.

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 RECEPTACLES

A. Receptacles installed vertically, shall be installed with the ground prong up. Receptacles installed horizontally, shall be installed with the neutral prong up.

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. At the water meter and "dielectric" union joints, install suitable pipe clamps on both sides of the meter or “dielectric” joint and connect together with No. 1/0 copper conductor. Connection shall not interfere with installation or removal of water meter.

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.
2. Provide an Intersystem Bonding Termination bar where required to provide a bonding connection point for building systems (telephone, cable televisions, telecommunications, etc.) other than the electrical system.

3.08 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.

3.09 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.

B. Verify and coordinate all penetrations with the contract drawings prior to the start of construction. Obtain approval before making any penetrations through structural members or fire-rated walls and ceilings. Scan (e.g. x-ray, electromagnetic, etc.) all concrete walls or floor structures prior to commencing with coring/drilling work for penetrations to avoid damaging any reinforcing steel.

3.10 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 ¾". 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 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 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.

3.11 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 four (4) copies submitted to the Owner.

3. Proper operation of all electrical devices shall be demonstrated at request of Owner during final inspection.
4. Balance loading on each feeder to the fullest extent possible.
5. Measure the ground resistance at the electrical service equipment. If requested, the measurements shall be made in the presence of the Owner. Submit four (4) copies of test results to the Owner.

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.

3.12 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

LEAHI HOSPITAL
AC REPLACEMENT

3675 KILAUEA AVE
HONOLULU, HAWAII 96816

PROJECT NO. 20-0295
T.M.K.: 3-2-031:001
PREPARED BY MECHANICAL/ELECTRICAL ENGINEER: INSYNERGY ENGINEERING, INC.

INDEX OF DRAWINGS

SHT. NO.	DWG. NO.	DESCRIPTION
1	001	TITLE SHEET
2	M-001	MECHANICAL GENERAL NOTES AND LEGEND
3	M-101	ADMIN FIRST AND SECOND FLOOR MECHANICAL DEMO AND NEW PLAN
4	M-102	YOUNG FIRST FLOOR MECHANICAL NEW PLAN
5	M-103	YOUNG SECOND FLOOR CONFERENCE ROOM MECHANICAL DEMO AND NEW PLAN
6	M-104	YOUNG SECOND FLOOR MECHANICAL DEMO AND NEW PLAN
7	M-105	YOUNG THIRD AND FOURTH FLOOR MECHANICAL NEW PLAN
8	M-106	YOUNG FIFTH FLOOR MECHANICAL NEW PLAN
9	M-301	MECHANICAL SECTIONS
10	M-302	MECHANICAL SECTIONS
11	M-401	MECHANICAL CONTROLS
12	M-402	MECHANICAL CONTROLS
13	M-501	MECHANICAL DETAILS
14	M-502	MECHANICAL DETAILS
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19	E-002	ELECTRICAL SYMBOLS AND PANEL SCHEDULES
20	E-201	ENLARGED BASEMENT ELECTRICAL PLAN
21	E-202	ENLARGED 1ST FLOOR ELECTRICAL PLAN
22	E-203	ENLARGED 2ND FLOOR ELECTRICAL PLAN
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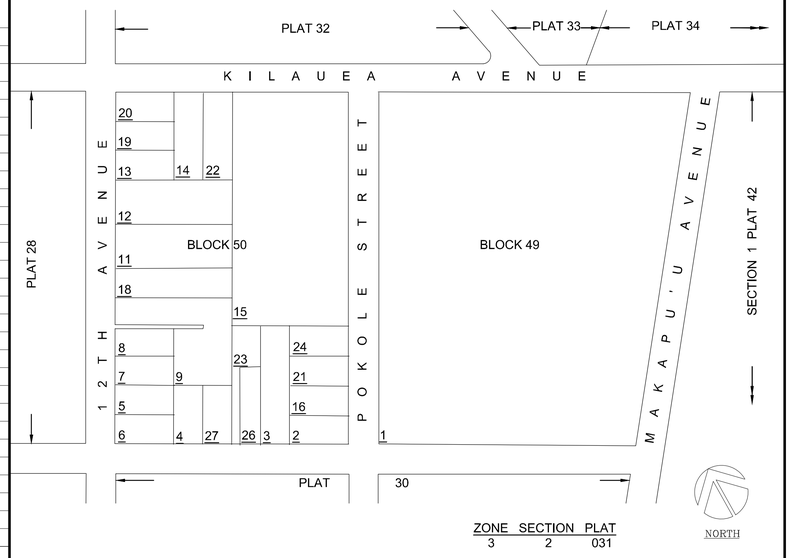
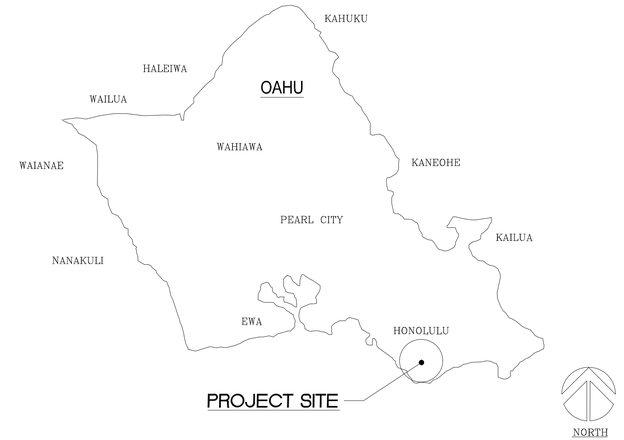
25	E-206	ENLARGED 5TH FLOOR ELECTRICAL PLAN
26	E-207	ENLARGED ADMIN 1ST FLOOR ELECTRICAL PLAN
27	E-208	ENLARGED ADMIN 2ND FLOOR ELECTRICAL PLAN
28	E-501	DETAILS AND ELEVATION
29	E-502	DETAILS
30	E-601	YOUNG BUILDING ONE LINE DIAGRAMS
31	E-801	ELECTRICAL MECHANICAL EQUIPMENT SCHEDULE

TAX MAP KEY



ISLAND MAP



ENERGY COMPLIANCE

CITY AND COUNTY OF HONOLULU CODE
CHAPTER 4 - COMMERCIAL ENERGY EFFICIENCY
2015 IECC

BUILDING ENERGY EFFICIENCY STANDARDS

TO THE BEST OF MY KNOWLEDGE, THIS PROJECT'S DESIGN SUBSTANTIALLY CONFORMS TO THE 2015 INTERNATIONAL ENERGY CONSERVATION CODE, AS AMENDED, PERTAINING TO:

JOEL P. YUEN LICENSED PROFESSIONAL ENGINEER No. 5805-M HAWAII, U.S.A.

SECTION C403 BUILDING MECHANICAL SYSTEMS

SECTION C404 SERVICE WATER HEATING (MANDATORY)

SIGNATURE: Joel P. Yuen DATE: 2/28/2020
NAME: JOEL P. YUEN
TITLE: MECHANICAL ENGINEER
LICENSE No.: 5805-M

REVISIONS	BY

This work was prepared by me or under my supervision and conducted by this project will be under my observation.
Joel P. Yuen

JOEL P. YUEN LICENSED PROFESSIONAL ENGINEER No. 5805-M HAWAII, U.S.A.

INSYNERGY ENGINEERING LLC
MECHANICAL ▪ ELECTRICAL ▪ FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

TITLE SHEET

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	001
Of	1 Sheets 31

MECHANICAL LEGEND

SYMBOL	ABBRV.	DESCRIPTION
	ACCU	AIR COOLED CONDENSING UNIT
	BHP	BRAKE HORSEPOWER
— CD —	CD	CONDENSATE
	CFM	CUBIC FEET PER MINUTE
	CONC	CONCRETE
	DBA	DECIBEL
Ø	DIA	DIAMETER
	DEMO	DEMOLITION
	DN	DOWN
	DWG	DRAWING
	DB	DRY BULB
	EAG	EXHAUST AIR GRILLE
	EER	ENERGY EFFICIENCY RATIO
	(E)	EXISTING
	E.S.P.	EXTERNAL STATIC PRESSURE
	FCU	FAN COIL UNIT
	FT	FEET
	HZ	HERTZ (CYCLES PER SECOND)
	HP	HORSE POWER
	IN	INCHES
	KW	KILOWATT
		MANUAL DAMPER
M		MOTORIZED DAMPER
	MAX	MAXIMUM
	MOCP	MAXIMUM OVERCURRENT PROTECTION DEVICE
	MIN	MINIMUM
	MCA	MINIMUM CURRENT AMPACITY
	(N)	NEW
	NO.	NUMBER
	NTS	NOT TO SCALE
	OA	OUTSIDE AIR
	OAD	OUTSIDE AIR DIFFUSER
	PH	PHASE
	RAR	RETURN AIR REGISTER
— RL/RS —	RL/RS	REFRIGERANT LIQUID/ REFRIGERANT SUCTION
	RPM	REVOLUTIONS PER MINUTE
SD		SMOKE DETECTOR
	SHT	SHEET
	SA	SUPPLY AIR
	SK	SINK
	SYM.	SYMBOL
	TEMP	TEMPERATURE
T		THERMOSTAT
	TYP	TYPICAL
	V	VOLT
	WAC	WINDOW AC
	WB	WET BULB

GENERAL NOTES:

1. EXAMINE THE PROJECT SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS AND THE EXTENT OF REMOVAL, RELOCATION, RECONNECTION AND/OR NEW WORK PRIOR TO BIDDING. NOTIFY AND COORDINATE WITH ENGINEER FOR ANY MAJOR DEVIATIONS DUE TO TO UNFORESEEN OR VARYING FIELD CONDITIONS. BID SUBMISSION SHALL BE CONSIDERED AS EVIDENCE THAT THE SUBCONTRACTOR HAS VISITED THE SITE AND HAS RESOLVED ALL DISCREPANCIES AND QUESTIONS AND NO EXTRA PAYMENT WILL BE AUTHORIZED FOR WORK MADE NECESSARY BY THE SUBCONTRACTOR'S FAILURE TO DO SO.
2. THE ENTIRE INSTALLATION SHALL COMPLY WITH ALL APPLICABLE REQUIREMENTS OF THE BUILDING CODE OF THE CITY AND COUNTY OF HONOLULU, STATE DEPARTMENT OF HEALTH REGULATIONS, 2006 UNIFORM PLUMBING CODE, UNIFORM FIRE CODE, NATIONAL FIRE PROTECTION AGENCY 1 2006, NATIONAL ELECTRICAL CODE, ASME PRESSURE PIPING CODE, HAWAII STATE MODEL ENERGY CODE, AND ALL OTHER AGENCIES HAVING JURISDICTION.
3. THE DRAWING AND SPECIFICATION ARE INTENDED TO COVER THE COMPLETED INSTALLATION OF SYSTEMS TO FUNCTION AS DESCRIBED AND SPECIFIED. THE OMISSION OF REFERENCE TO ANY NECESSARY ITEM OF LABOR OR MATERIAL SHALL NOT RELIEVE THE CONTRACTOR FROM PROVIDING SUCH LABOR AND MATERIAL FOR COMPLETE AND SATISFACTORY OPERATING SYSTEMS.
4. ALL EQUIPMENT SHALL BE CAPABLE OF FITTING INTO THE SPACES ALLOCATED WHILE MEETING THE MANUFACTURER'S RECOMMENDED ACCESS REQUIREMENTS. REVIEW ALL SPACES WHERE EQUIPMENT IS TO BE INSTALLED PRIOR TO ORDERING OF EQUIPMENT AND NOTIFY THE CONTRACTING OFFICER OF ANY INADEQUATE CLEARANCES OR CONDITIONS THAT WILL PREVENT THE PROPER INSTALLATION, MAINTENANCE, AND OPERATION OF THE EQUIPMENT.
5. PROVIDE SHOP DRAWING FOR THE LAYOUT OF EQUIPMENT, PIPING, AND DUCTWORK SHOWING COORDINATION OF ALL WORK WITH ALL OTHER TRADES, INCLUDING PLUMBING, FIRE SPRINKLER, FIRE ALARM, CONTROLS, ELECTRICAL, AND COMMUNICATION SYSTEMS. COORDINATION DRAWING SHALL OVERLAY HVAC, PLUMBING, FIRE SPRINKLER, ELECTRICAL, AND FIRE ALARM SYSTEMS, AND ALL CONFLICTS BETWEEN TRADES SHALL BE NOTED AND RESOLVED.
6. VERIFY AND COORDINATE ALL ROOF, WALL, AND FLOOR PENETRATIONS PRIOR TO THE START OF CONSTRUCTION.
7. OBTAIN APPROVAL FROM THE ENGINEER BEFORE MAKING ANY PENETRATIONS THROUGH STRUCTURAL MEMBERS, WALLS, AND SLABS.
8. DRAWINGS DO NOT ATTEMPT TO SHOW EXACT DETAILS OF PIPING AND DUCTWORK. PROVIDE OFFSETS AS NECESSARY TO AVOID LOCAL OBSTRUCTIONS OR INTERFERENCE WITH OTHER TRADES. REVIEW ALL PIPING AND DUCT RUN PRIOR TO FABRICATION AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY INTERFERENCE AND/OR LACK OF ADEQUATE CLEARANCES.
9. SHOULD PROJECT CONDITIONS REQUIRE REARRANGEMENT OF WORK, MARK SUCH AS CHANGES ON THE AS-BUILT DRAWINGS. IF THESE CHANGES REQUIRE ALTERNATE METHODS TO THOSE APPROVED BY THE CONTRACT DOCUMENTS, SUBMIT SHOP DRAWINGS SHOWING THE PROPOSED ALTERNATE METHODS TO THE ENGINEER FOR REVIEW. DO NOT PROCEED UNTIL REVIEWED.
10. PROPERLY FIRESTOP ALL PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS, OR PARTITIONS WITH A UL APPROVED SYSTEM APPROPRIATE FOR PENETRATION TYPE AND FIRE RATING. FIRESTOP ALL PENETRATIONS BETWEEN FLOORS.
11. SEISMICALLY BRACE ALL EQUIPMENT, PIPING, AND DUCTWORK IN ACCORDANCE WITH THE CURRENT CITY AND COUNTY OF HONOLULU BUILDING CODE FOR THE SEISMIC ZONE 2A.
12. ROUTE ALL CONTROL AND MOTOR STARTER WIRING IN CONDUIT. ANY CONDUIT SHALL BE APPROVED PRIOR TO INSTALLATION.
13. PROVIDE BALANCING DAMPERS AT ALL BRANCHED DUCTWORK.
14. CONTRACTOR SHALL RESTORE ALL EXISTING CONSTRUCTION IMPACTED BY NEW WORK TO ITS ORIGINAL CONDITION OR BETTER. PAINT ALL NEW WORK AND ALL AREAS AFFECTED BY THE CONTRACTOR'S WORK TO MATCH ADJACENT SURFACES.

CONSTRUCTION CONTRACT BID NOTES:

PROVIDE SEPARATE BIDS FOR THE FOLLOWING:

1. BASE BID: YOUNG BUILDING NURSE IN-SERVICE CONFERENCE ROOM AND 2ND,3RD,4TH, AND 5TH FLOOR NURSE STATION, DINNING ROOM, AND SOLARIUM.
2. ADDITIVE ALTERNATE 1: YOUNG BUILDING ADULT DAY HEALTH.
3. ADDITIVE ALTERNATE 2: YOUNG BUILDING OCCUPATIONAL AND RECREATIONAL THERAPY AND ADMIN BUILDING CONFERENCE ROOMS.

CONSTRUCTION PHASING PLAN:

WORK SHALL BE SCHEDULE D AND PHASED TO MINIMIZE DISTURBANCE TO HOSPITAL OPERATION. SUGGESTED WORK SEQUENCES AND WORK CONSTRAINTS ARE AS FOLLOWS:

A. BASE BID: YOUNG BUILDING NURSE IN-SERVICE CONFERENCE ROOM AND 2ND, 3RD, 4TH, AND 5TH FLOOR NURSE STATION, DINING ROOM, AND SOLARIUM.
   1. ONLY 1 FLOOR SHALL BE AFFECTED AT ANY ONE TIME.
   2. ONLY 1 PATIENT GATHERING AREA (DINING ROOM AND SOLARIUM) SHALL BE AFFECTED AT ANY ONE TIME.
   3. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO PATIENT ROOMS WHEN WORK IS CONDUCTED IN CORRIDOR.
   4. PROVIDE ALL NECESSARY INFECTION CONTROL MEASURE AND DUST BARRIERS IN ALL AREA OF WORK IN PATIENT CARE AREAS.

B. ADDITIVE ALTERNATE 1: YOUNG BUILDING ADULT DAY HEALTH
   1. ONLY HALF OF THE ADULT DAY HEALTH SPACE SHALL BE AFFECTED AT ANY ONE TIME.
   2. ONLY 1 OFFICE ROOM SHALL BE TURNED OVER TO THE CONTRACTOR AT ANY ONE TIME.
   3. PROVIDE ALL NECESSARY INFECTION CONTROL MEASURE AND DUST BARRIERS IN ALL AREA OF WORK IN PATIENT CARE AREAS.

C. ADDITIVE ALTERNATE 2: YOUNG BUILDING OCCUPATIONAL AND RECREATIONAL THERAPY AND ADMIN BUILDING CONFERENCE ROOMS
   1. ONLY HALF OF THE OCCUPATIONAL AND RECREATIONAL THERAPY SPACE SHALL BE AFFECTED AT ANY ONE TIME.
   2. ONLY A MAXIMUM OF 2 OFFICE ROOMS SHALL BE TURNED OVER TO THE CONTRACTOR AT ANY ONE TIME.
   3. CONSTRUCTION TO THE ADMIN 1ST AND 2ND FLOOR CONFERENCE ROOMS SHALL COMMENCE SIMULTANEOUSLY.
   4. PROVIDE ALL NECESSARY INFECTION CONTROL MEASURE AND DUST BARRIERS IN ALL AREA OF WORK IN PATIENT CARE AREAS.

REVISIONS	BY

This work was prepared by me or under my supervision and construction of this project will be under my observation.

JOEL P. YUEN
LICENSED PROFESSIONAL ENGINEER
No. 5805-M
HAWAII, U.S.A.

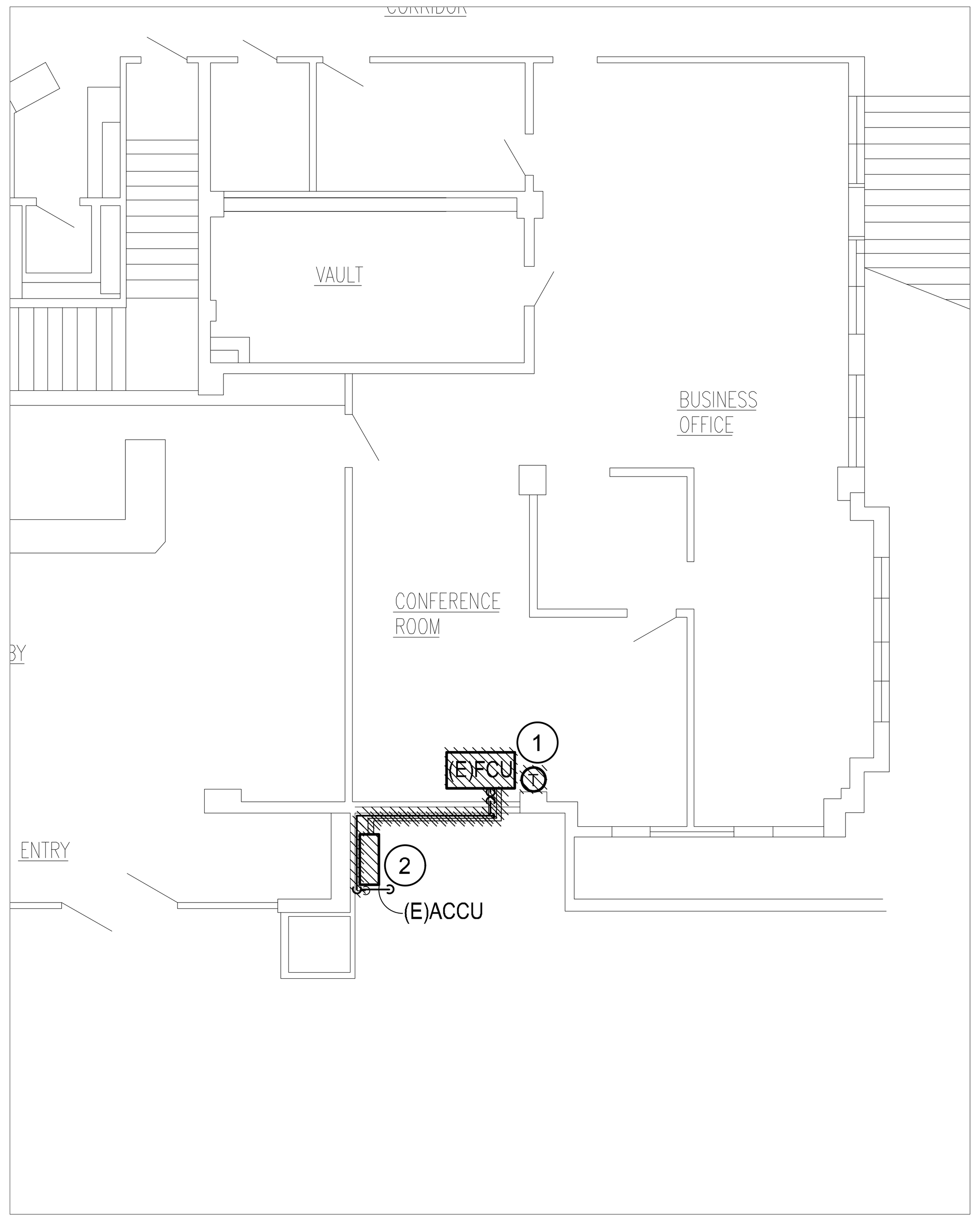
INSYNERGY ENGINEERING INC
MECHANICAL ▪ ELECTRICAL ▪ FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

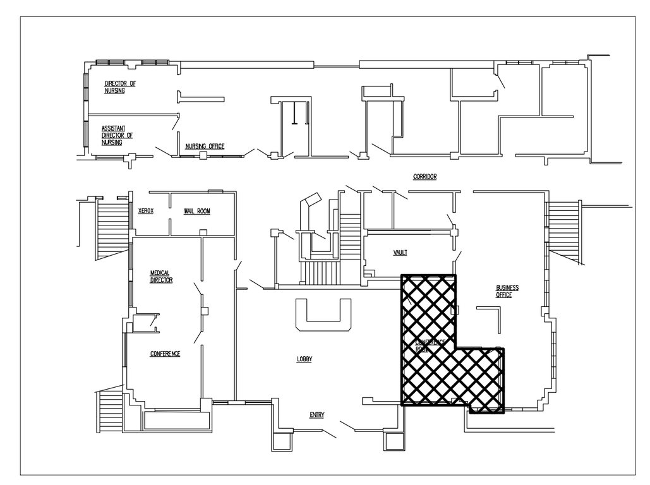
LEAHI HOSPITAL AC REPLACEMENT

MECHANICAL GENERAL NOTES AND LEGEND

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-001

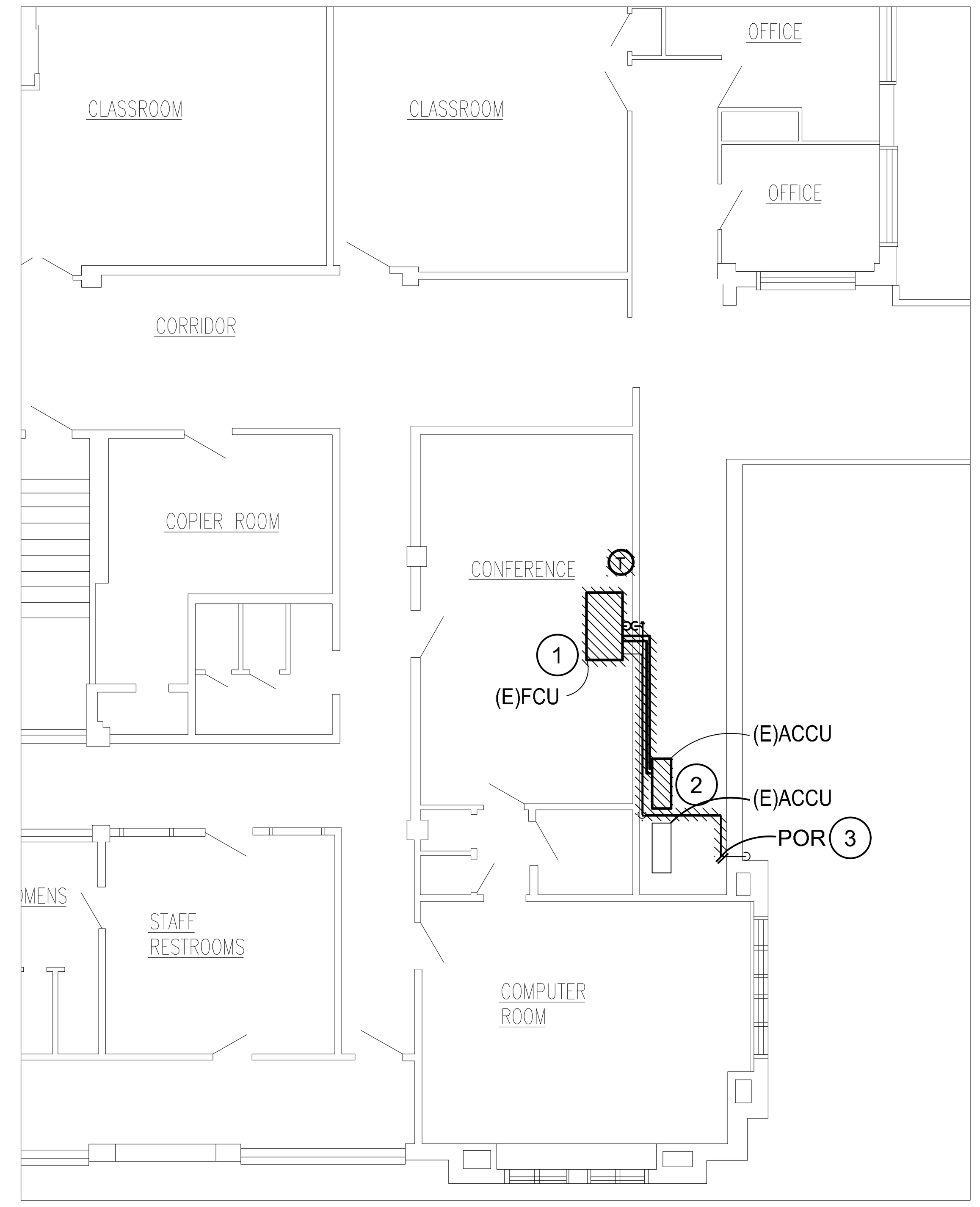
Of 2 Sheets 31

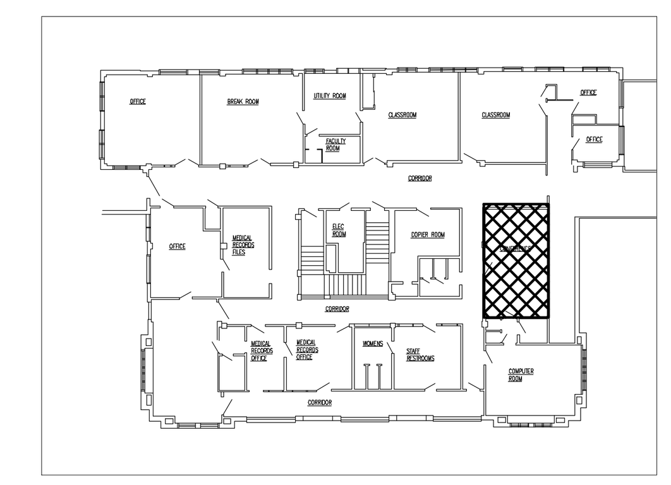




KEYPLAN
SCALE: N.T.S.

1 ADDITIVE ALTERNATE 2: ADMIN FIRST FLOOR MECHANICAL DEMO PLAN
SCALE: 1/8" = 1'0"



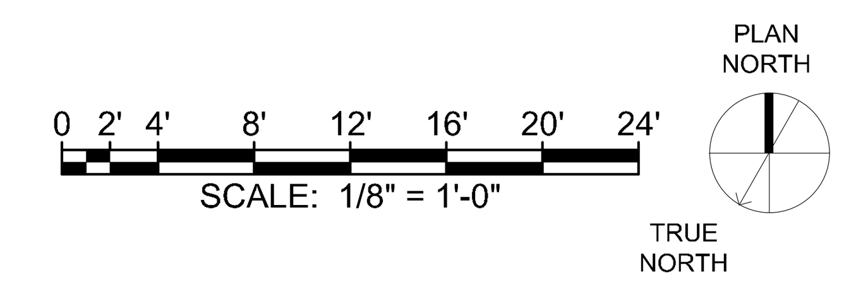


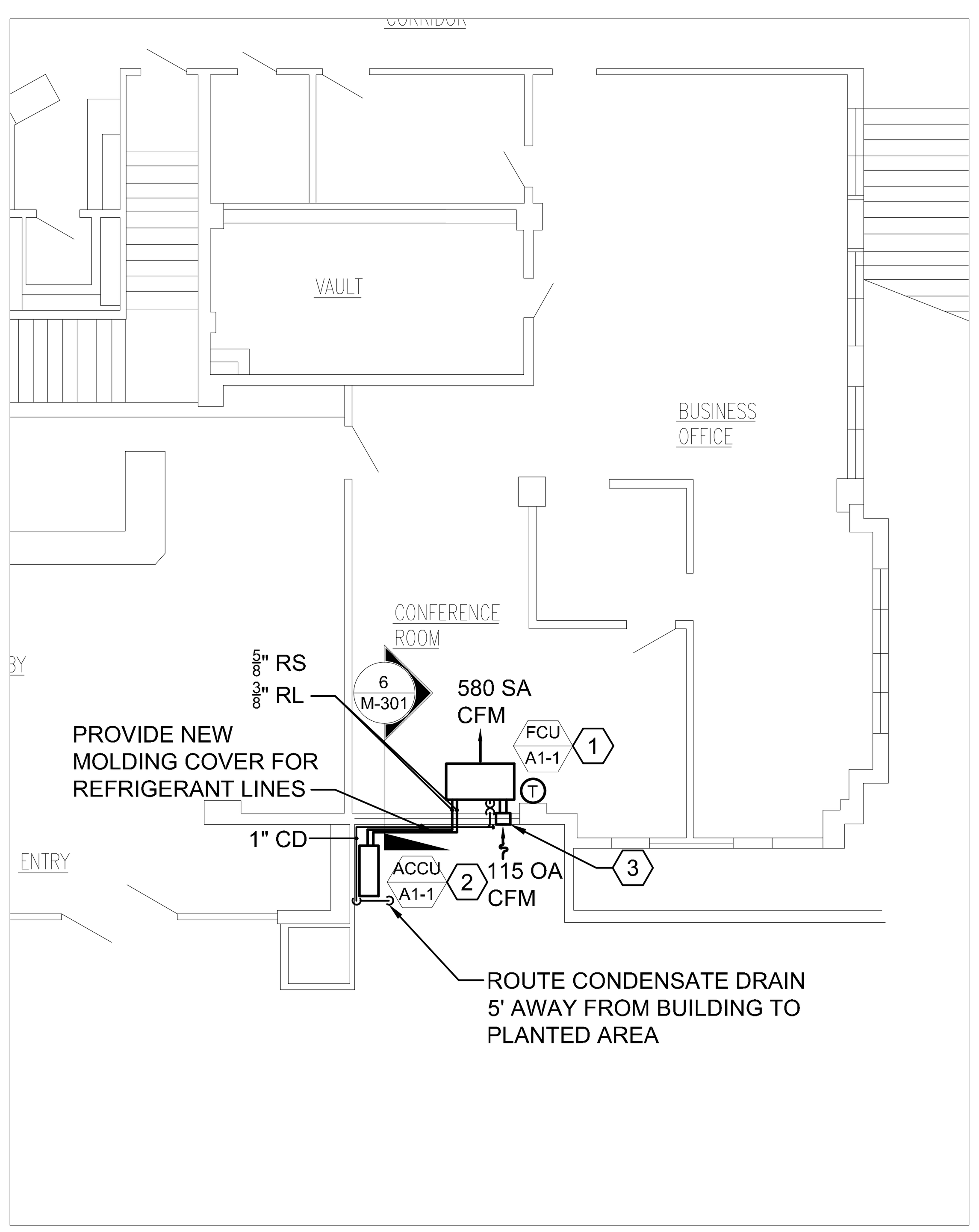
KEYPLAN
SCALE: N.T.S.

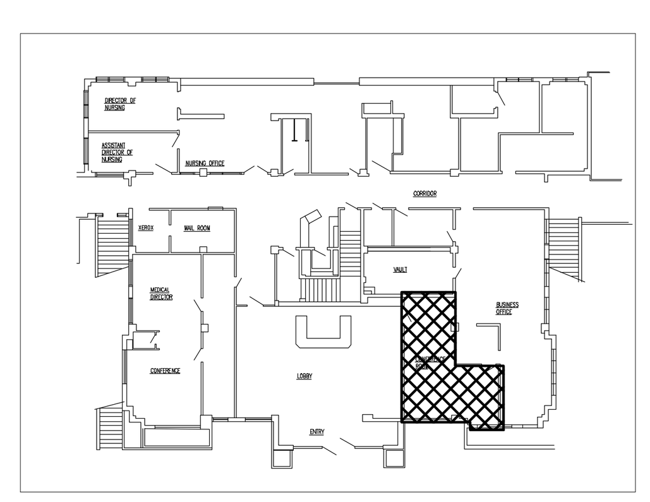
2 ADDITIVE ALTERNATE 2: ADMIN SECOND FLOOR MECHANICAL DEMO PLAN
SCALE: 1/8" = 1'0"

MECHANICAL DEMO NOTES:

1. REMOVE (E)FCU AND ASSOCIATED REFRIGERANT PIPING, T-STAT, CONTROLS AND WIRING.
2. REMOVE (E)ACCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
3. REMOVE CONDENSATE DRAIN PIPE UP TO POR.

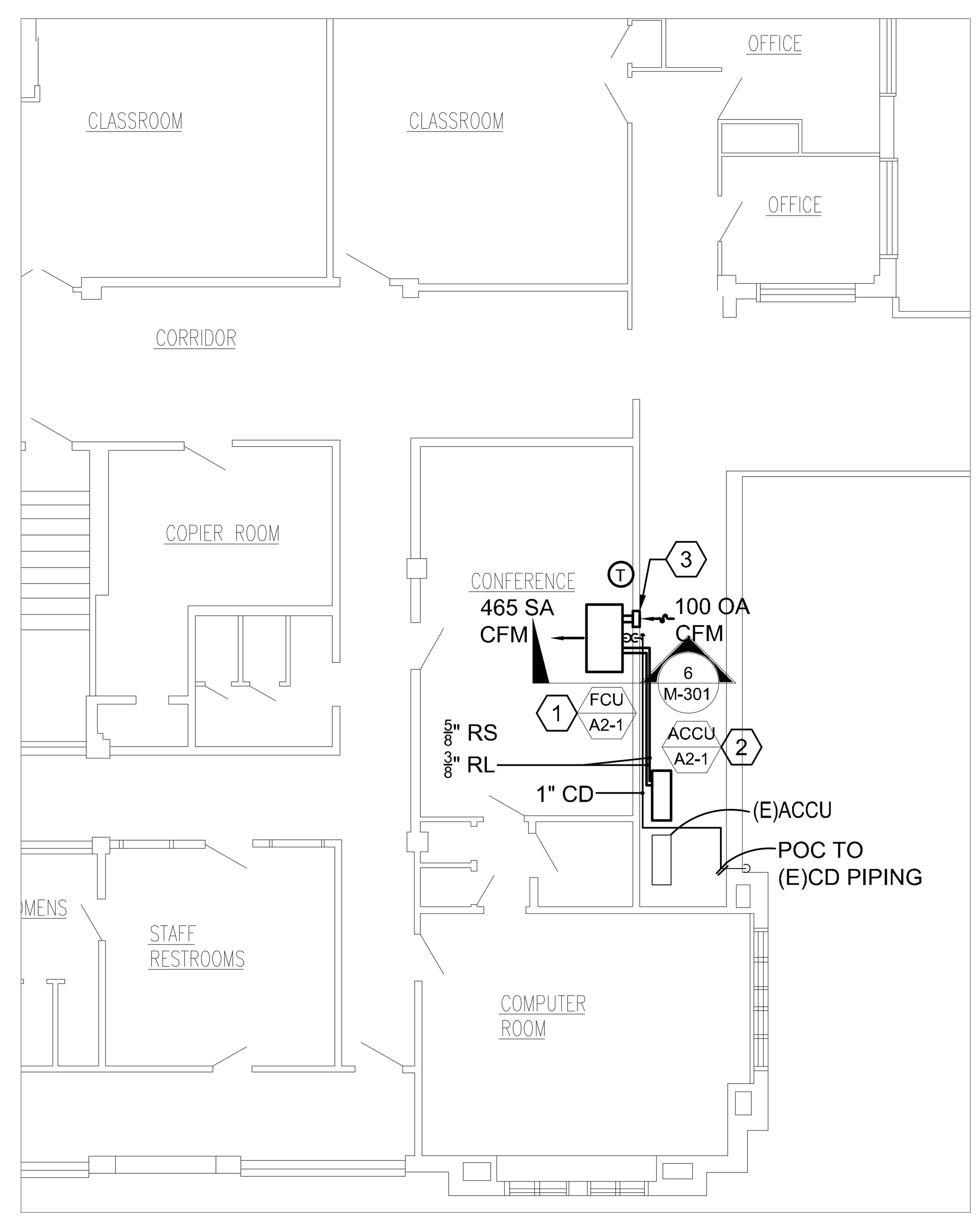


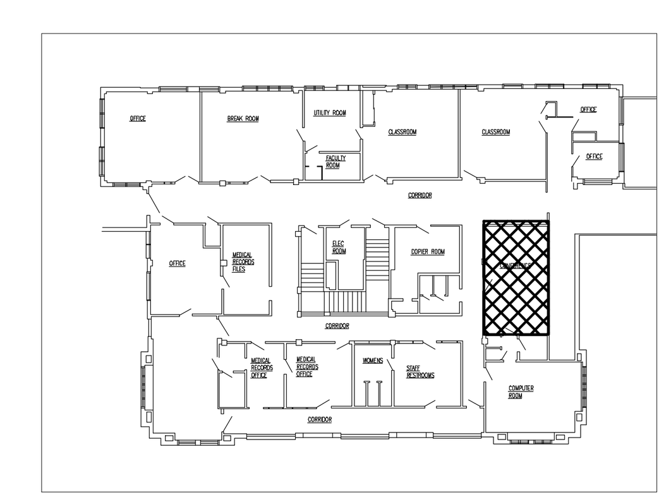




KEYPLAN
SCALE: N.T.S.

3 ADDITIVE ALTERNATE 2: ADMIN FIRST FLOOR MECHANICAL NEW PLAN
SCALE: 1/8" = 1'0"



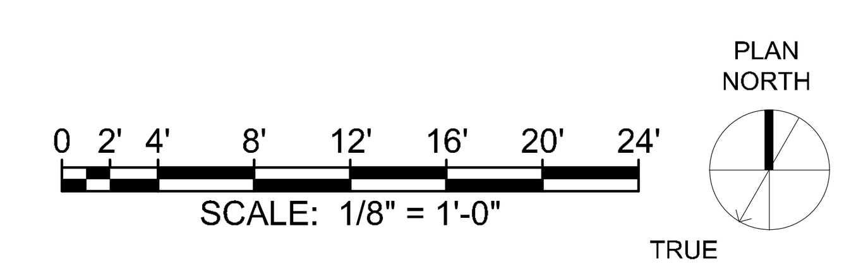


KEYPLAN
SCALE: N.T.S.

4 ADDITIVE ALTERNATE 2: ADMIN SECOND FLOOR MECHANICAL NEW PLAN
SCALE: 1/8" = 1'0"

MECHANICAL NEW WORK NOTES:

1. PROVIDE NEW FCU AND ASSOCIATED REFRIGERANT PIPING, CONDENSATE DRAIN PIPE, T-STAT, CONTROLS AND WIRING.
2. PROVIDE NEW ACCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
3. PROVIDE NEW OA LOUVER. SEE M-502.



REVISIONS	BY

This work was prepared by me or under my supervision and construction of this project will be under my observation.

JOEL P. YUEN
LICENSED PROFESSIONAL ENGINEER
No. 5805-M
HAWAII, U.S.A.

InSynergy Engineering, Inc.
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

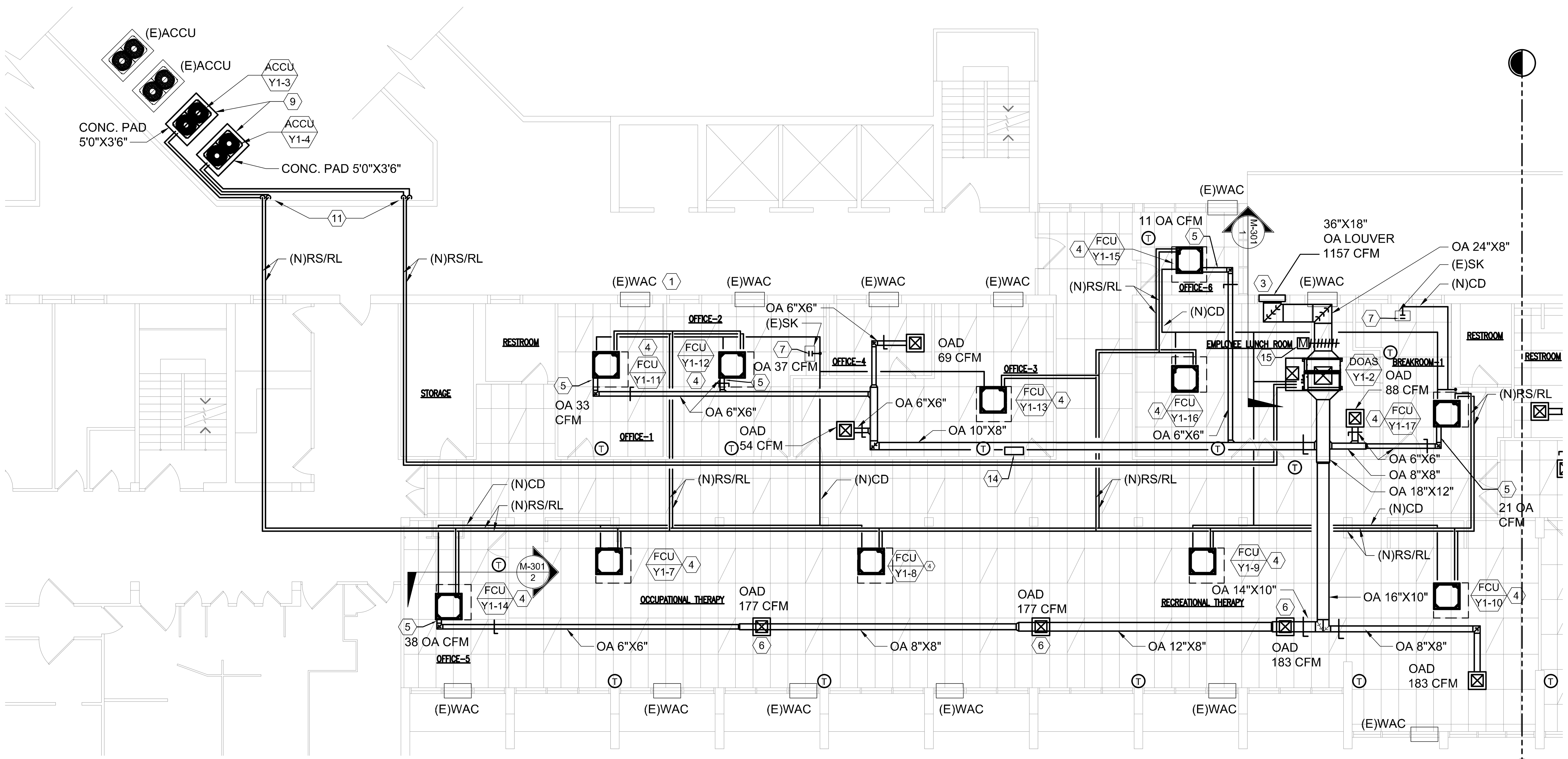
ADMIN MECHANICAL NEW/DEMO PLAN

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-101

Of 3 Sheets 31

MECHANICAL NEW WORK NOTES:

1. (E) WAC TO REMAIN AS BACKUP UNIT AND WILL BE NORMALLY OFF. TYP. OF ALL (E) WAC UNITS.
2. (E) EA DUCT TO REMAIN.
3. PROVIDE OA LOUVER THROUGH (E) WINDOW. ROUTE OA INTAKE DUCTWORK THROUGH CEILING.
4. MODIFY (E) T-BAR CEILING TO FIT 33"X33" CASSETTE FCU.
5. CONNECT OA DUCT TO KNOCK-OUT CONNECTION
6. PROVIDE MANUAL VOLUME DAMPER ON VERTICAL OA BRANCH.
7. SIDE TAP (E) SANITARY PIPE BEFORE P-TRAP AND CONNECT CD PIPE. INSULATE EXPOSED SANITARY PIPE AND P-TRAP.
8. REMOVE (E) PARKING STALLS AND PROVIDE CONCRETE PAD ON GROUND LEVEL FOR ACCU Y1-1 & ACCU Y1-2. ADJUST CONCRETE PAD SIZE AS REQUIRED FOR EQUIPMENT.
9. PROVIDE CONCRETE PAD ON GROUND LEVEL FOR ACCU Y1-3 & ACCU Y1-4 IN MECHANICAL YARD. ADJUST CONCRETE PAD SIZE AS REQUIRED FOR EQUIPMENT.
10. ROUTE RS/RL PIPING UP TO FIRST FLOOR ALONG EXPOSED WALL.
11. ROUTE RS/RL PIPING UP TO FIRST FLOOR ALONG CONCRETE COLUMN.
12. 8"X6" TRANSFER DUCT. BALANCE TO 100 CFM EACH.
13. MASTER CONTROLLER FOR ACCU-1 & ACCU-2
14. MASTER CONTROLLER FOR ACCU-3 & ACCU-4
15. MOTORIZED DAMPER
16. 4" BOLLARDS, 3" APART O.C.



1 ADDITIVE ALTERNATE 2 - YOUNG FIRST FLOOR MECHANICAL NEW PLAN - OT AND RT

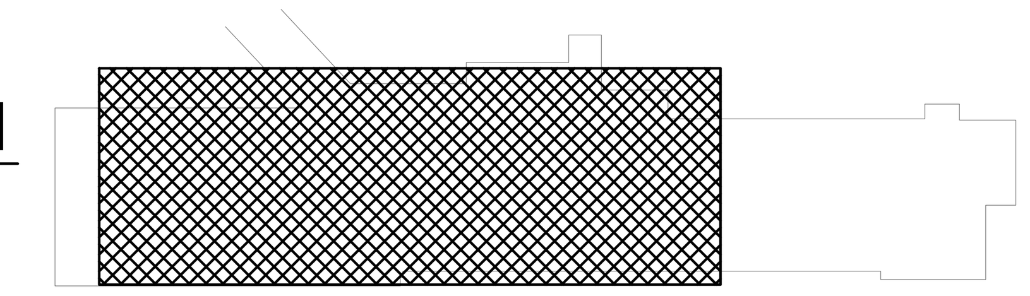
SCALE: 1/8" = 1'0"

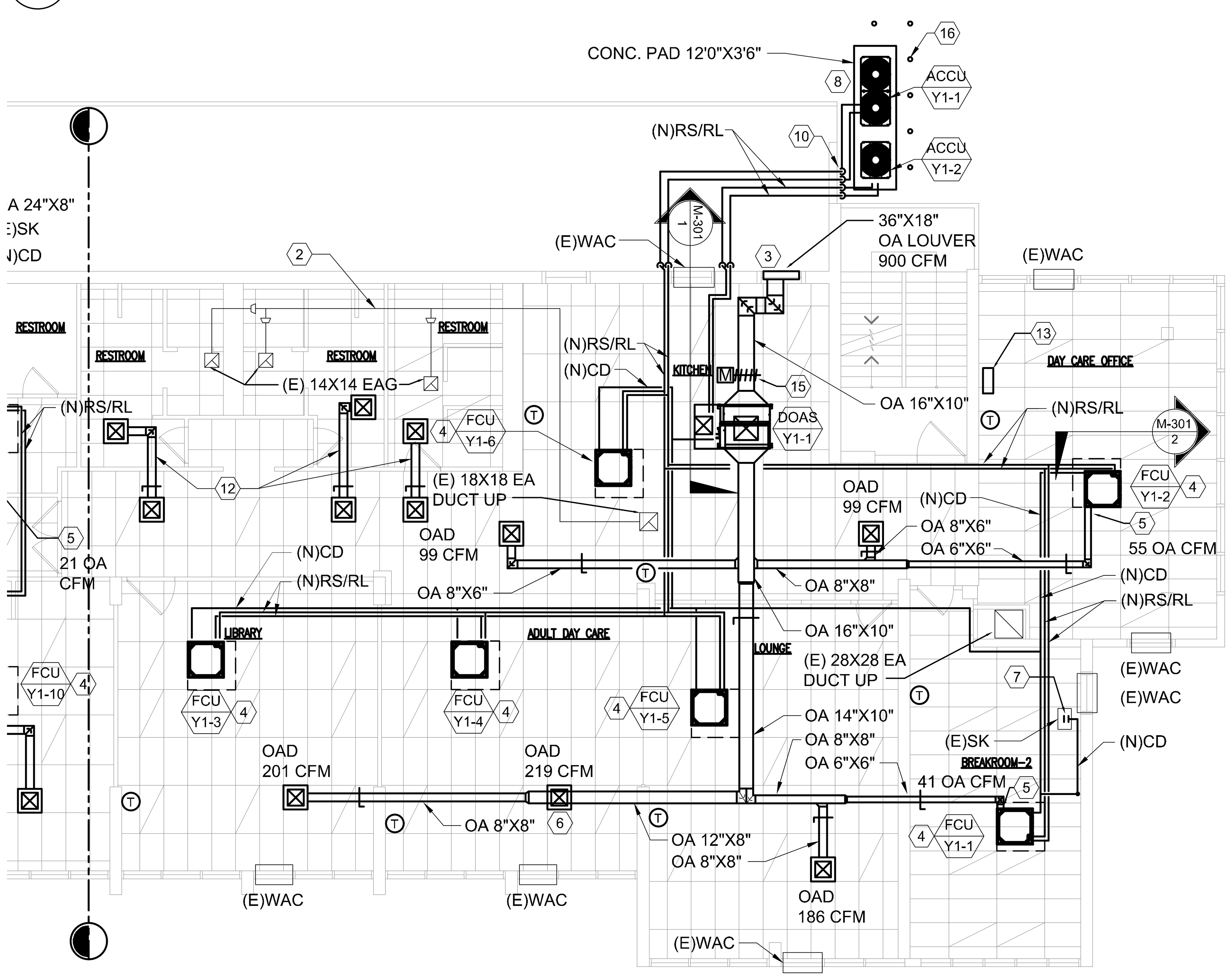
0 2' 4' 8' 12' 16' 20' 24' SCALE: 1/8" = 1'-0"

PLAN NORTH / TRUE NORTH

KEYPLAN

SCALE: N.T.S.





2 ADDITIVE ALTERNATE 1 - YOUNG FIRST FLOOR MECHANICAL NEW PLAN - ADULT DAY HEALTH

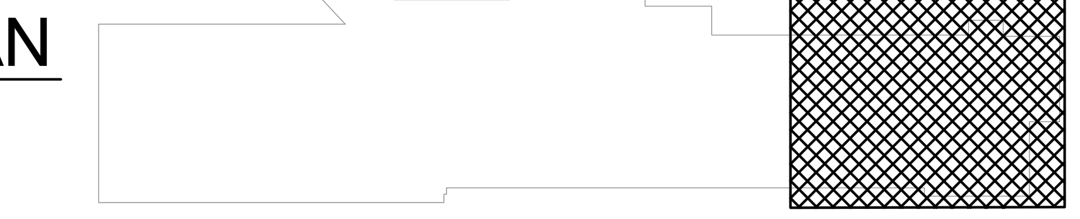
SCALE: 1/8" = 1'0"

0 2' 4' 8' 12' 16' 20' 24' SCALE: 1/8" = 1'-0"

PLAN NORTH / TRUE NORTH

KEYPLAN

SCALE: N.T.S.



REVISIONS	BY

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JOEL P. YUEN LICENSED PROFESSIONAL ENGINEER No. 5805-M HAWAII, U.S.A.

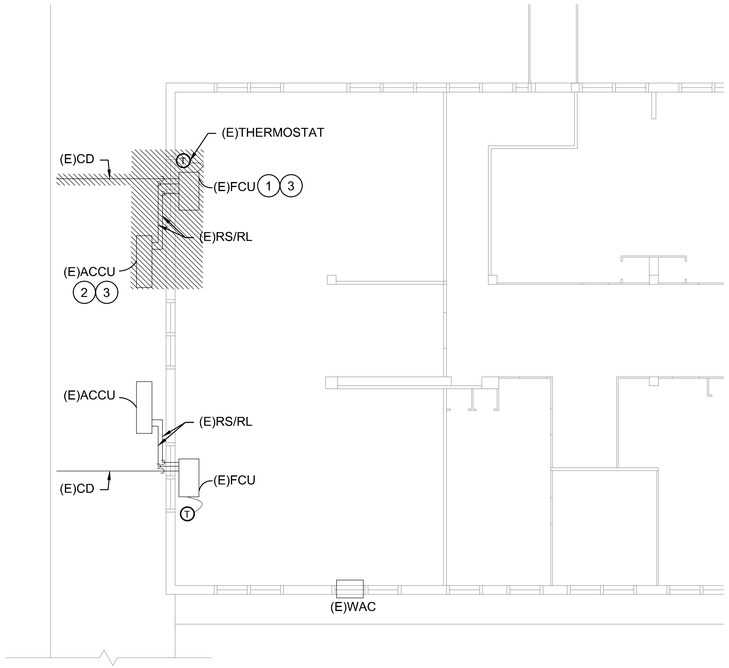
InSynergy Engineering, Inc.
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

YOUNG FIRST FLOOR MECHANICAL NEW PLAN

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-102

Of 4 Sheets 31



MECHANICAL DEMO NOTES:

1. REMOVE (E)FCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
2. REMOVE (E)ACCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
3. REMOVE ALL REFRIGERANT PIPING ASSOCIATED WITH (E)FCU& (E)ACCU. REQUIRES DEMOLITION AND DISPOSAL OF AC EQUIPMENT PER 40 CFR 82 PART F AND 608.

1 BASE BID YOUNG SECOND FLOOR CONFERENCE ROOM MECHANICAL DEMO PLAN

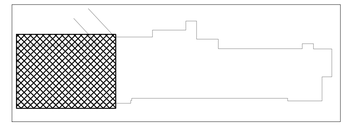
SCALE: 1/8" = 1'0"

0 2' 4' 8' 12' 16' 20' 24'

SCALE: 1/8" = 1'-0"

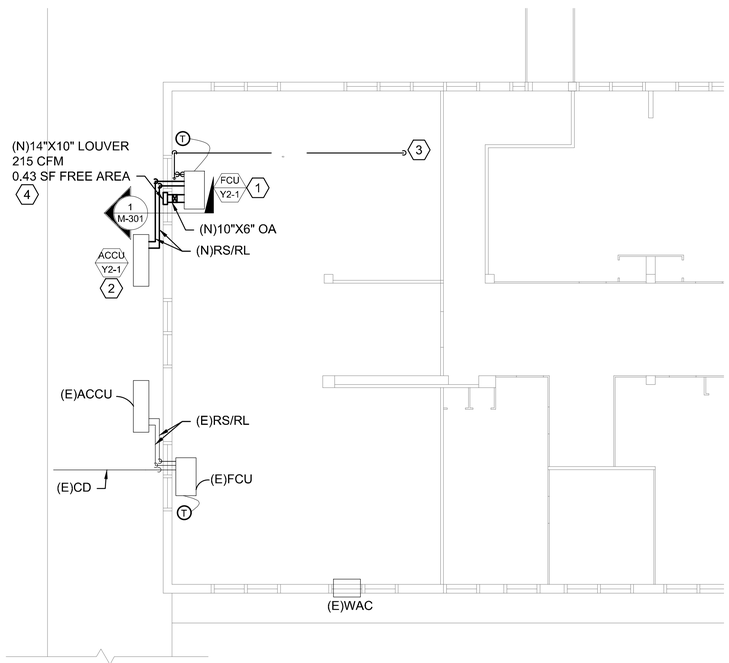
PLAN NORTH

TRUE NORTH



KEYPLAN

SCALE: N.T.S.



MECHANICAL NEW WORK NOTES:

1. PROVIDE NEW FCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
2. PROVIDE NEW ACCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING. MOUNTED UNIT ON (E)PAD.
3. CD PIPE CONNECTION TO (E) DRINKING FOUNTAIN ON FIRST FLOOR. CD PIPE TO RUN IN FIRST FLOOR CEILING SPACE. PROVIDE SIDE TAP TRAP TO CONNECTION.
4. PROVIDE OA LOUVER THROUGH (E)WINDOW. ROUTE OA INTAKE DUCTWORK UP THROUGH CEILING.

2 BASE BID YOUNG SECOND FLOOR CONFERENCE ROOM MECHANICAL NEW PLAN

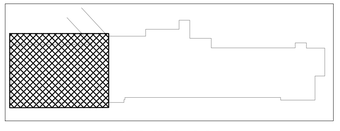
SCALE: 1/8" = 1'0"

0 2' 4' 8' 12' 16' 20' 24'

SCALE: 1/8" = 1'-0"

PLAN NORTH

TRUE NORTH



KEYPLAN

SCALE: N.T.S.

REVISIONS	BY

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JOEL P. YUEN * LICENSED PROFESSIONAL ENGINEER * HAWAII, U.S.A. No. 5805-M

INSYNERGY ENGINEERING LLC
MECHANICAL ▪ ELECTRICAL ▪ FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

YOUNG SECOND FLOOR CONFERENCE ROOM MECHANICAL NEW/DEMO PLAN

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-103

Of 5 Sheets 31

MECHANICAL DEMO NOTES:

1. REMOVE (E)8"X4" OA DUCT.

MECHANICAL NEW WORK NOTES:

1. (E)WAC TO REMAIN AS BACKUP UNIT AND WILL BE NORMALLY OF. TYP OF ALL (E)WAC UNITS.
2. PROVIDE NEW FCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
3. PROVIDE NEW DOAS AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
4. PROVIDE BOOSTER FAN.
5. PROVIDE OA LOUVER THROUGH (E)WINDOW. ROUTE OA INTAKE DUCTWORK UP THROUGH CEILING.
6. PROVIDE OA LOUVER WITH 0.71 SF FREE AREA TO PROVIDE 355 CFM OA.
7. MODIFY (E)T-BAR CEILING TO FIT 33"X33" CASSETTE FCU.
8. CONNECT OA DUCT TO FCU KNOCKOUT CONNECTION.
9. SIDE TAP (E)SANITARY PIPE BEFORE P-TRAP AND CONNECT CD PIPE TO (E) SINK. INSULATE EXPOSED SANITARY PIPE AND P-TRAP.
10. ROUTE RS/RL PIPING TO FOURTH FLOOR ALONG EXPOSED WALL.
11. ROUTE RS/RL PIPING TO FOURTH FLOOR ALONG CONCRETE COLUMN. PROVIDE VERTICAL PIPE SUPPORT.
12. ROUTE RS/RL PIPING IN CEILING.
13. (N)MOTORIZED DAMPER.

1 BASE BID YOUNG SECOND FLOOR MECHANICAL DEMO PLAN

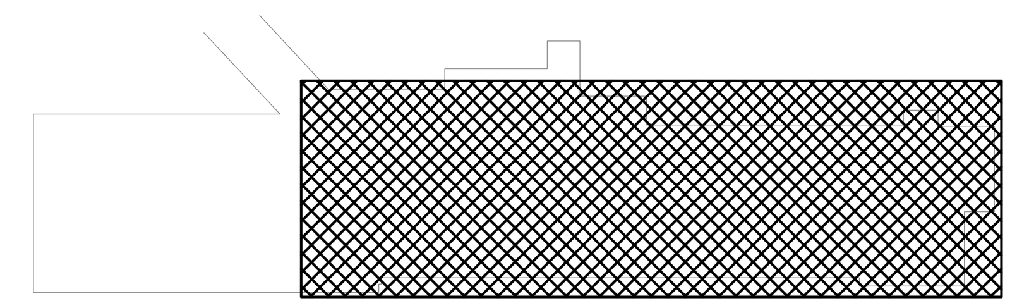
SCALE: 1/8" = 1'0"

0 2' 4' 8' 12' 16' 20' 24' SCALE: 1/8" = 1'-0"

PLAN NORTH / TRUE NORTH

KEYPLAN

SCALE: N.T.S.



2 BASE BID YOUNG SECOND FLOOR MECHANICAL NEW PLAN

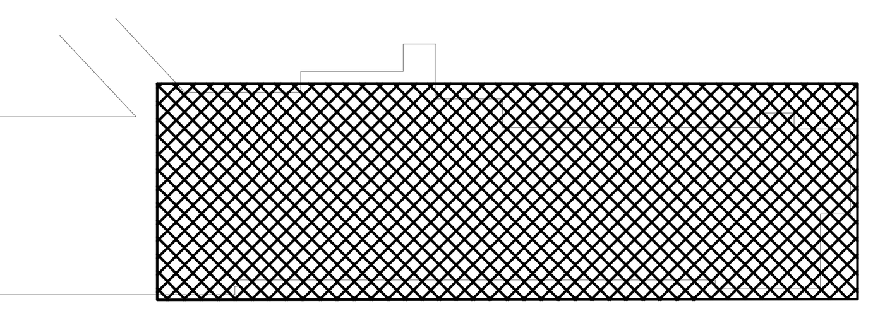
SCALE: 1/8" = 1'0"

0 2' 4' 8' 12' 16' 20' 24' SCALE: 1/8" = 1'-0"

PLAN NORTH / TRUE NORTH

KEYPLAN

SCALE: N.T.S.



REVISIONS	BY

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JOEL P. YUEN — LICENSED PROFESSIONAL ENGINEER — No. 5805-M — HAWAII, U.S.A.

InSynergy Engineering Inc.
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

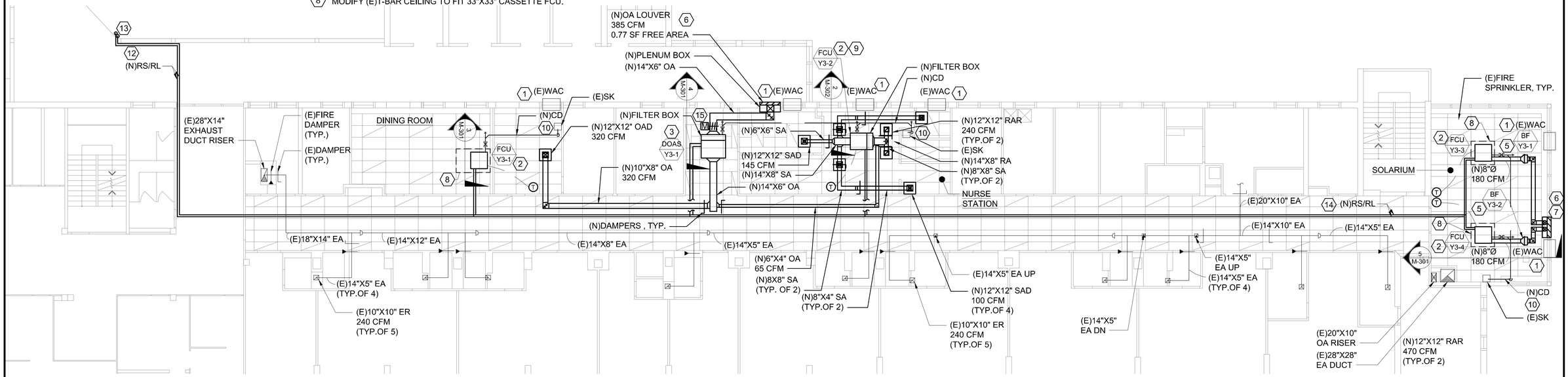
YOUNG SECOND FLOOR MECHANICAL NEW/DEMO PLAN

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-104

Of 6 Sheets 31

MECHANICAL NEW WORK NOTES:

1. (E)WAC TO REMAIN AS BACKUP UNIT AND WILL BE NORMALLY OF. TYP OF ALL (E)WAC UNITS.
2. PROVIDE NEW FCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
3. PROVIDE NEW DOAS AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING. CONCRETE COLUMN. PROVIDE VERTICAL PIPE SUPPORT.
4. PROVIDE NEW ACCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
5. PROVIDE BOOSTER FAN.
6. PROVIDE OA LOUVER THROUGH (E)WINDOW. ROUTE OA INTAKE DUCTWORK UP THROUGH CEILING.
7. PROVIDE OA LOUVER WITH 0.71 SF FREE AREA TO PROVIDE 355 CFM OA.
8. MODIFY (E)T-BAR CEILING TO FIT 33"X33" CASSETTE FCU.
9. CONNECT OA DUCT TO FCU KNOCKOUT CONNECTION .
10. SIDE TAP (E)SANITARY PIPE BEFORE P-TRAP AND CONNECT CD PIPE TO (E) SINK. INSULATE EXPOSED SANITARY PIPE AND P-TRAP.
11. PROVIDE STRUCTURAL SUPPORT FOR ACCU 2-2, 3-1. 4-1. & 5-1.
12. ROUTE RS/RL PIPING TO FOURTH FLOOR ALONG EXPOSED WALL.
13. ROUTE RS/RL PIPING TO FOURTH FLOOR ALONG CONCRETE COLUMN. PROVIDE VERTICAL PIPE SUPPORT.
14. ROUTE RS/RL PIPING IN CEILING SPACE.
15. (N)MOTORIZED DAMPER.



1 BASE BID YOUNG THIRD FLOOR MECHANICAL NEW PLAN

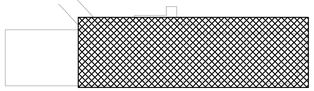
SCALE: 1/8" = 1'0"

0 2' 4' 8' 12' 16' 20' 24'

SCALE: 1/8" = 1'-0"

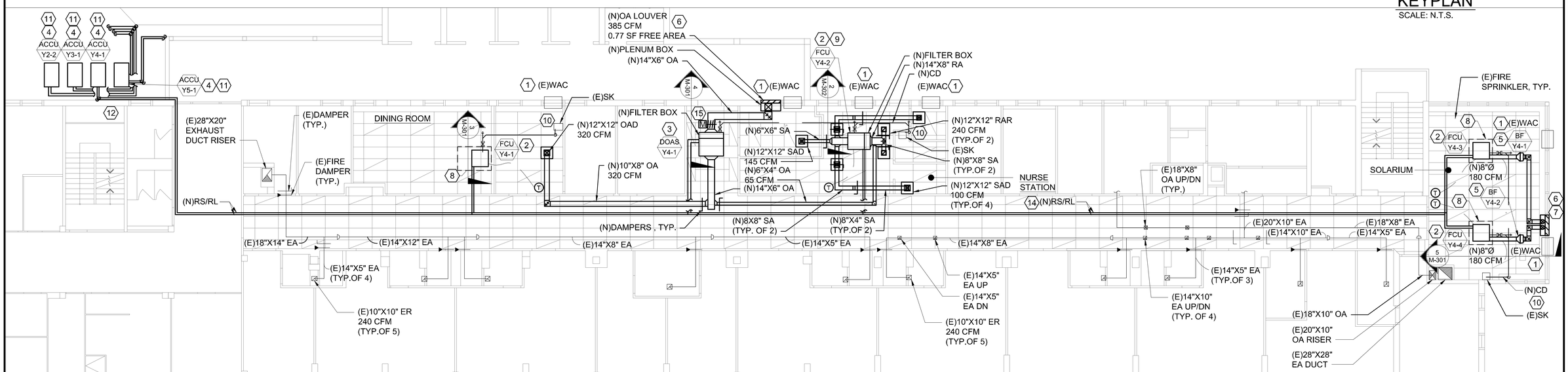
PLAN NORTH

TRUE NORTH



KEYPLAN

SCALE: N.T.S.



2 BASE BID YOUNG FOURTH FLOOR MECHANICAL NEW PLAN

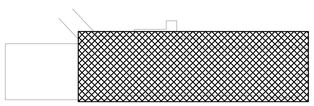
SCALE: 1/8" = 1'0"

0 2' 4' 8' 12' 16' 20' 24'

SCALE: 1/8" = 1'-0"

PLAN NORTH

TRUE NORTH



KEYPLAN

SCALE: N.T.S.

REVISIONS	BY

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JOEL P. YUEN — LICENSED PROFESSIONAL ENGINEER — No. 5805-M — HAWAII, U.S.A.

INSYNERGY ENGINEERING LLC
MECHANICAL ▪ ELECTRICAL ▪ FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

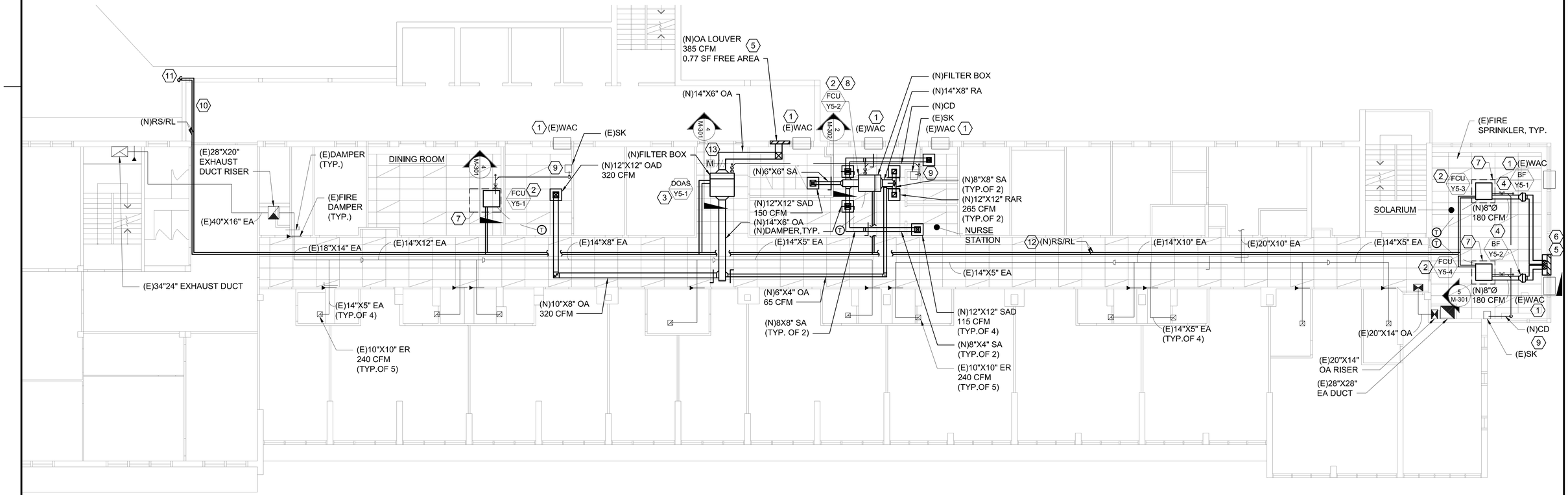
YOUNG THIRD AND FOURTH FLOOR MECHANICAL NEW PLAN

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-105

Of 7 Sheets 31

MECHANICAL NEW WORK NOTES:

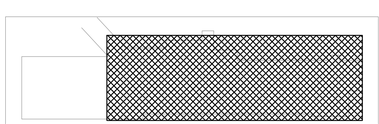
1. (E)WAC TO REMAIN AS BACKUP UNIT AND WILL BE NORMALLY OF. TYP OF ALL (E)WAC UNITS.
2. PROVIDE NEW FCU AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
3. PROVIDE NEW DOAS AND ASSOCIATED REFRIGERANT PIPING, CONTROLS AND WIRING.
4. PROVIDE BOOSTER FAN.
5. PROVIDE OA LOUVER THROUGH (E)WINDOW. ROUTE OA INTAKE DUCTWORK UP THROUGH CEILING.
6. PROVIDE OA LOUVER WITH 0.71 SF FREE AREA TO PROVIDE 355 CFM OA.
7. MODIFY (E)T-BAR CEILING TO FIT 33"X33" CASSETTE FCU.
8. CONNECT OA DUCT TO FCU KNOCKOUT CONNECTION
9. SIDE TAP (E)SANITARY PIPE BEFORE P-TRAP AND CONNECT CD PIPE TO (E)SINK. INSULATE EXPOSED SANITARY PIPE AND P-TRAP.
10. ROUTE RS/RL PIPING TO FOURTH FLOOR ALONG EXPOSED WALL.
11. ROUTE RS/RL PIPING TO FOURTH FLOOR ALONG CONCRETE COLUMN. PROVIDE VERTICAL PIPE SUPPORT.
12. ROUTE RS/RL PIPING IN CEILING SPACE.
13. (N)MOTORIZED DAMPER.



1 BASE BID YOUNG FIFTH FLOOR MECHANICAL NEW PLAN
SCALE: 1/8" = 1'0"

0 2' 4' 8' 12' 16' 20' 24'
SCALE: 1/8" = 1'-0"

PLAN NORTH
TRUE NORTH



KEYPLAN
SCALE: N.T.S.

REVISIONS	BY

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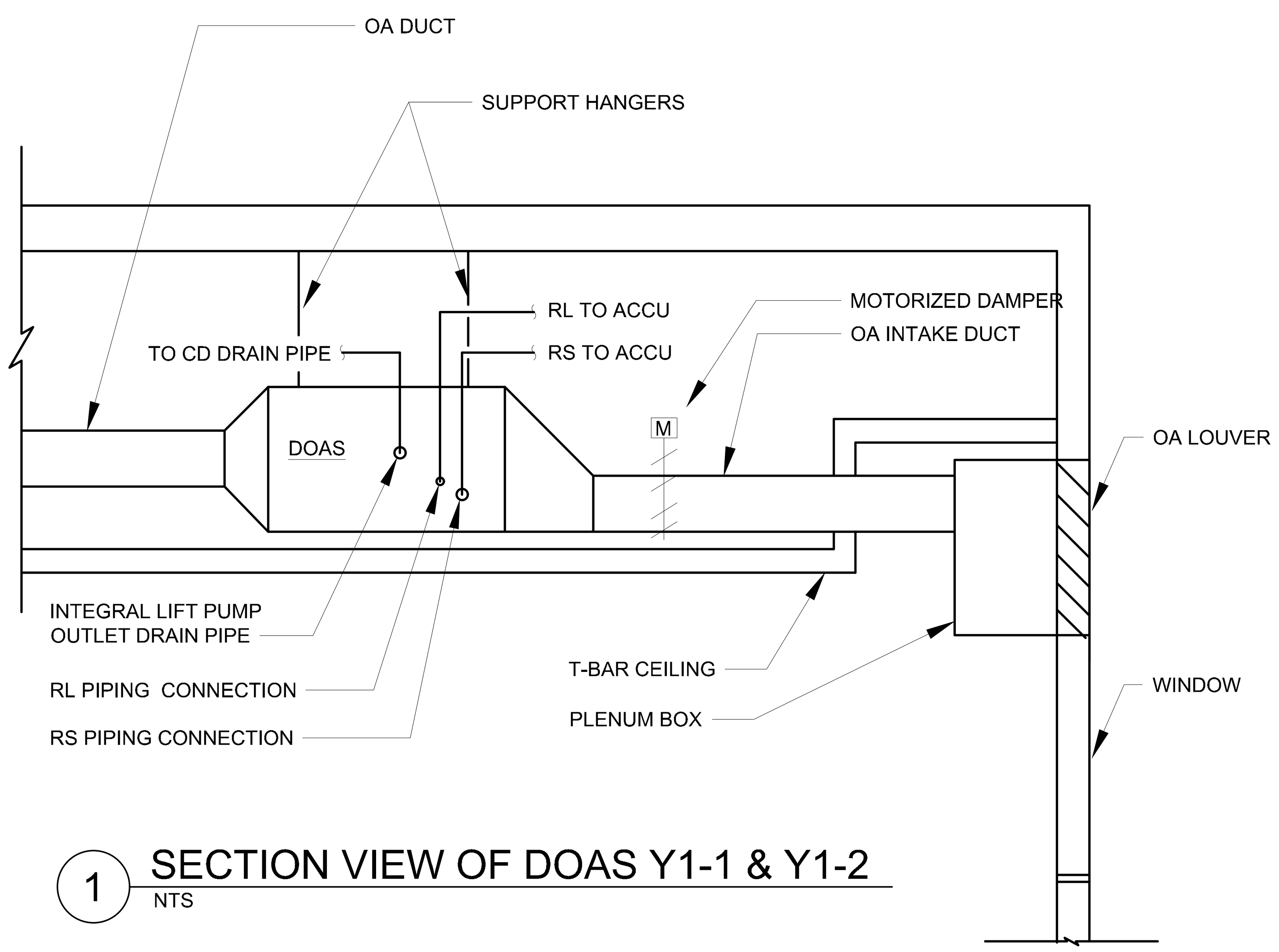
JOEL P. YUEN * LICENSED PROFESSIONAL ENGINEER * HAWAII, U.S.A.
No. 5805-M

INSYNERGY ENGINEERING LLC
MECHANICAL ▪ ELECTRICAL ▪ FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

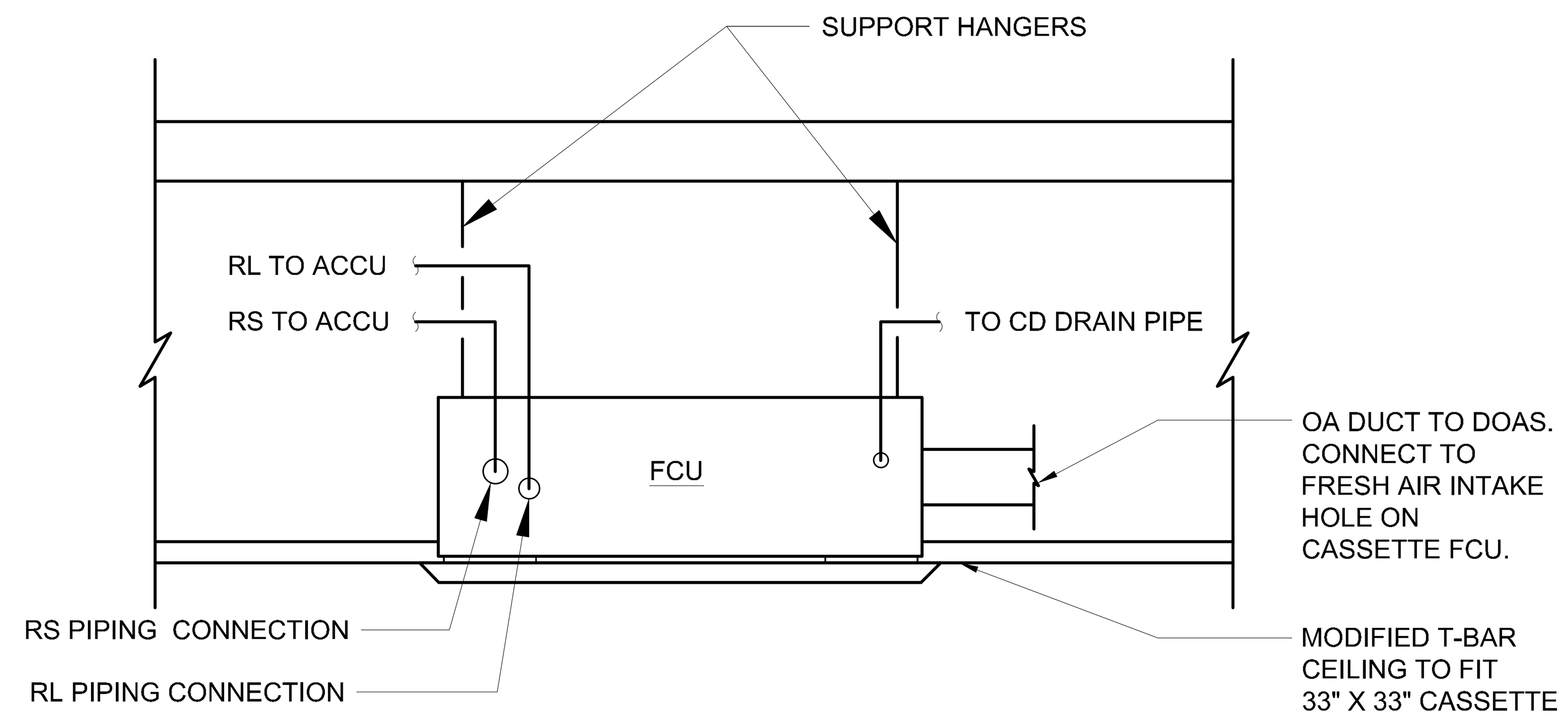
LEAHI HOSPITAL AC REPLACEMENT

YOUNG FIFTH FLOOR MECHANICAL NEW PLAN

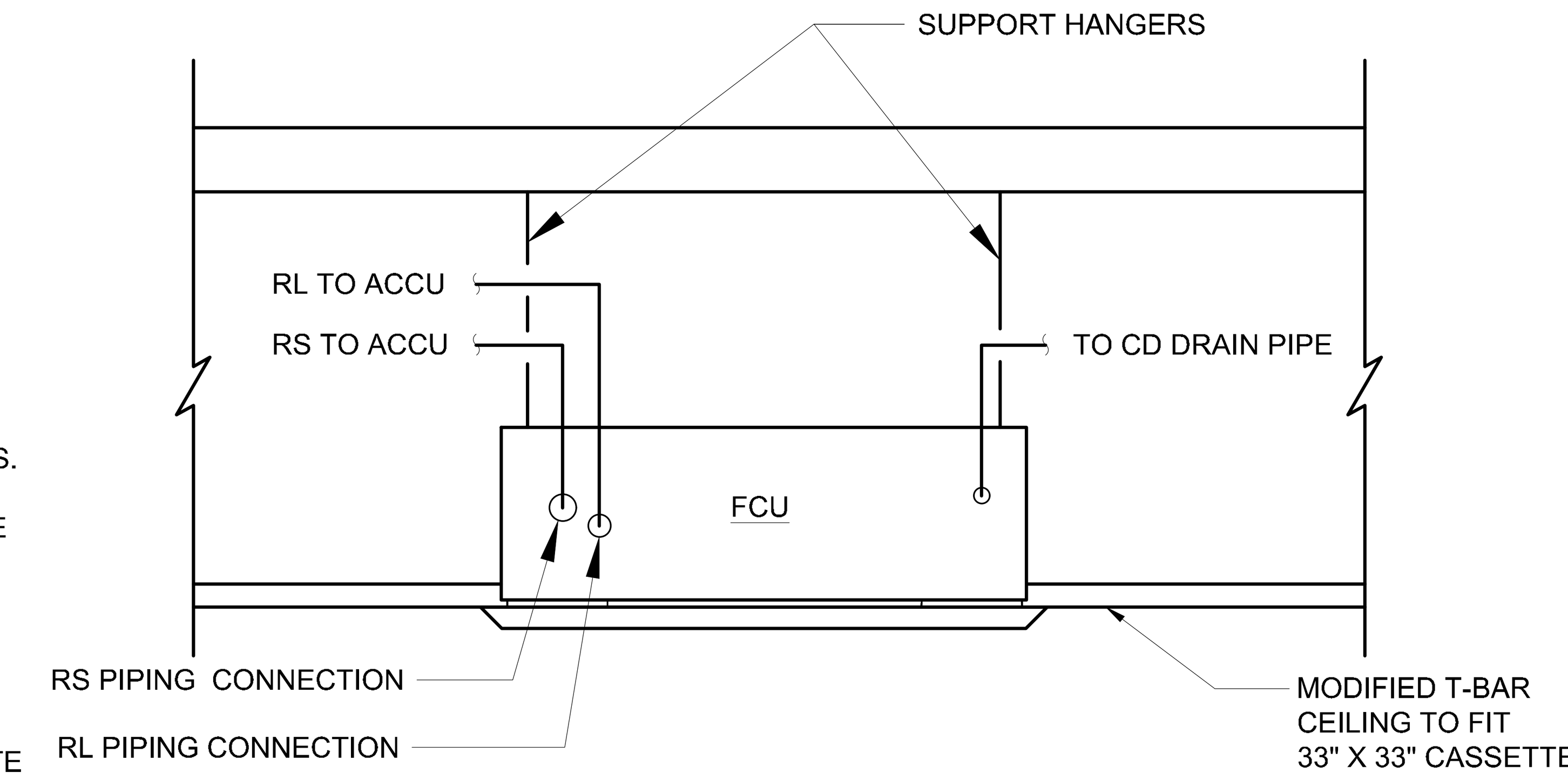
Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-106
Of	8 Sheets 31



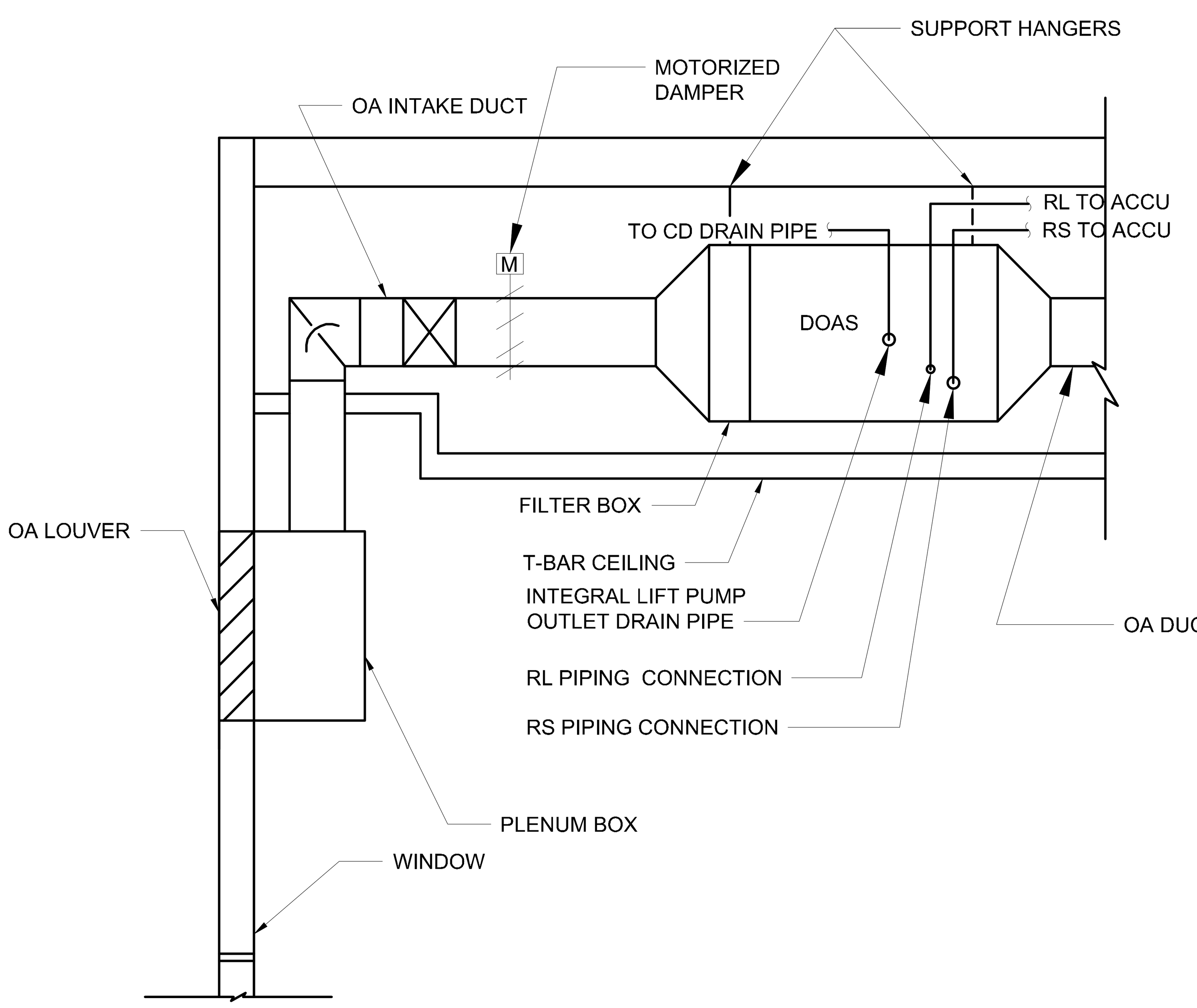
1 SECTION VIEW OF DOAS Y1-1 & Y1-2
NTS



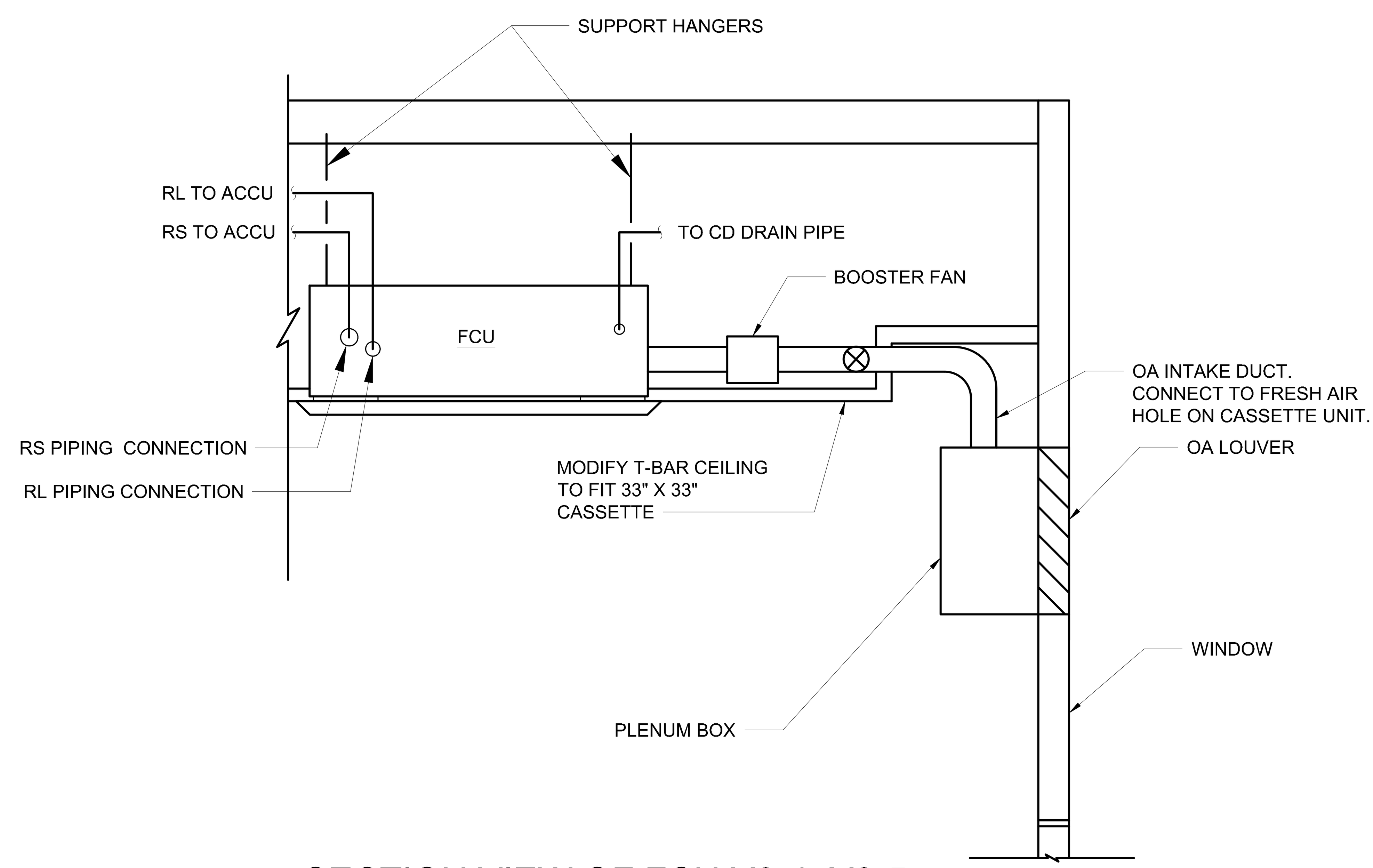
2 SECTION VIEW OF FCU Y1-2 & Y1-14
NTS



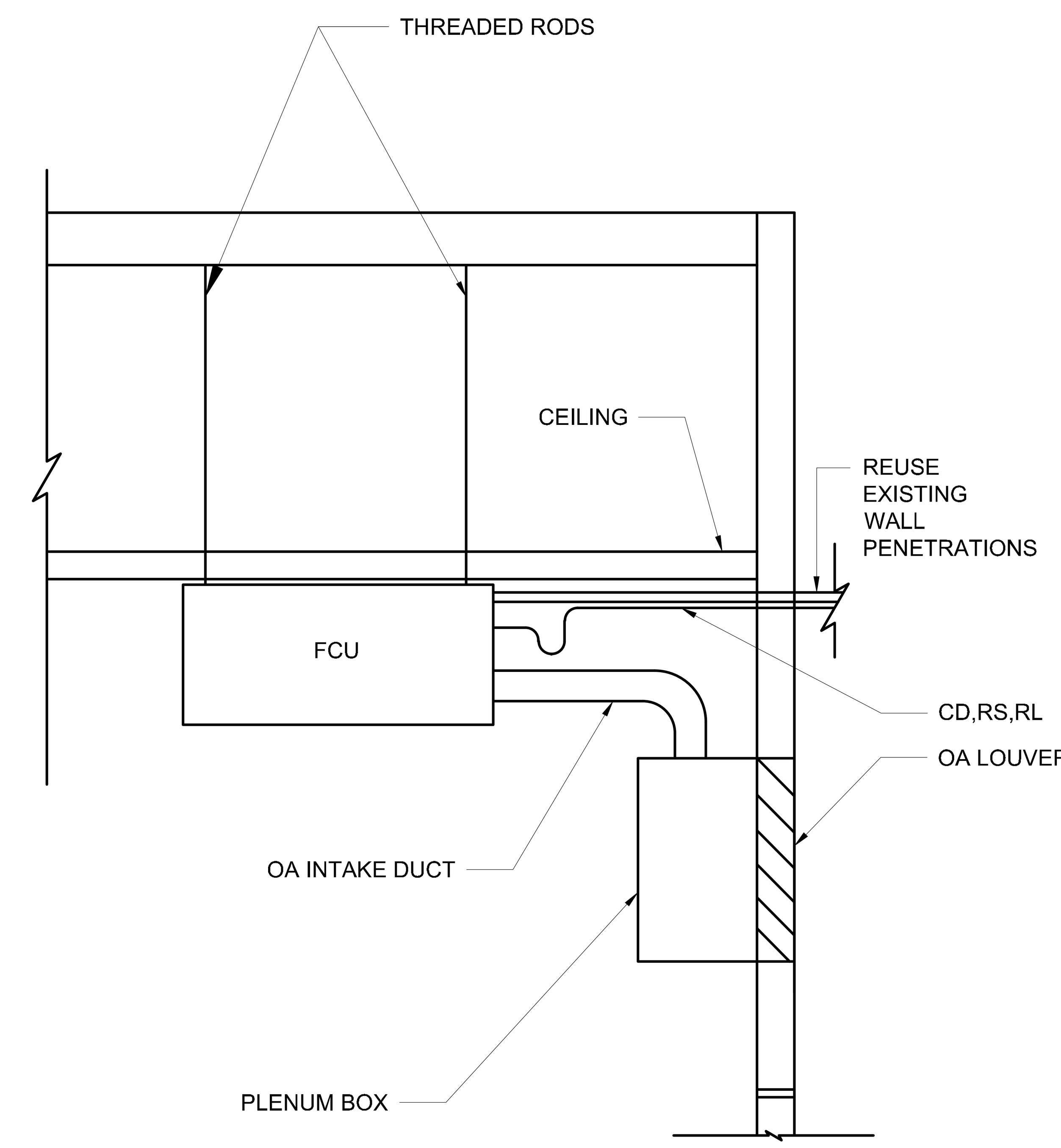
3 SECTION VIEW OF FCU Y2-2, Y3-1, Y4-1 & Y5-1
NTS



4 SECTION VIEW OF DOAS Y3-1, Y4-1, & Y5-1
NTS



5 SECTION VIEW OF FCU Y2-4, Y2-5, Y3-3, Y3-4, Y4-3, Y4-4, Y5-3, & Y5-4
NTS



6 SECTION VIEW OF FCU A1-1, A2-1
NTS

REVISIONS	BY

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JOEL P. YUEN
LICENSED PROFESSIONAL ENGINEER
No. 5805-M
HAWAII, U.S.A.

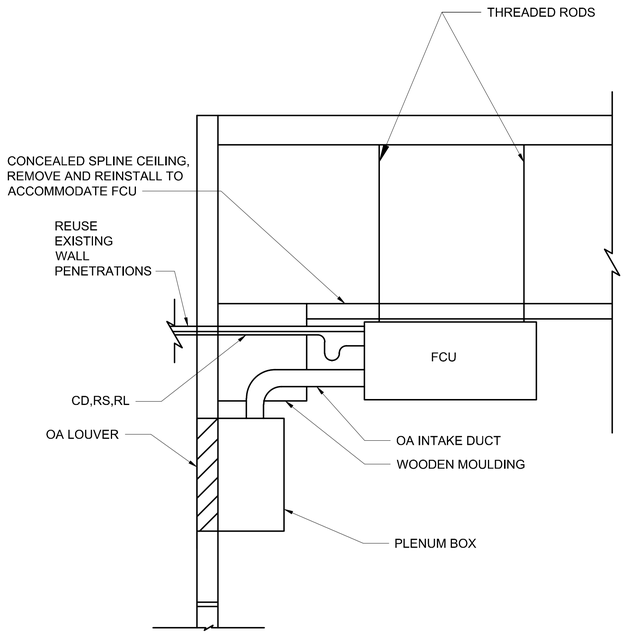
InSynergy Engineering, Inc.
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

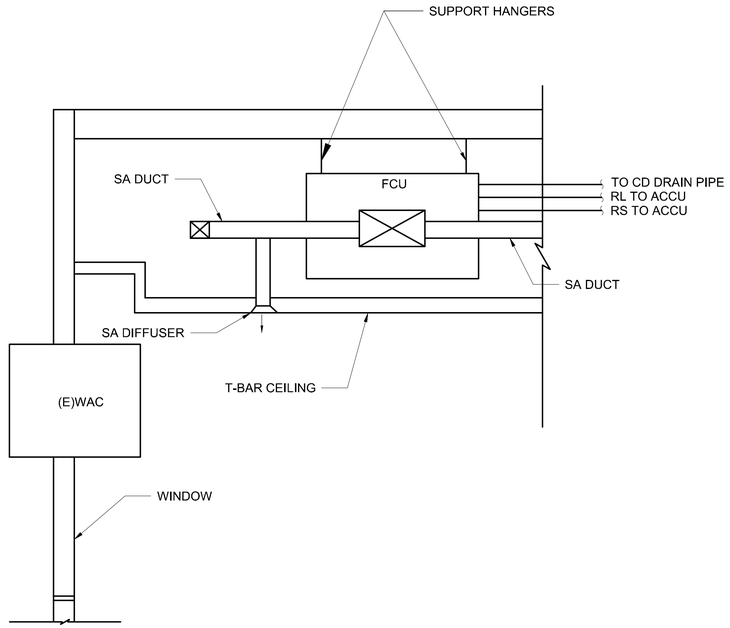
MECHANICAL SECTION

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-301

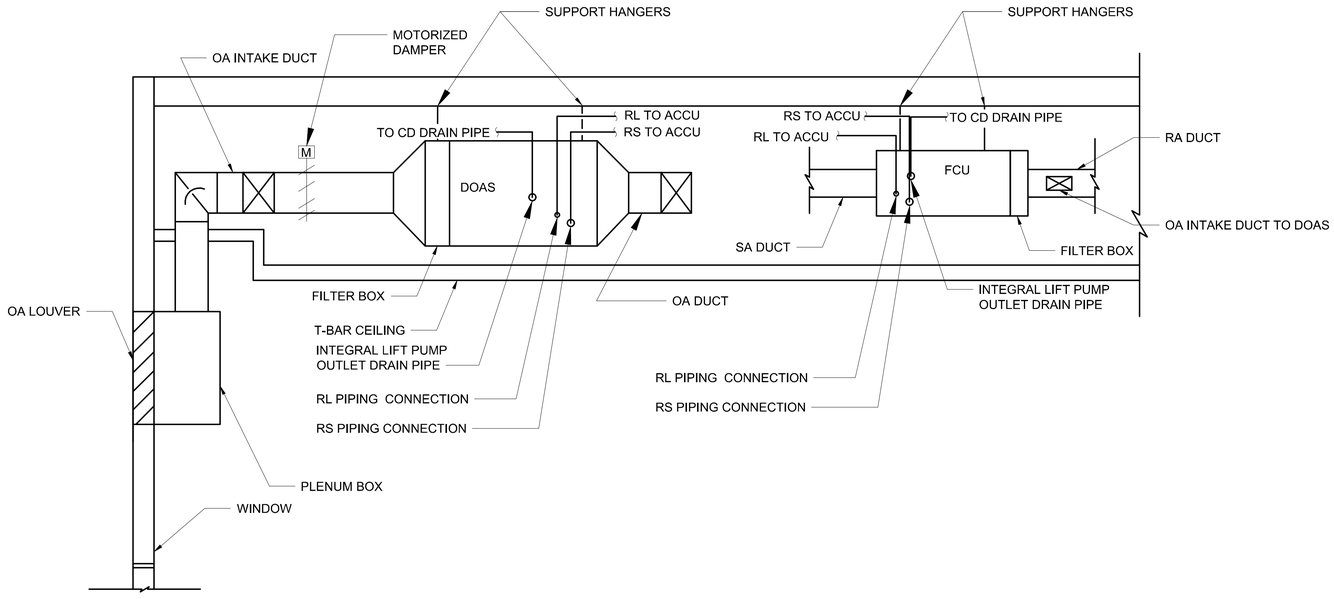
Of 9 Sheets 31



1 SECTION VIEW OF FCU 2-1
NTS



2 SECTION VIEW OF FCU Y3-2, Y4-2, & Y5-2
NTS



3 SECTION VIEW OF DOAS Y2-1 & FCU Y2-3
NTS

REVISIONS	BY

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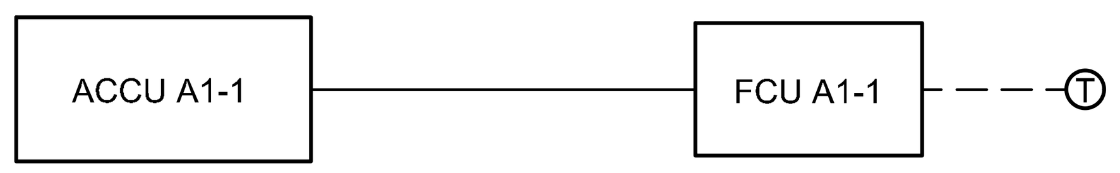
JOEL P. YUEN * LICENSED PROFESSIONAL ENGINEER * HAWAII, U.S.A. * No. 5805-M

INSYNERGY ENGINEERING LLC
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

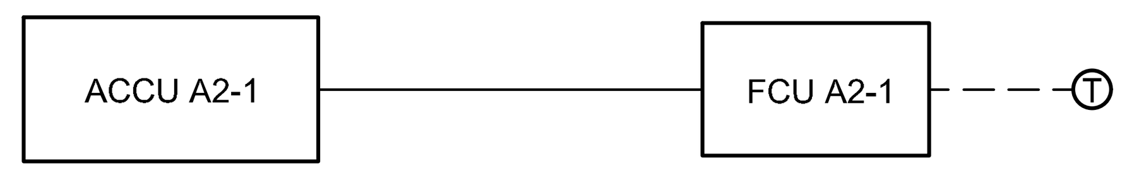
MECHANICAL SECTION

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-302
Of	10 Sheets 31



1 ADDITIVE ALTERNATE 2 ACCU A1-1 WIRING DIAGRAM

NOT TO SCALE



2 ADDITIVE ALTERNATE 2 ACCU A2-1 WIRING DIAGRAM

NOT TO SCALE

3 BASE BID ACCU Y2-1 WIRING DIAGRAM

NOT TO SCALE

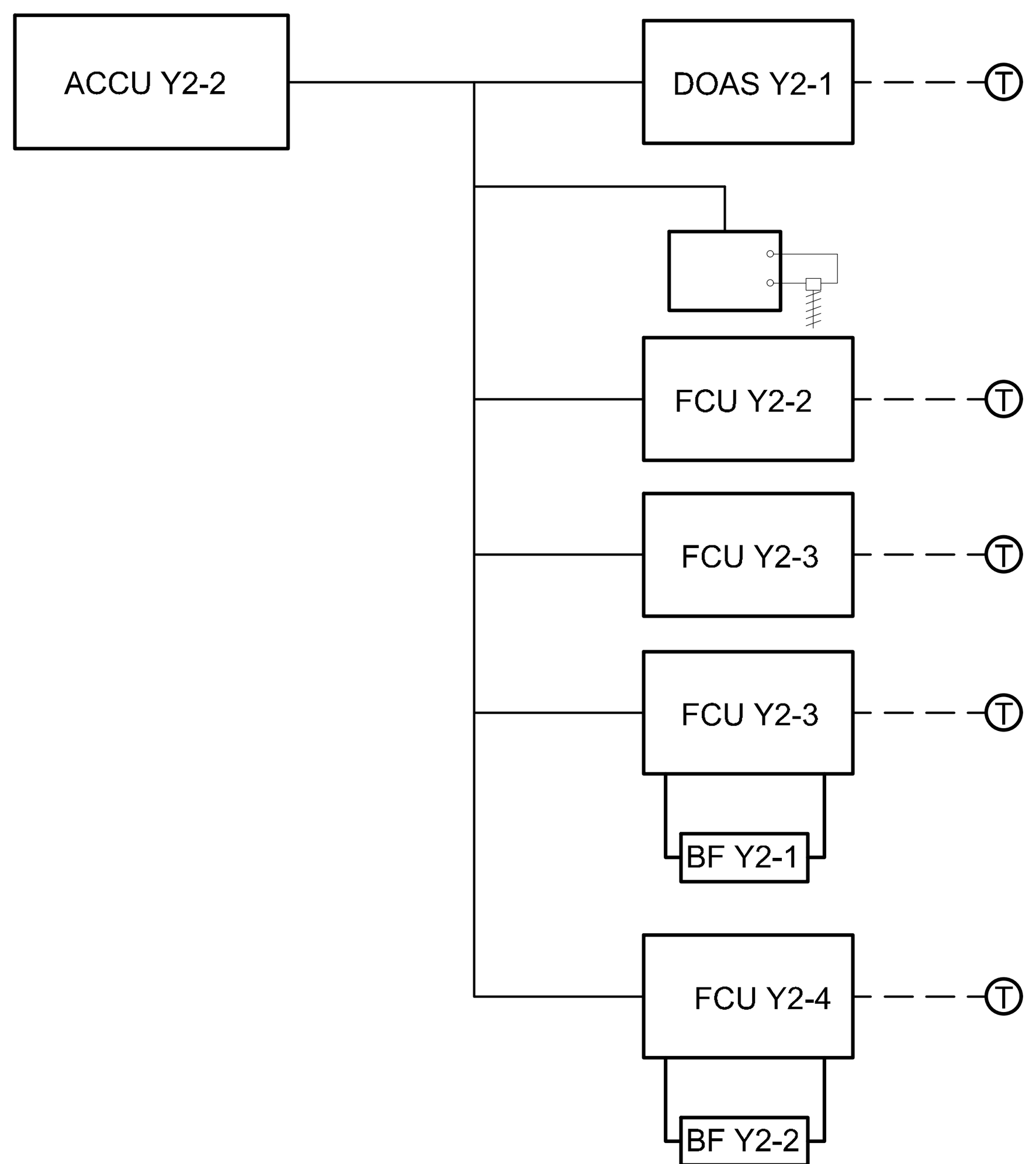
ACCU Y2-2, Y3-1, Y4-1 AND Y5-2 SEQUENCE OF OPERATIONS

THE NURSE STATION, DINING ROOM, AND SOLARIUM WILL BE SERVED BY SPLIT DX AIR CONDITIONING SYSTEMS. THE SEQUENCE OF OPERATIONS WILL BE AS FOLLOWS:

1. EACH FCU SHALL BE CONTROLLED VIA A PROGRAMMABLE T-STAT MOUNTED ON THE WALL WHERE INDICATED ON THE DRAWINGS.
2. THE PROGRAMMABLE T-STAT (TO BE MOUNTED AT 4' AFF) SHALL MODULATE THE REFRIGERANT FLOW TO THE INDOOR UNIT TO MAINTAIN A SPACE TEMPERATURE OF 75°F.
3. THE OUTSIDE AIR BOOSTER FAN AND OA DAMPER SHALL BE INTERLOCKED TO OPERATE WITH THE FCU AND DOAS RESPECTIVELY. DAMPER SHALL BE NORMALLY CLOSED. ACTIVATION OF THE DOAS SHALL RELAY A 24V SIGNAL TO AUTOMATICALLY OPEN THE DAMPER.
4. ACTIVATION OF THE FAN COIL SERVING NURSE STATION OR DINING ROOM SPACE SHALL ALSO ACTIVATE THE DOAS UNIT.
5. DEACTIVATION OF BOTH FAN COILS SERVING NURSE STATION AND DINING ROOM SPACES SHALL ALSO DEACTIVATE THE DOAS UNIT.

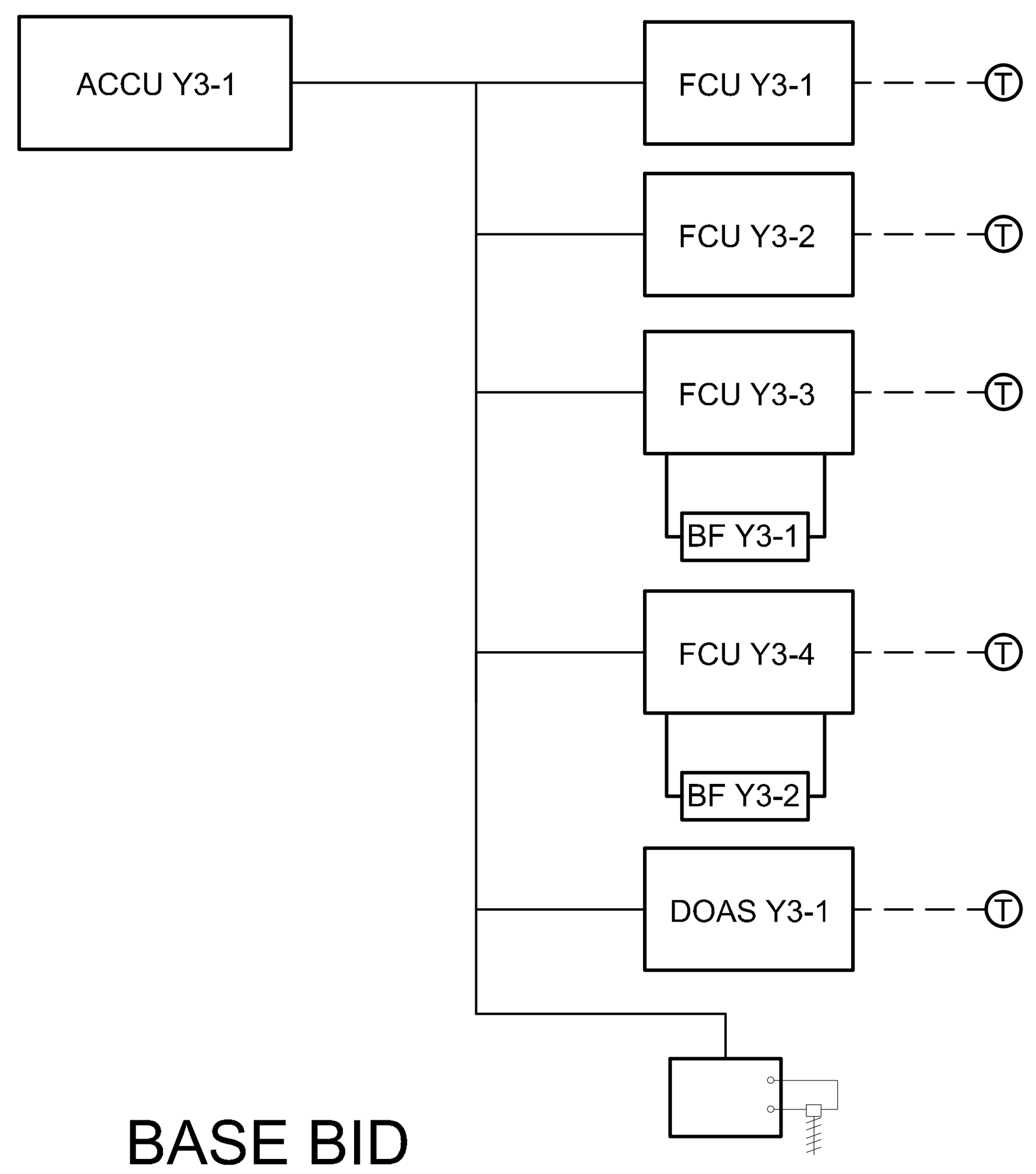
SCHEDULING:

6. DURING NORMAL OPERATION HOURS, THE A/C SYSTEM SHALL BE PROGRAMMED TO BE MANUALLY ACTIVATED BY THE USER AND SHALL REMAIN ON UNTIL THE END OF THE BUSINESS DAY OR UNTIL THE USER MANUALLY DEACTIVATES THE UNIT, WHICHEVER COMES FIRST.
7. A BYPASS FUNCTION SHALL BE PROVIDED FOR NON-BUSINESS HOURS. THE BYPASS SHALL REMAIN EFFECTIVE FOR TWO HOURS.
8. STOP OPERATIONS SHALL BE BASED ON INDIVIDUAL 7 DAY SCHEDULES WITH A MINIMUM OF 5 OPERATION PATTERNS PER DAY.



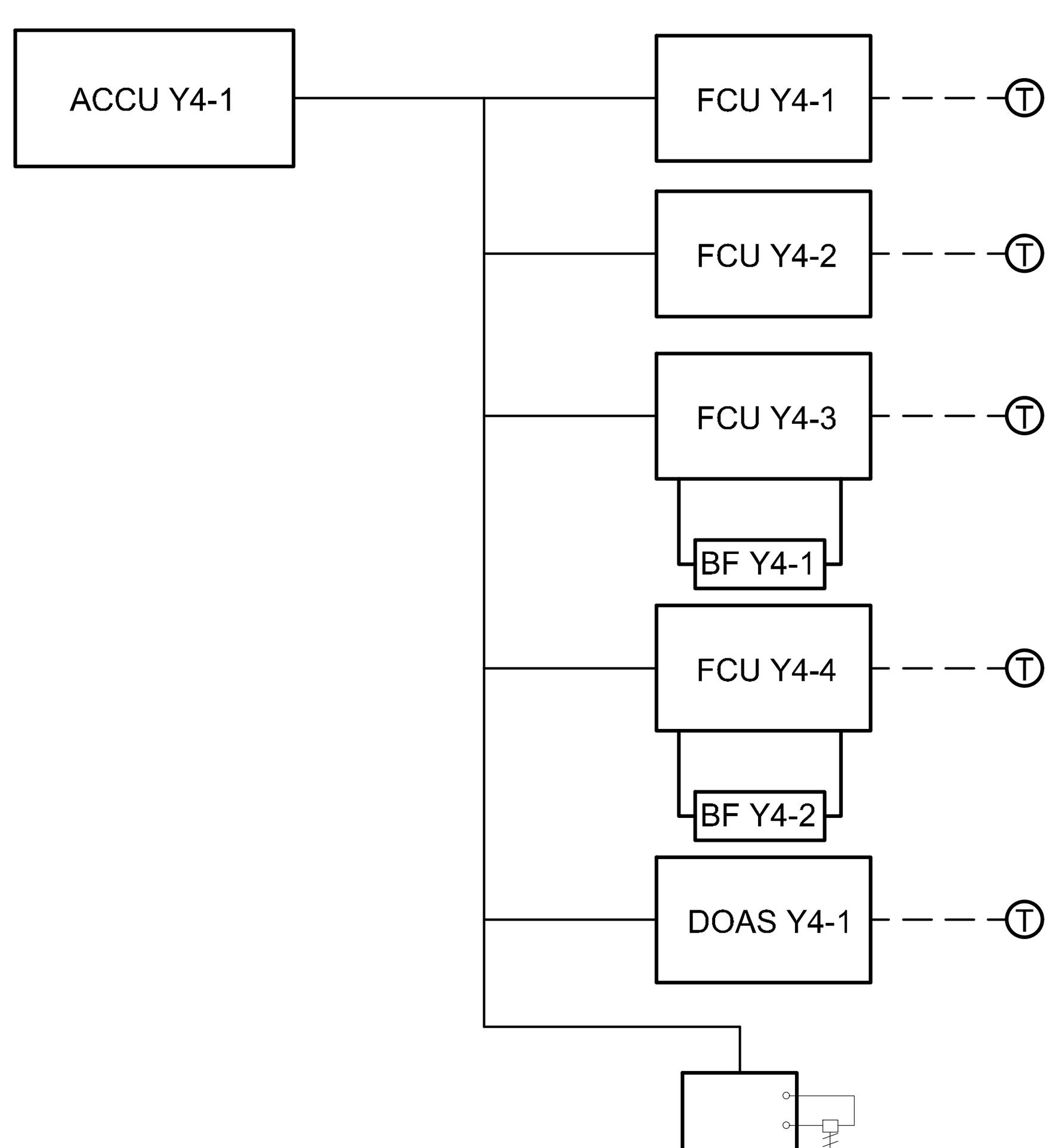
4 BASE BID ACCU Y2-2 WIRING DIAGRAM

NOT TO SCALE



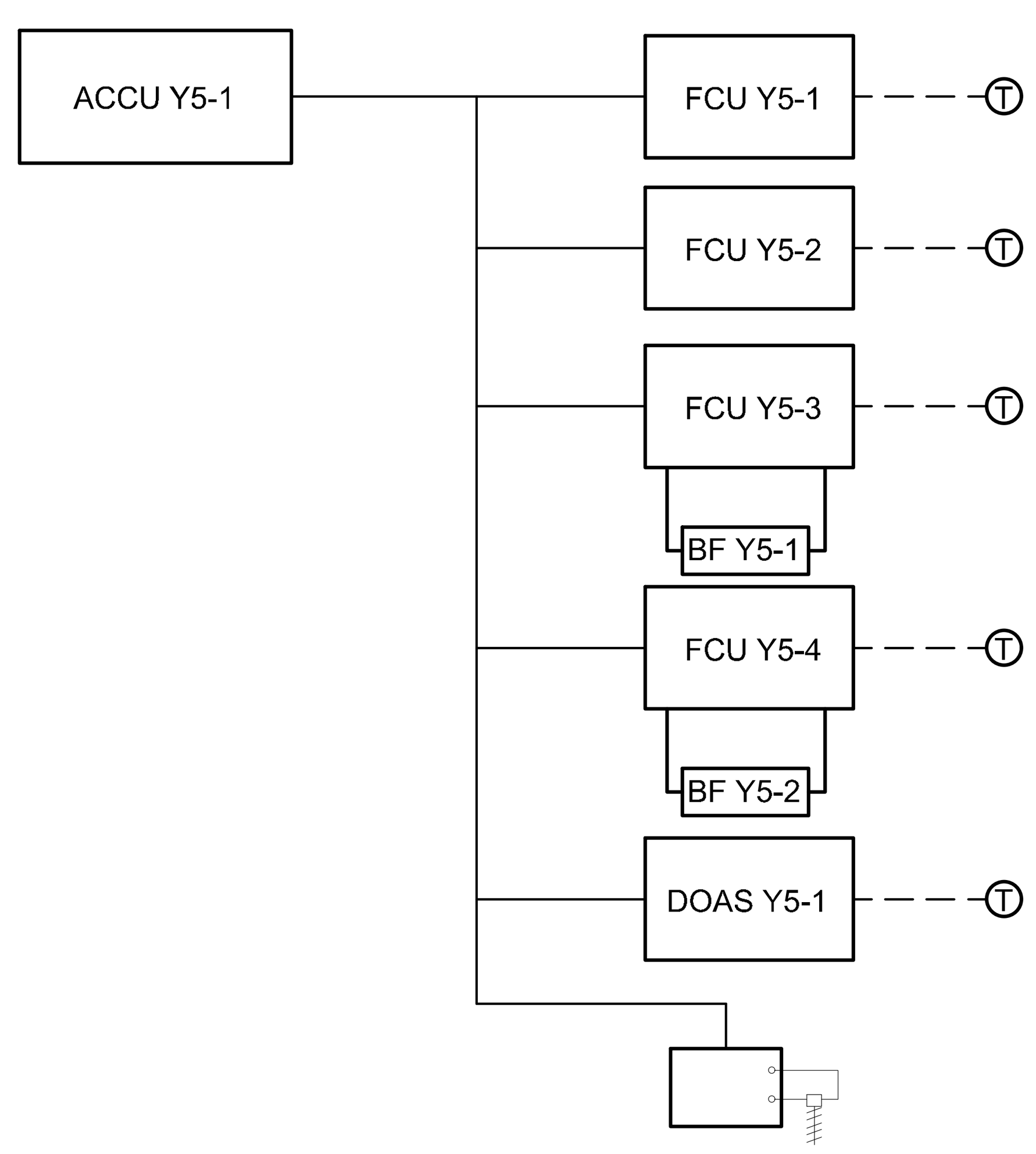
5 BASE BID ACCU Y3-1 WIRING DIAGRAM

NOT TO SCALE



6 BASE BID ACCU Y4-1 WIRING DIAGRAM

NOT TO SCALE



7 BASE BID ACCU Y5-1 WIRING DIAGRAM

NOT TO SCALE

REVISIONS	BY

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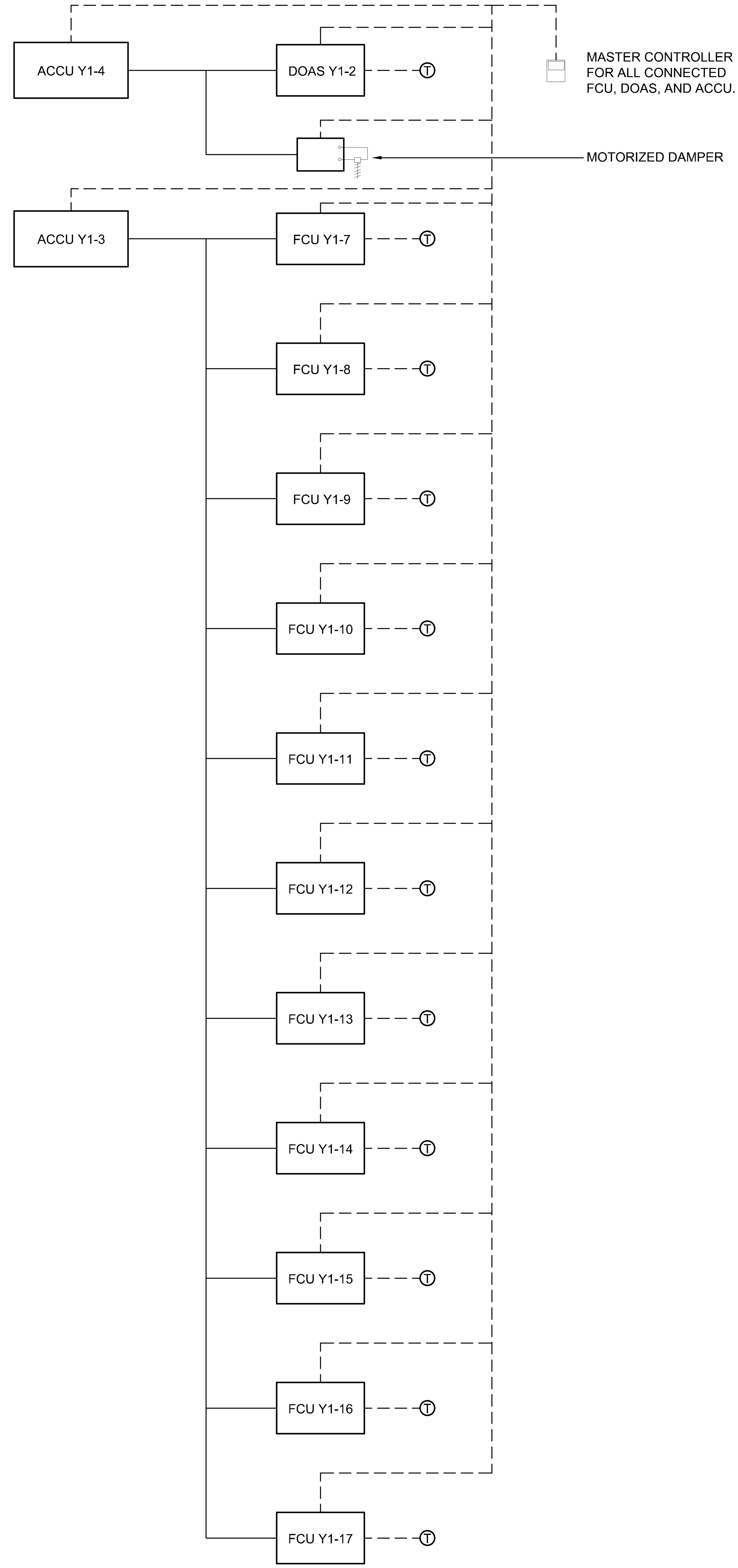
JOEL P. YUEN LICENSED PROFESSIONAL ENGINEER No. 5805-M HAWAII, U.S.A.

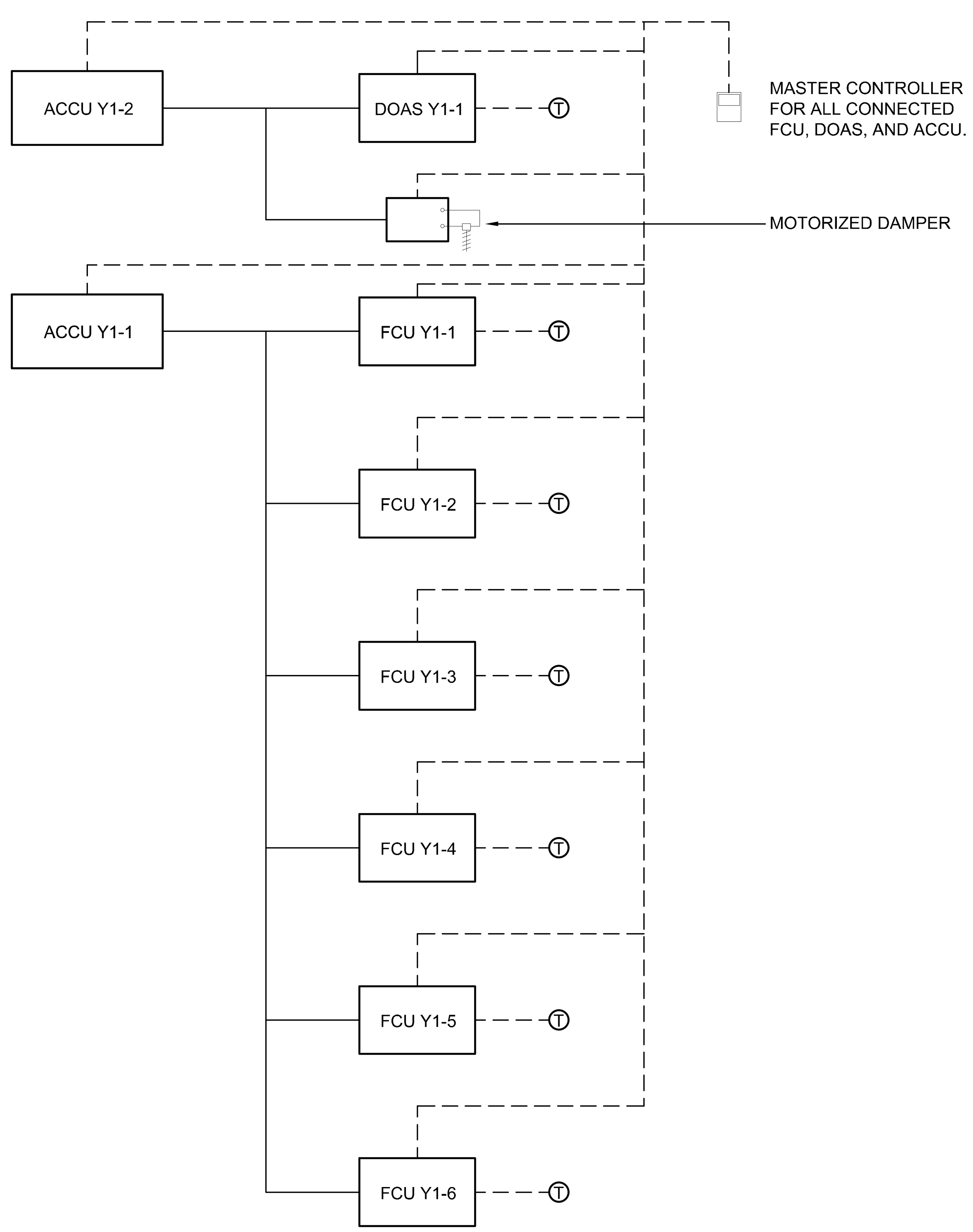
INSYNERGY ENGINEERING INC
MECHANICAL ■ ELECTRICAL ■ FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

MECHANICAL CONTROLS

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-401
Of 11 Sheets	31





2 ADDITIVE ALTERNATE 1
ACCU Y1-1 & Y1-2 WIRING DIAGRAM
NOT TO SCALE

1 ADDITIVE ALTERNATE 2
ACCU Y1-3 & Y1-4 WIRING DIAGRAM
NOT TO SCALE

ACCU Y1-1, Y1-2, Y1-2, AND Y1-4 SEQUENCE OF OPERATIONS

THE ADULT DAY HEALTH AND OCCUPATIONAL/RECREATIONAL THERAPY WILL BE SERVED BY SPLIT DX AIR CONDITIONING SYSTEMS. THE SEQUENCE OF OPERATIONS WILL BE AS FOLLOWS:

1. EACH FCU SHALL BE CONTROLLED VIA A PROGRAMMABLE T-STAT MOUNTED ON THE WALL WHERE INDICATED ON THE DRAWINGS.
2. THE PROGRAMMABLE T-STAT (TO BE MOUNTED AT 4' AFF) SHALL MODULATE THE REFRIGERANT FLOW TO THE INDOOR UNIT TO MAINTAIN A SPACE TEMPERATURE OF 75°F.
3. THE MOTORIZED OA DAMPER SHALL BE INTERLOCKED TO OPERATE WITH THE FCU AND DOAS RESPECTIVELY. DAMPER SHALL BE NORMALLY CLOSED. ACTIVATION OF THE DOAS SHALL RELAY A 24V SIGNAL TO AUTOMATICALLY OPEN THE DAMPER.
4. ACTIVATION OF ANY FCU PER RESPECTIVE AREA SHALL ACTIVATE THE DOAS UNIT WITHIN THE RESPECTIVE AREA.
5. DEACTIVATION OF ALL FCUS PER RESPECTIVE AREA SHALL DEACTIVATE THE DOAS UNIT WITHIN THE RESPECTIVE AREA.
6. PROVIDE A MASTER CONTROLLER TO MONITOR ALL FCU, ACCU, AND DOAS UNITS PER RESPECTIVE AREA.

SCHEDULING:

7. DURING NORMAL OPERATION HOURS, THE A/C SYSTEM SHALL BE PROGRAMMED TO BE MANUALLY ACTIVATED BY THE USER AND SHALL REMAIN ON UNTIL THE END OF THE BUSINESS DAY OR UNTIL THE USER MANUALLY DEACTIVATES THE UNIT, WHICHEVER COMES FIRST.
8. A BYPASS FUNCTION SHALL BE PROVIDED FOR NON-BUSINESS HOURS. THE BYPASS SHALL REMAIN EFFECTIVE FOR TWO HOURS.
9. STOP OPERATIONS SHALL BE BASED ON INDIVIDUAL 7 DAY SCHEDULES WITH A MINIMUM OF 5 OPERATION PATTERNS PER DAY.

REVISIONS	BY

This work was prepared by me or under my supervision and construction of this project will be under my observation.

JOEL P. YUEN LICENSED PROFESSIONAL ENGINEER No. 5805-M HAWAII U.S.A.

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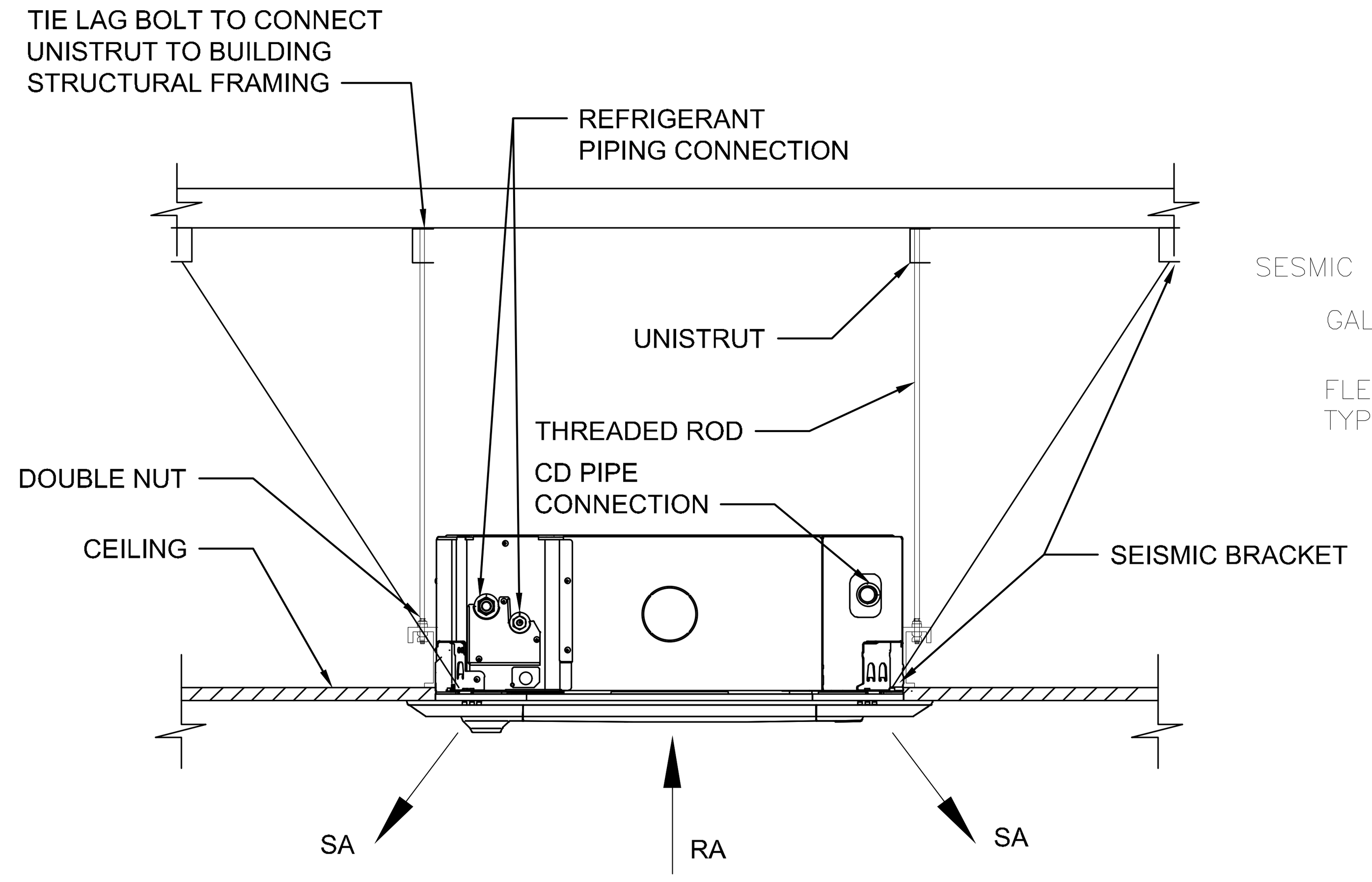
LEAHI HOSPITAL AC REPLACEMENT

MECHANICAL CONTROLS

Designed	CL, GO, KT
Drawn	ISE
Checked	JY
Date	2/28/2020
Job No.	20008
Sheet	M-402

Of 12 Sheets 31



1 CASSETTE TYPE FCU DETAIL
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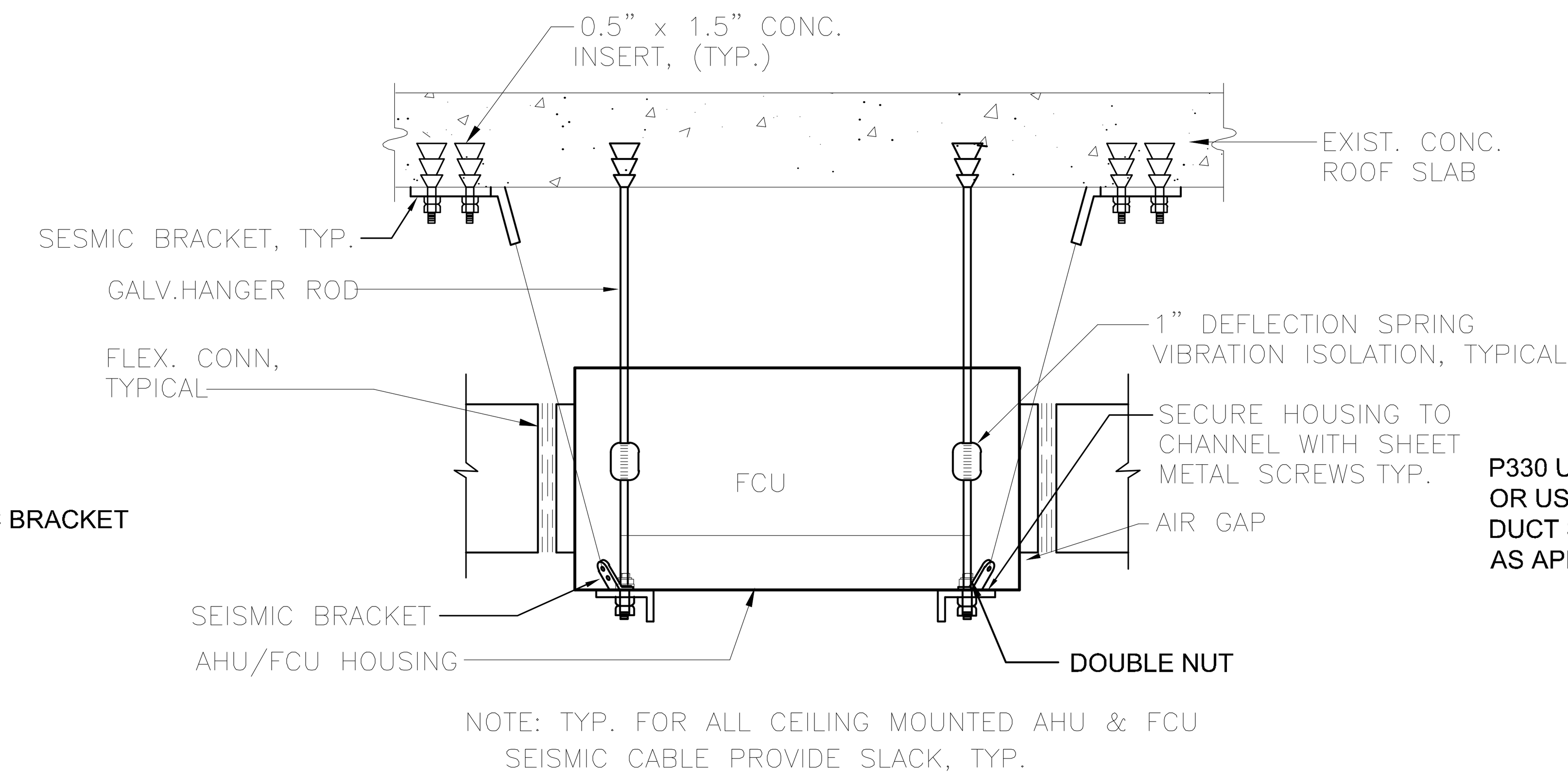

2 HORIZONTAL DUCTED FCU MOUNTING DETAIL WITH SEISMIC RESTRAINT
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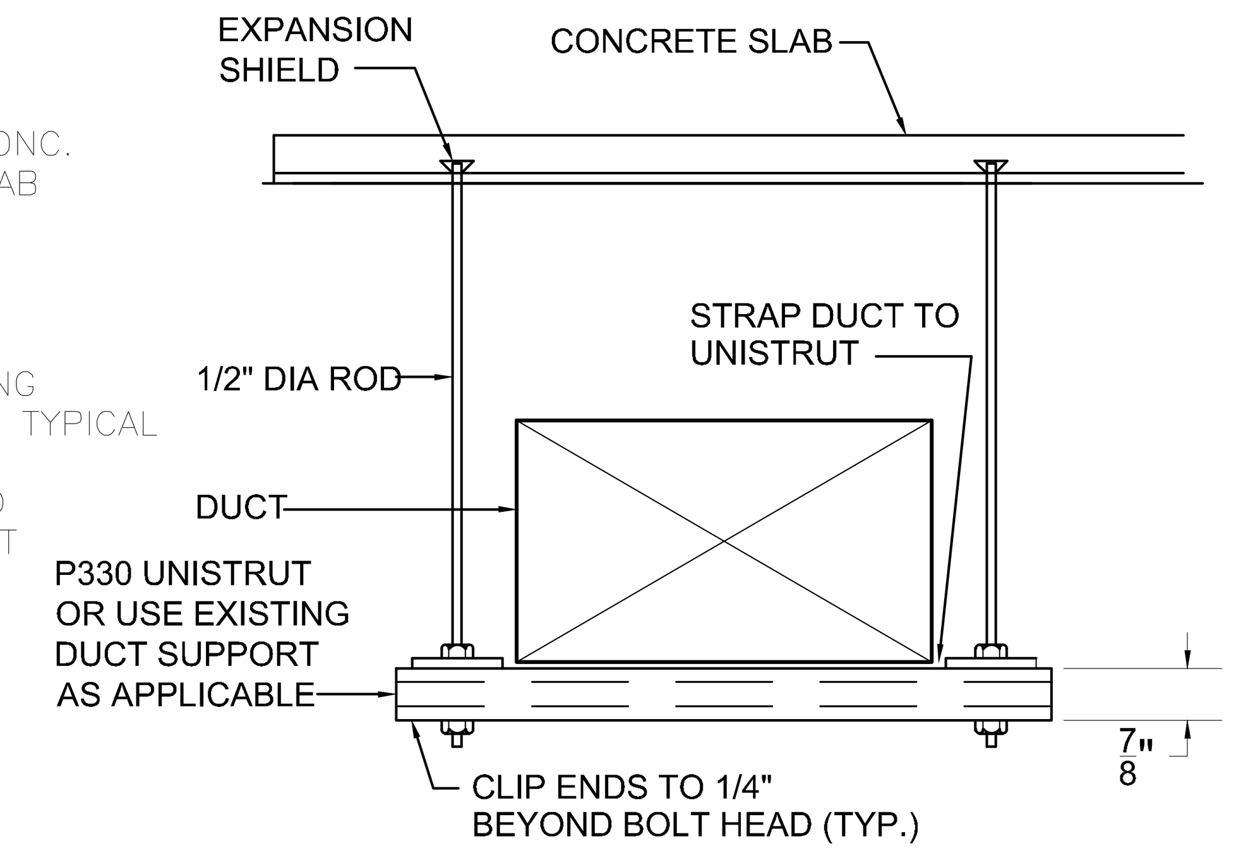

3 RECTANGULAR DUCT SUPPORT DETAIL
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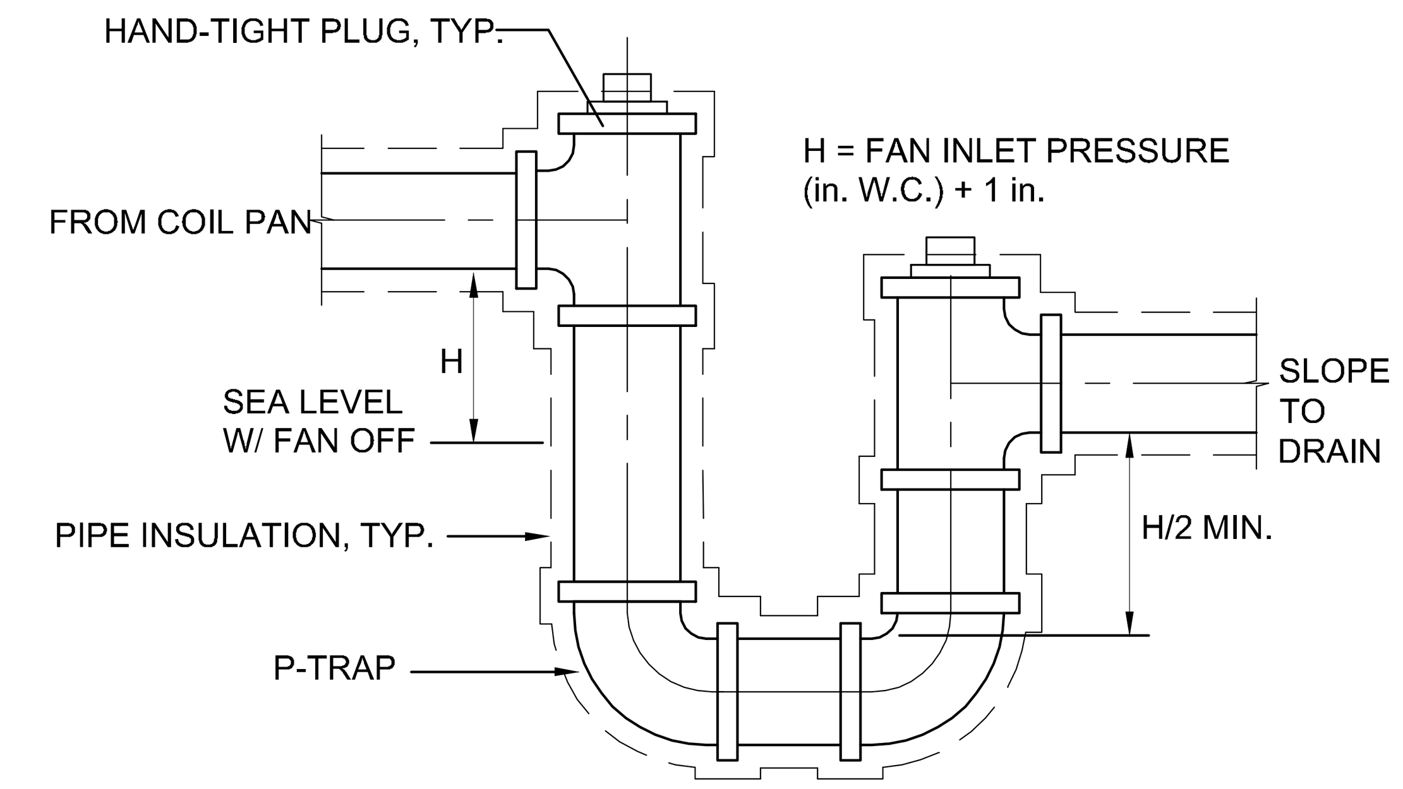

4 TYPICAL FCU/DOAS CONDENSATE TRAP DETAIL
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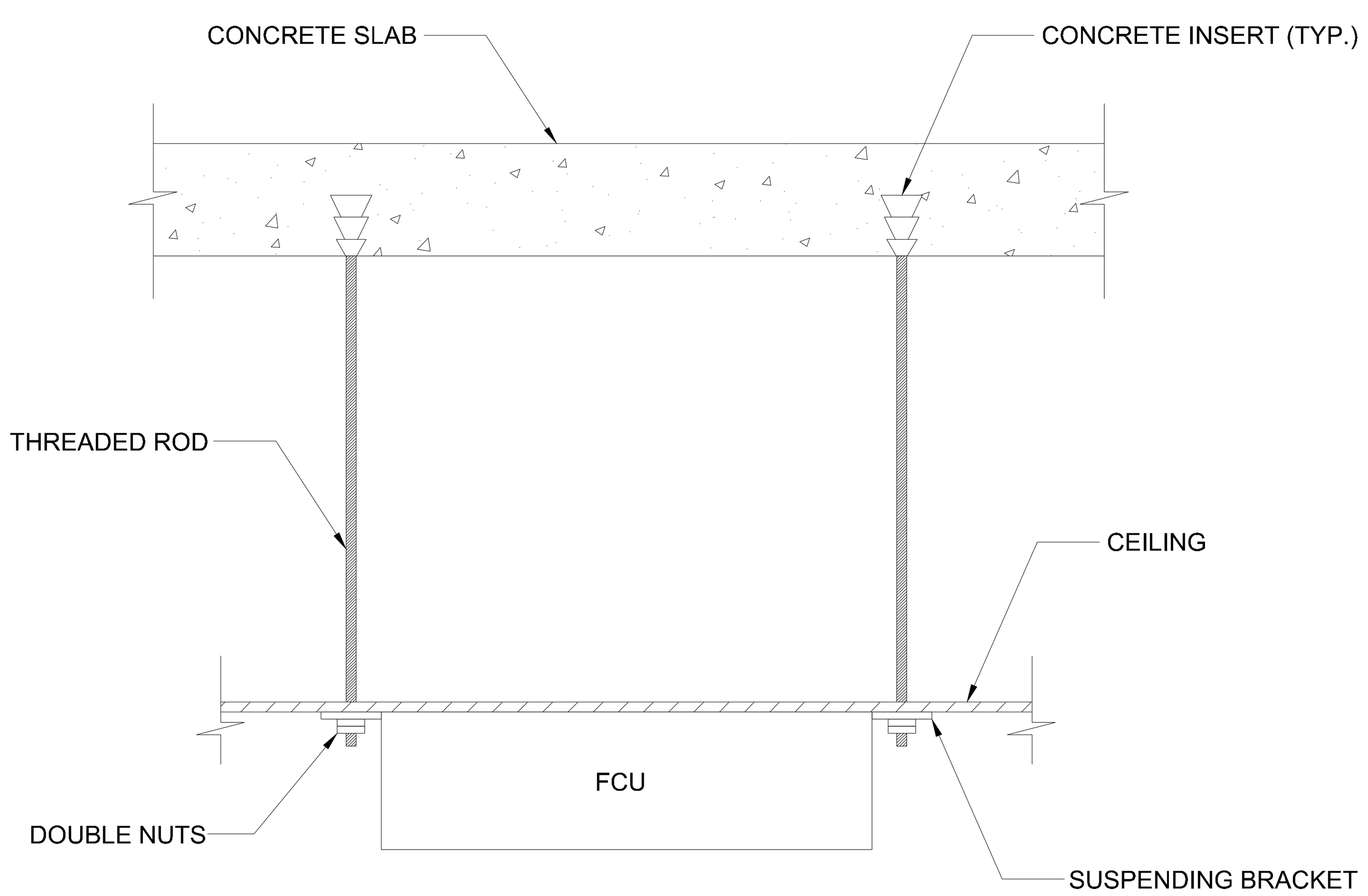

5 CEILING SUSPENDED FCU MOUNTING DETAIL
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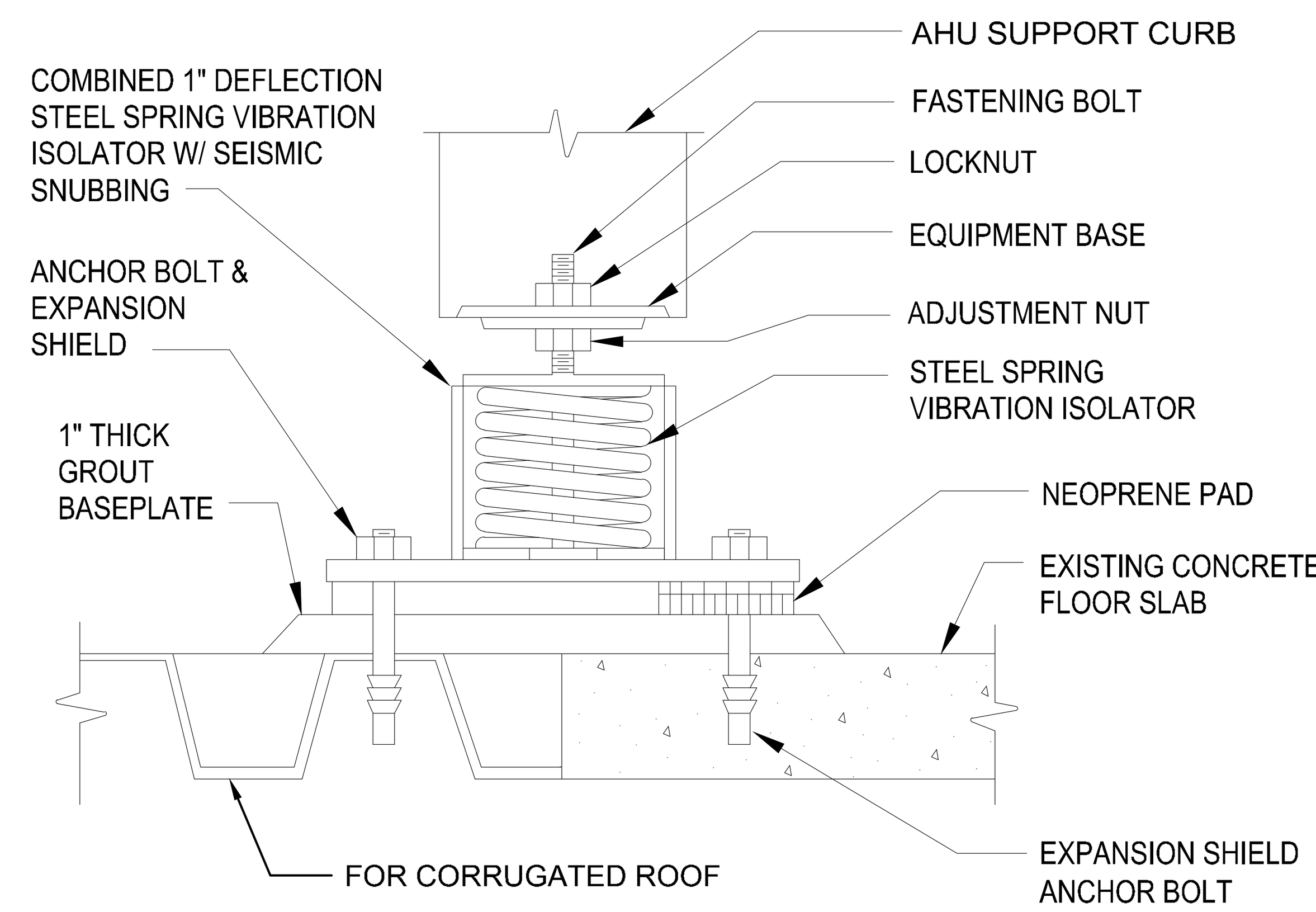

6 FLOOR SUPPORTED EQUIPMENT MOUNTING DETAIL
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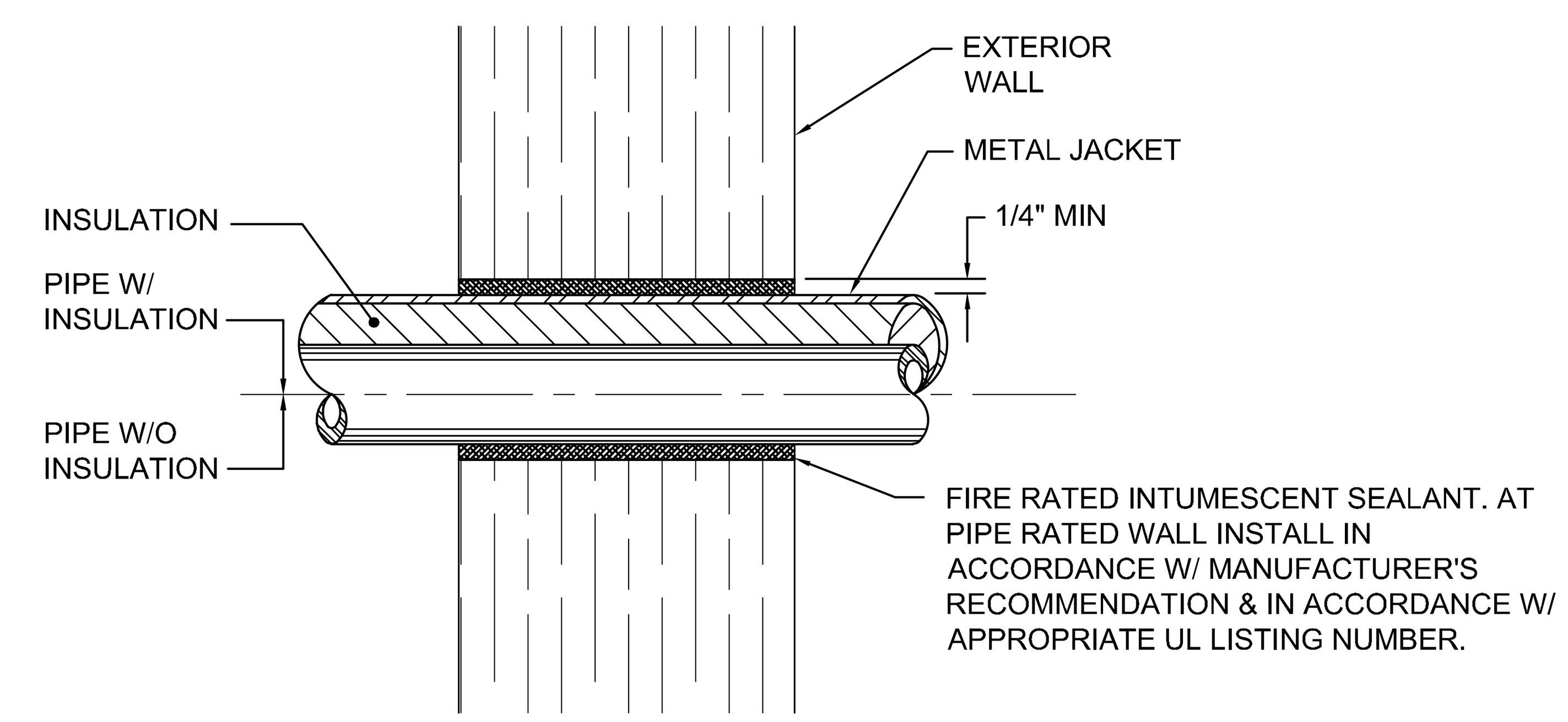

7 PIPE PENETRATION THRU WALL
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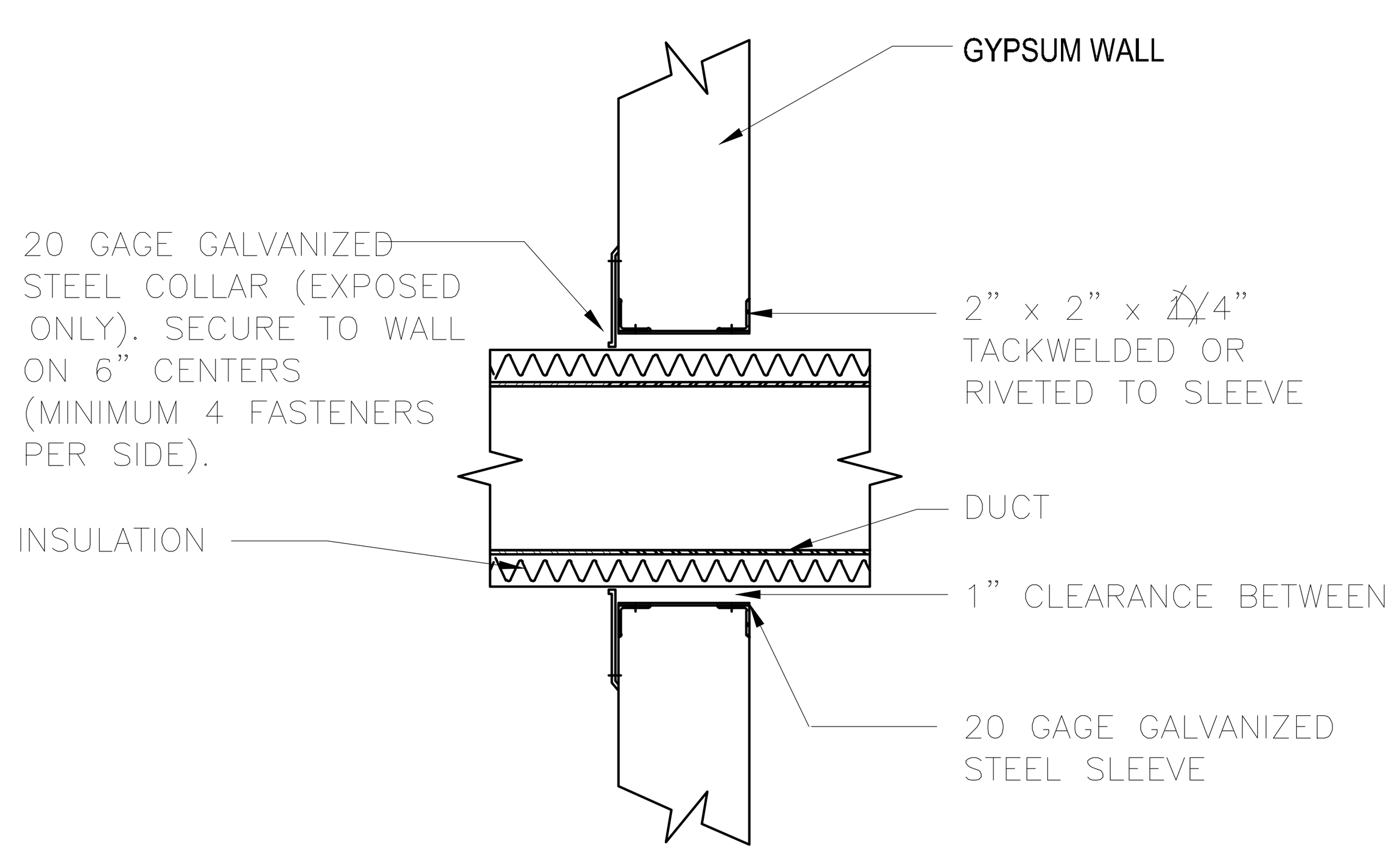

8 TYPICAL DUCT PENETRATION THRU WALL
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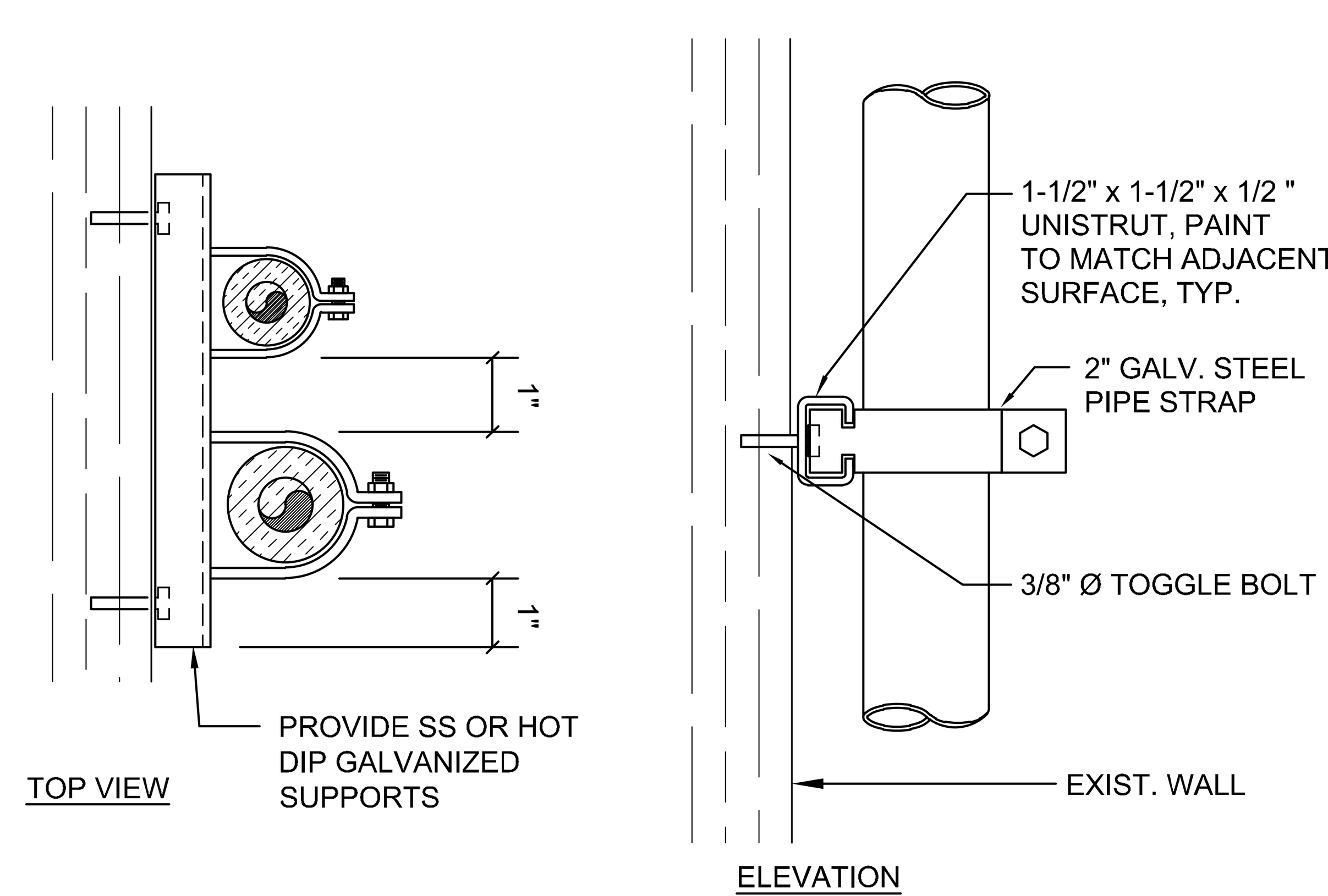

9 VERTICAL PIPE SUPPORT DETAIL
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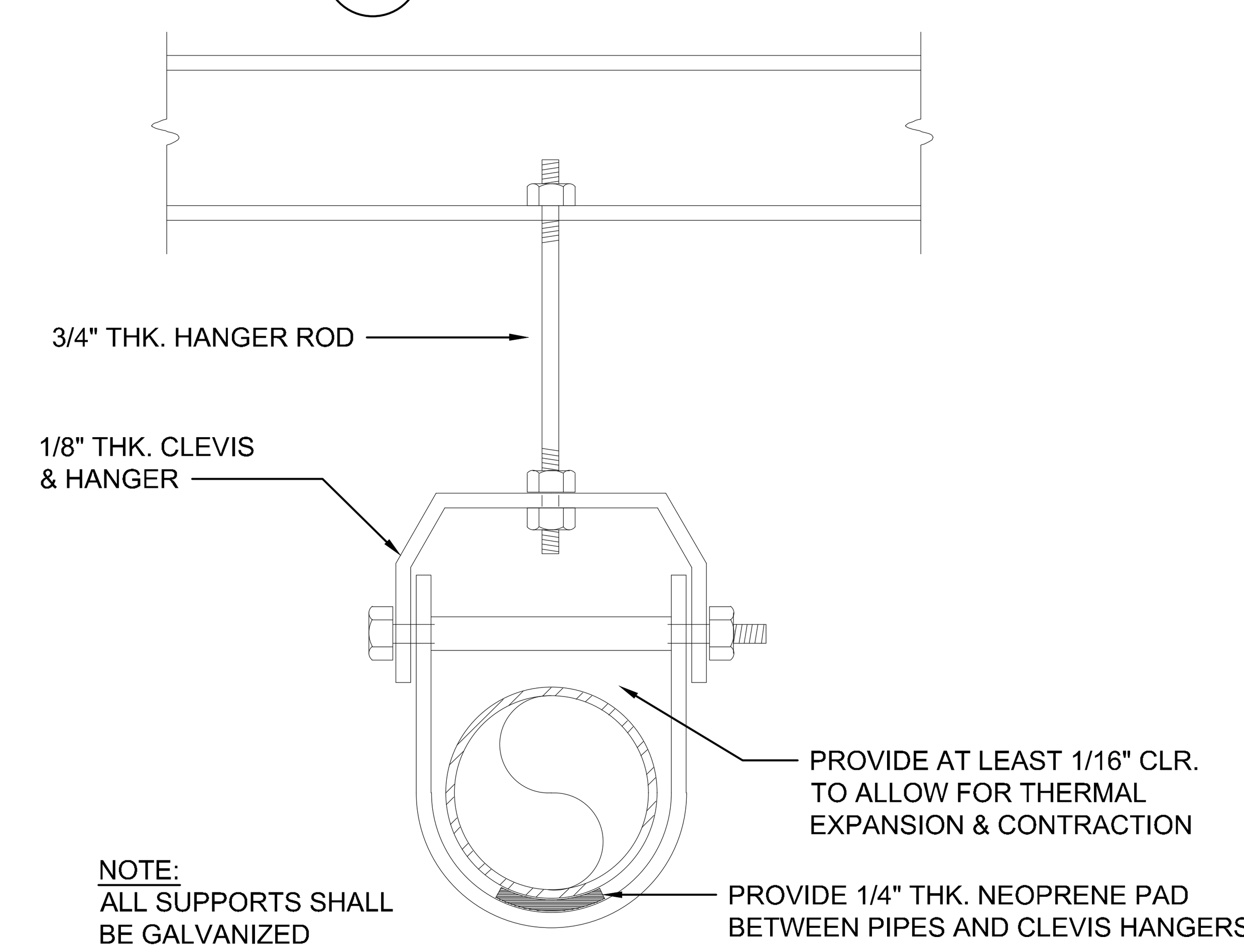

10 PIPE HANGING SUPPORT DETAIL
SCALE: NTS

REVISIONS	BY

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JOEL P. YUEN LICENSED PROFESSIONAL ENGINEER No. 5805-M HAWAII, U.S.A.

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LEAHI HOSPITAL AC REPLACEMENT

MECHANICAL DETAILS

Designed	CL, GO, KT
Drawn	ISE
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Date	2/28/2020
Job No.	20008
Sheet	M-501

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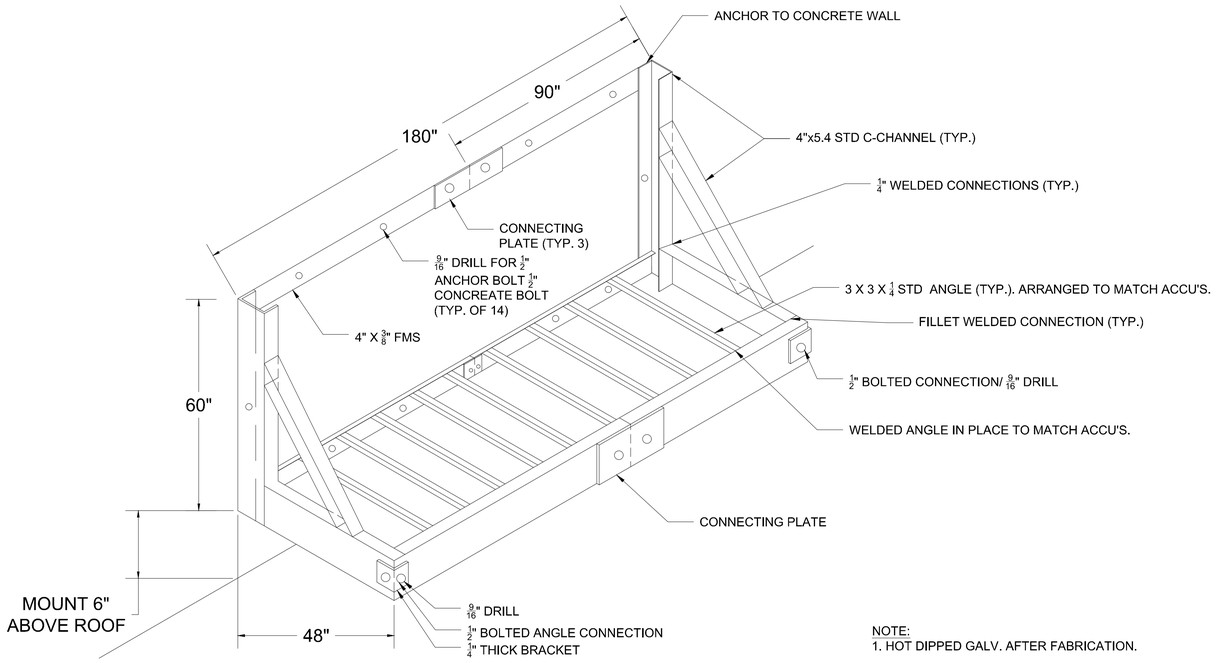
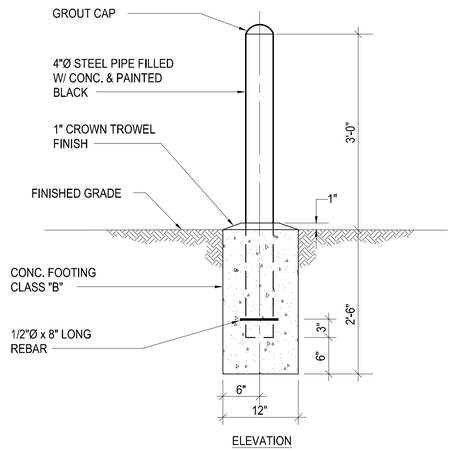


NOTE:
1. HOT DIPPED GALV. AFTER FABRICATION.

2. SUBMIT SHOP DRAWING TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.

1 EQUIPMENT MOUNTING DETAIL FOR ACCU Y2-2, Y3-1, Y4-1 & Y5-1
NOT TO SCALE



ELEVATION

2 TYPICAL PIPE BOLLARD DETAIL
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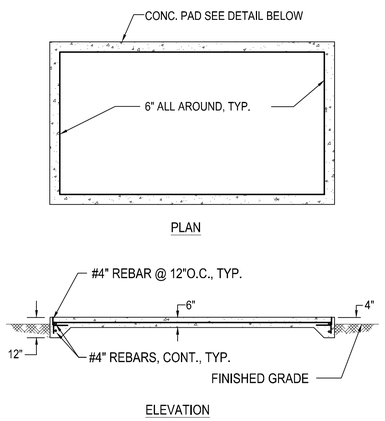

PLAN

ELEVATION

3 NEW CONCRETE PAD ON GRADE DETAIL
NOT TO SCALE

REVISIONS	BY

This work was prepared by me or under my supervision and conducted for this project will be under my observation.

JOEL P. YUEN — LICENSED PROFESSIONAL ENGINEER — No. 5805-M — HAWAII, U.S.A.

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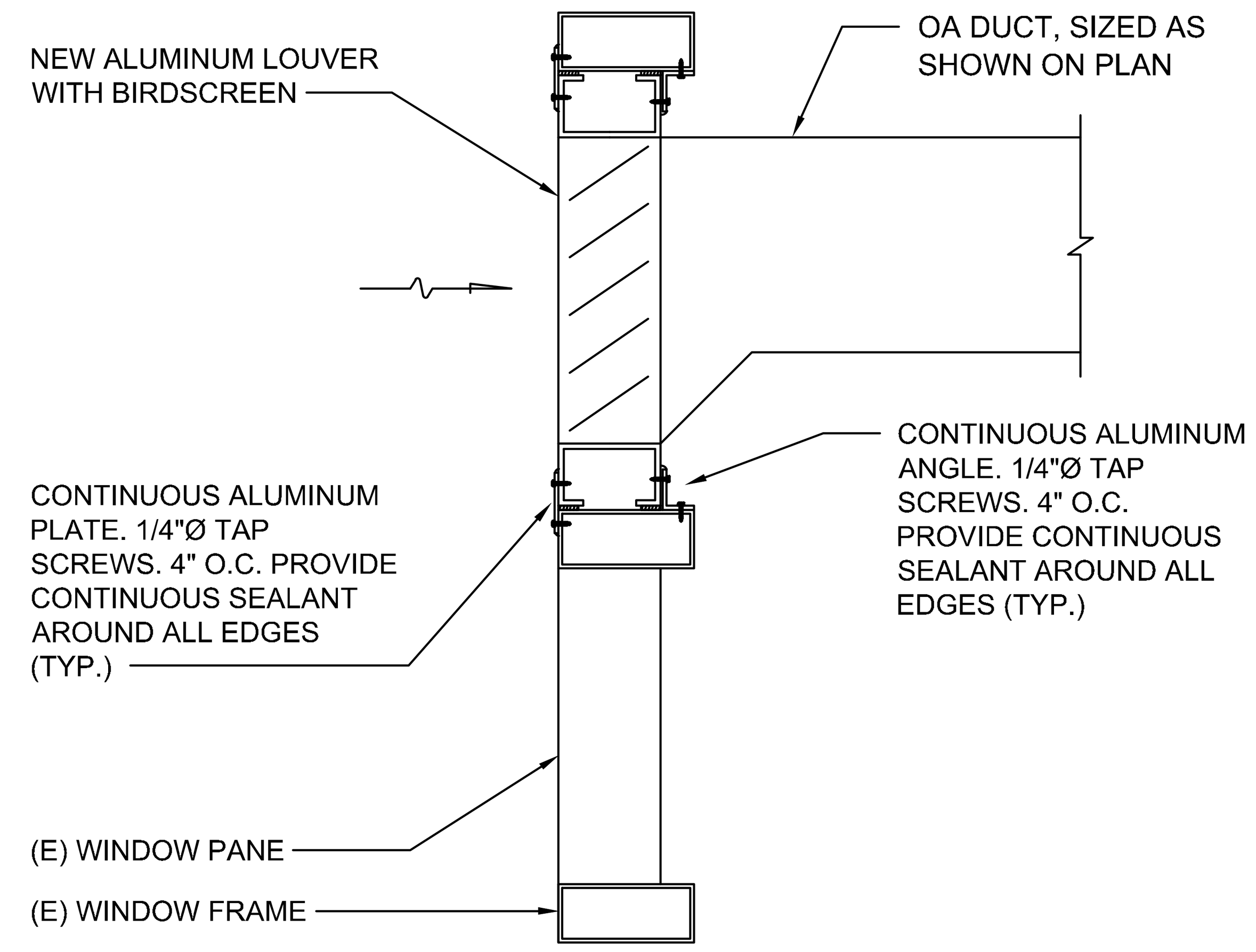
Sheet	M-502
Of	14 Sheets 31



1 TYPICAL LOUVER FRAME DETAIL
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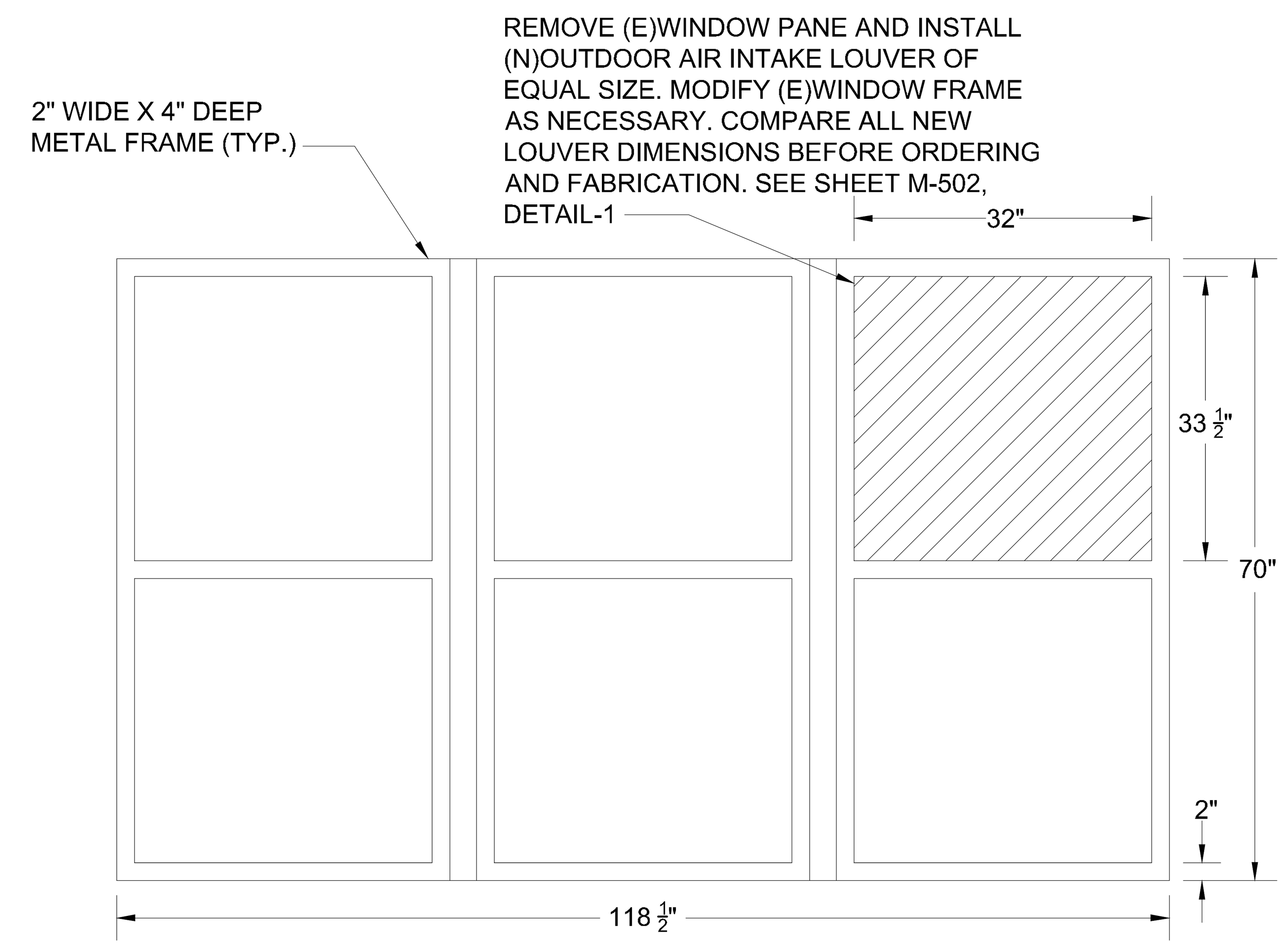

2 FCU-A1-1 OA WINDOW LOUVER DETAIL
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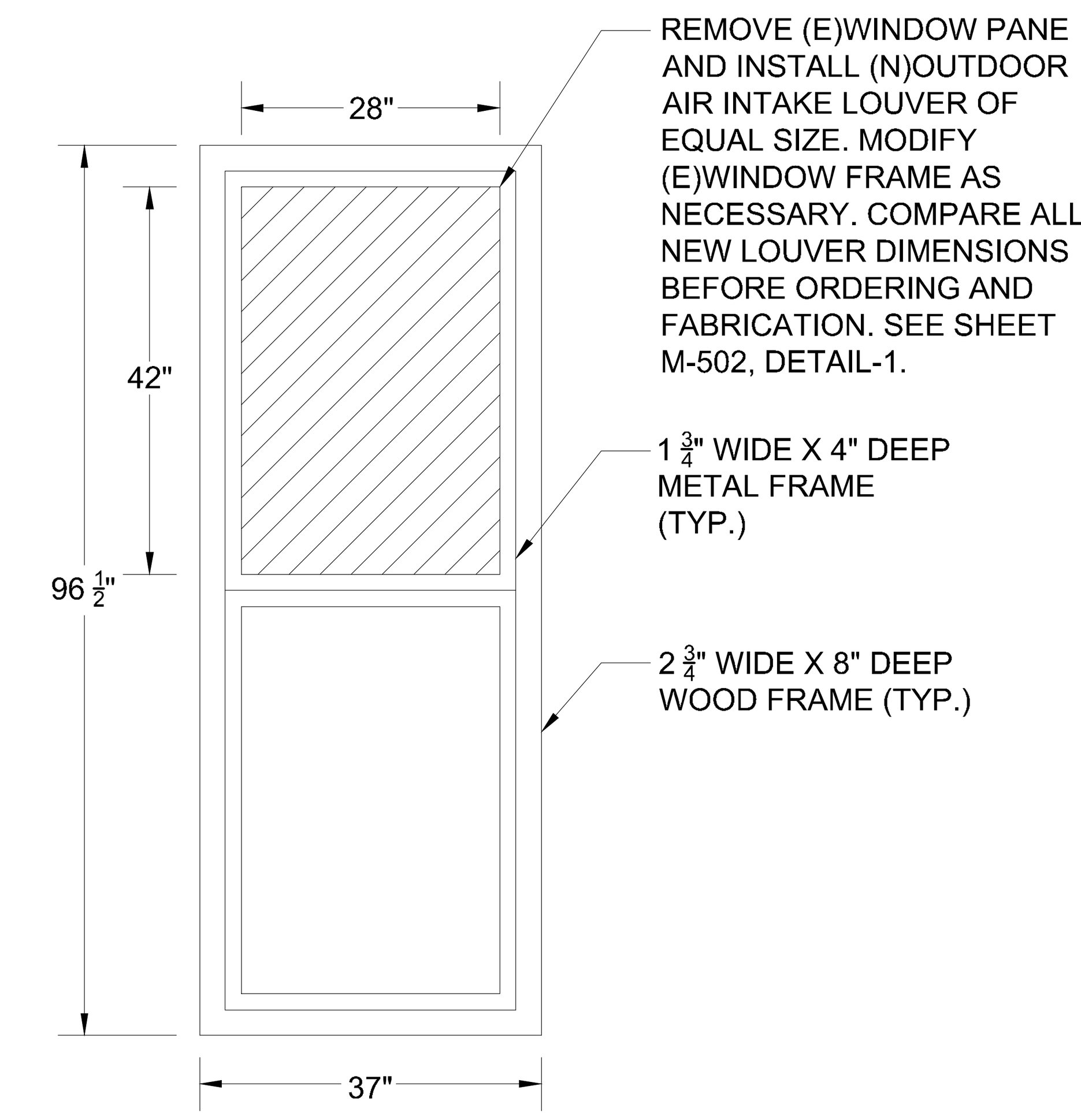

3 FCU-A2-1 OA WINDOW LOUVER DETAIL
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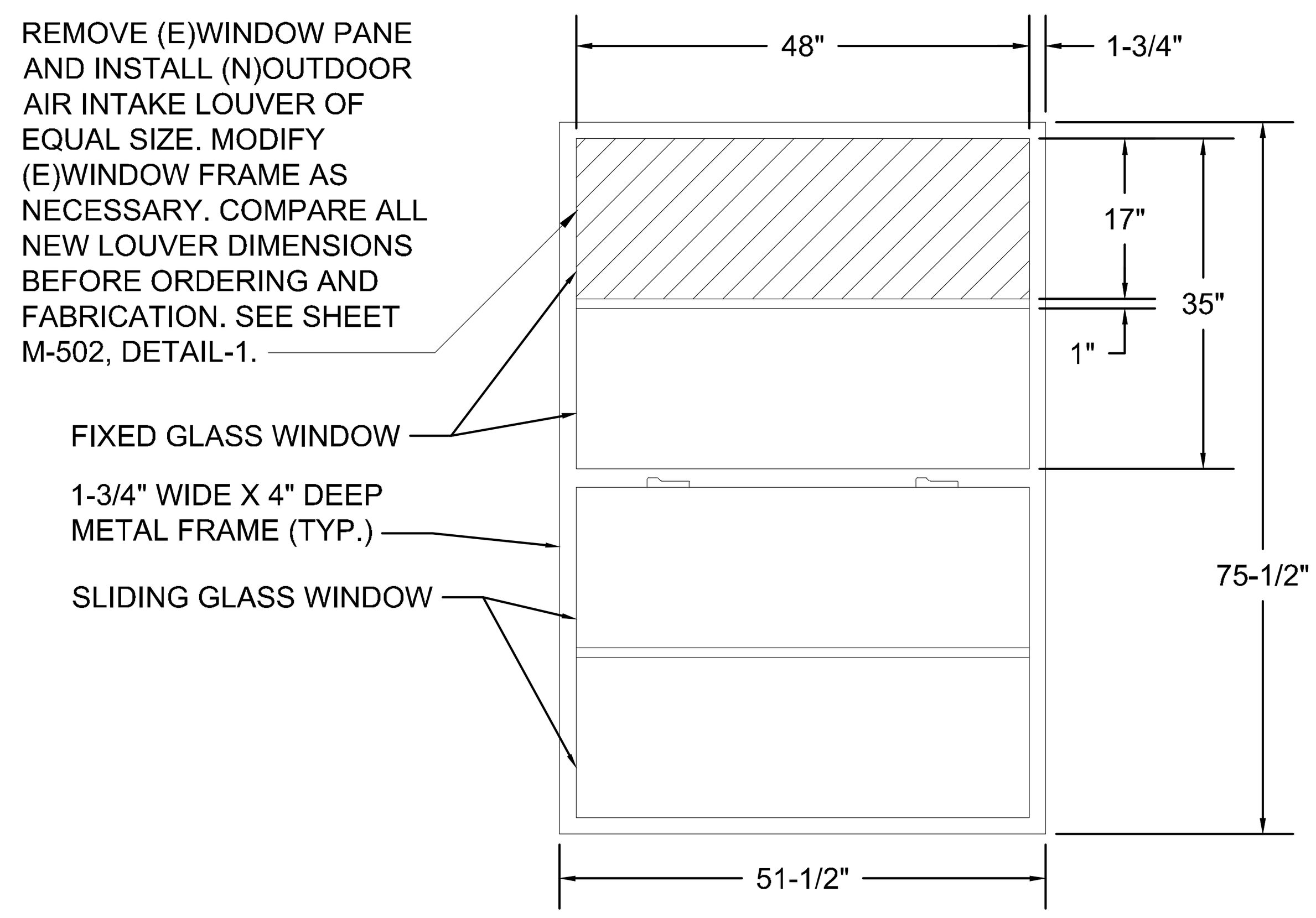

4 DOAS Y1-1 OA WINDOW LOUVER DETAIL
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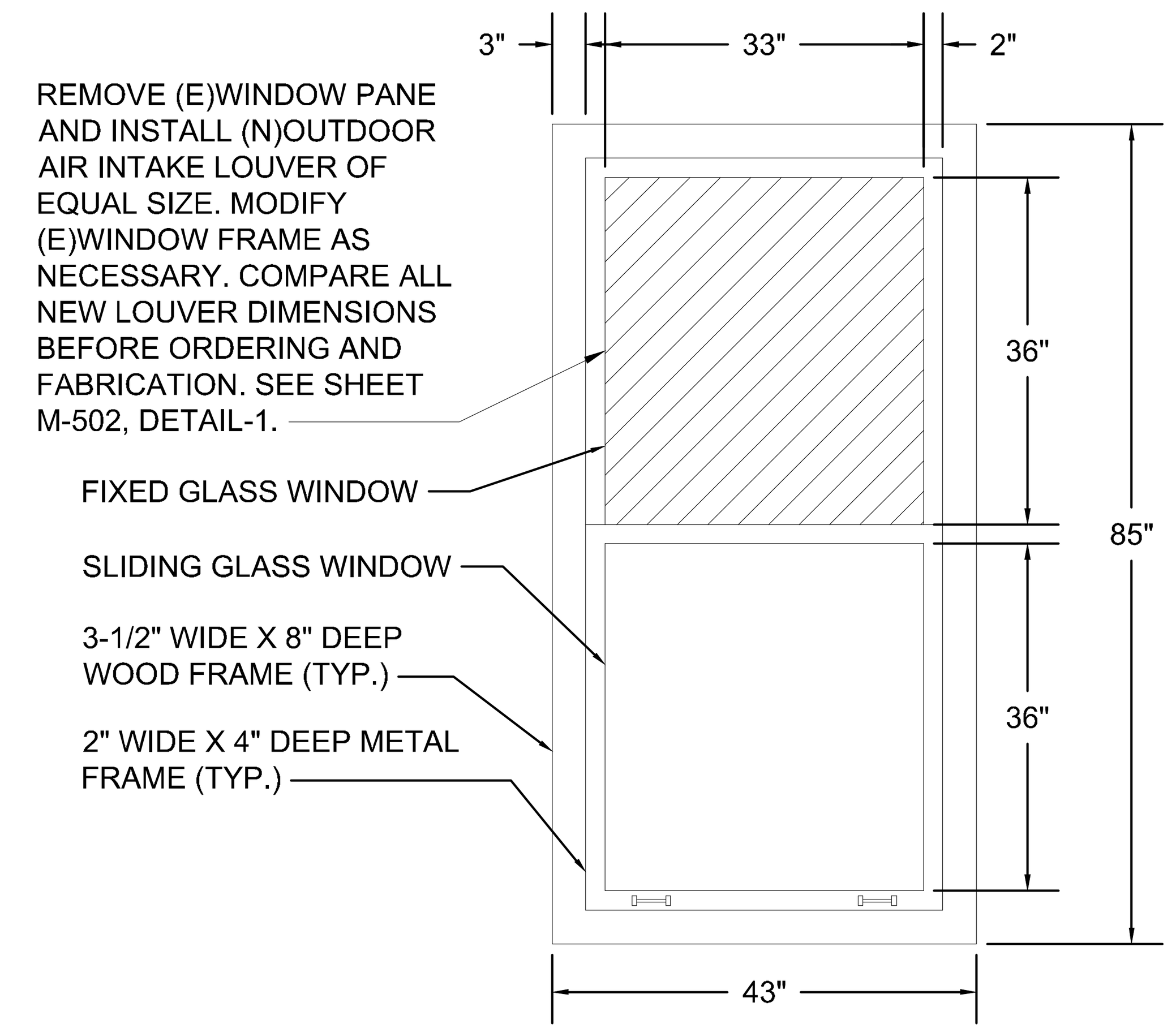

5 DOAS Y1-2 OA WINDOW LOUVER DETAIL
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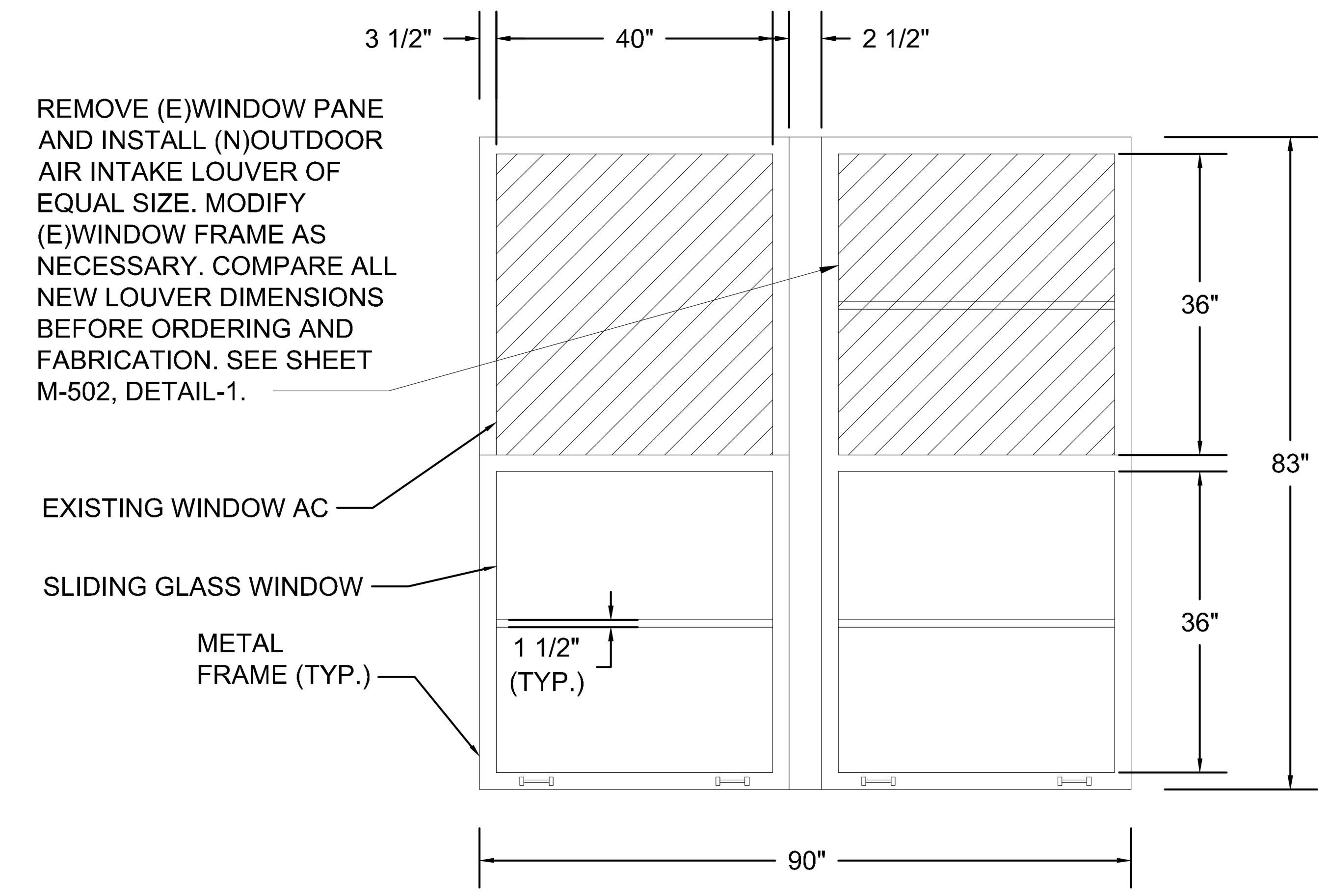

6 DOAS Y3-1, Y4-1, Y5-1 OA WINDOW LOUVER DETAIL
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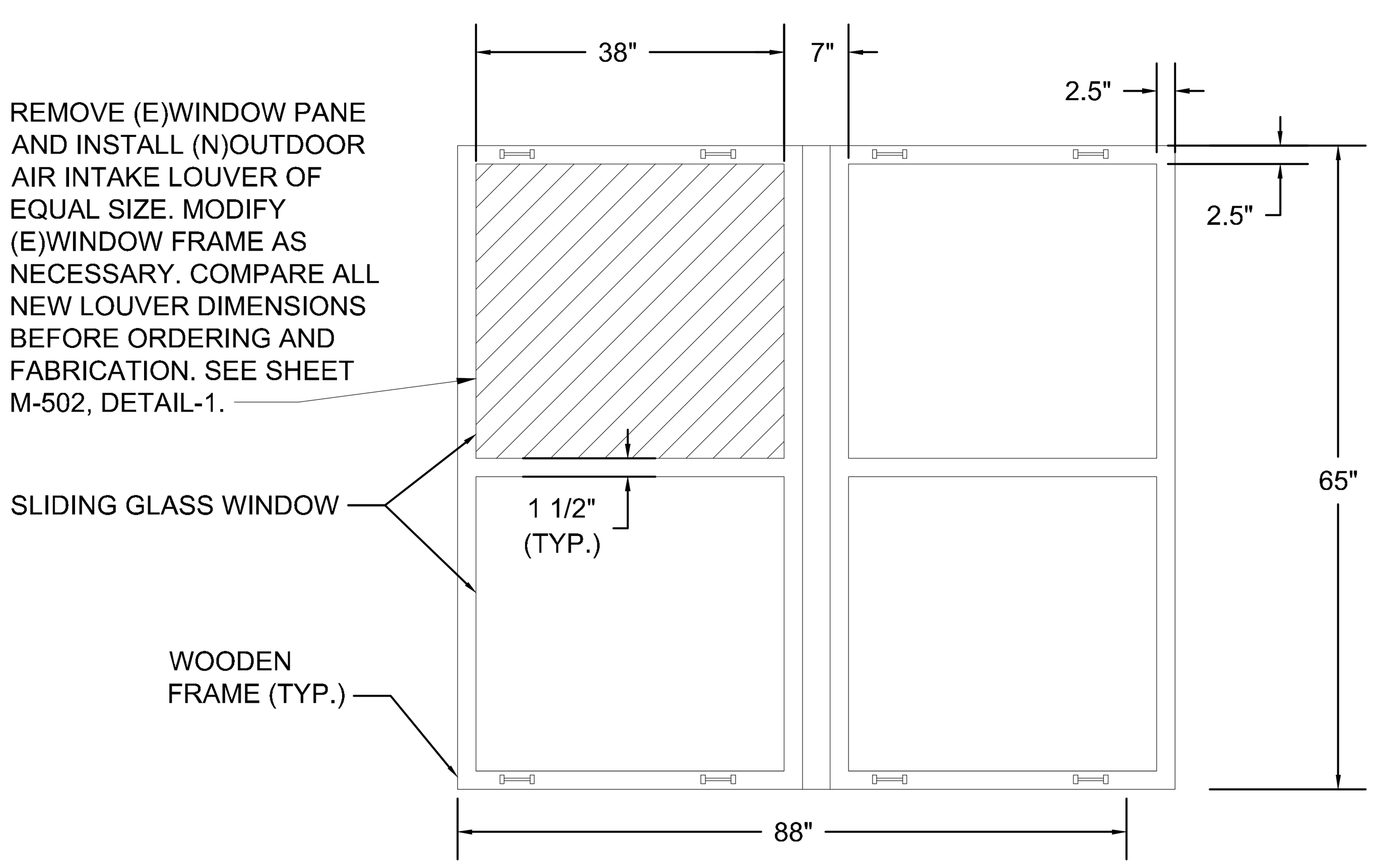

7 FCU Y2-1 OA WINDOW LOUVER DETAIL
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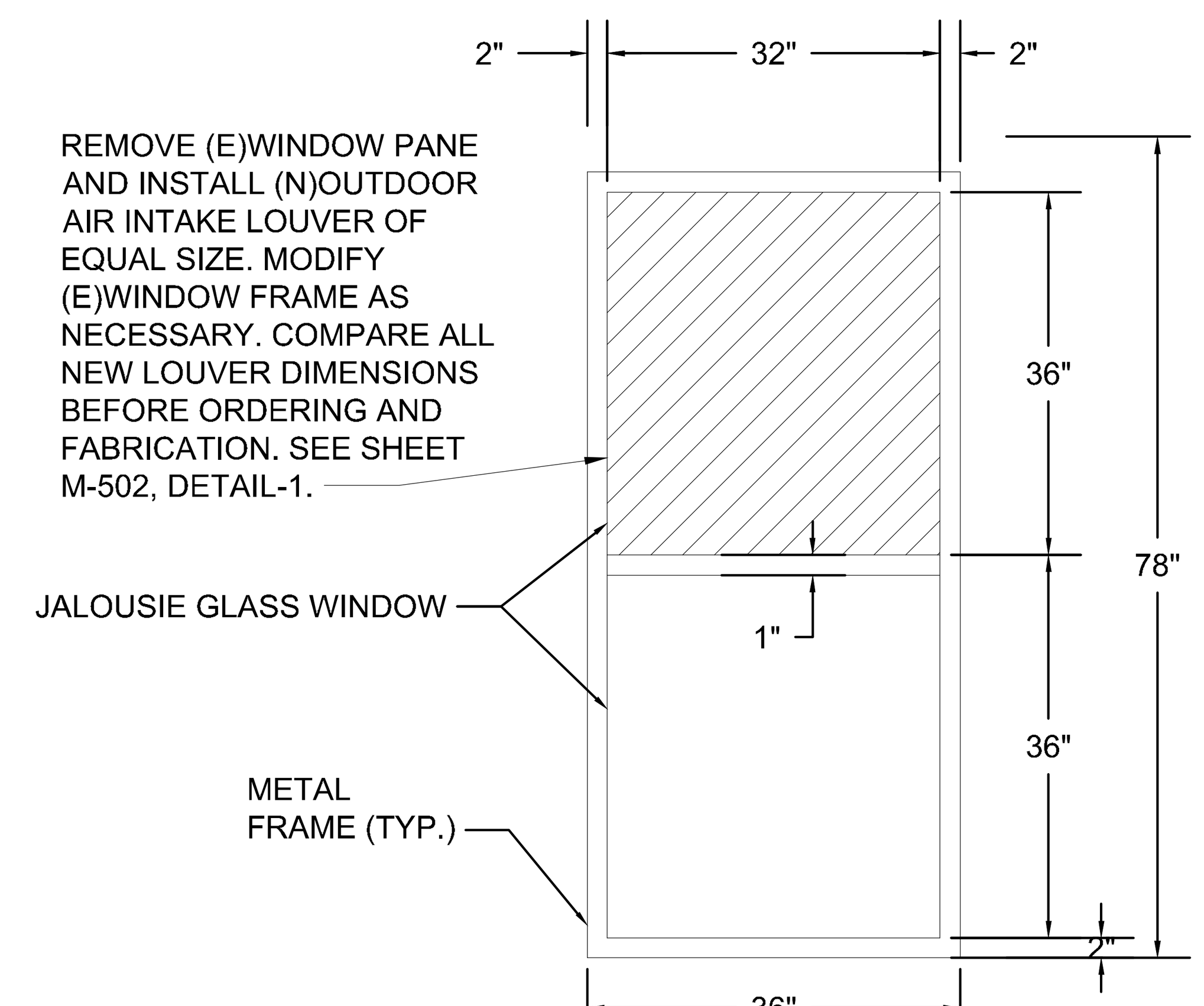

8 FCU Y2-4, Y2-5, Y3-3, Y3-4, Y4-3, Y4-4 Y5-3, Y5-4 OA WINDOW LOUVER DETAIL
NOT TO SCALE

REVISIONS	BY

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JOEL P. YUEN LICENSED PROFESSIONAL ENGINEER No. 5805-M HAWAII, U.S.A.

InSynergy Engineering Inc.
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LEAHI HOSPITAL AC REPLACEMENT
MECHANICAL DETAILS

Designed	CL, GO, KT
Drawn	ISE
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Sheet	M-503
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FAN COIL UNIT SCHEDULE (DX)

UNIT NO.	SERVES	UNIT TYPE	DESIGN SA (CFM)	DESIGN OA (CFM)	TOTAL CAPACITY (BTUH)	SENSIBLE CAPACITY (BTUH)	E.S.P (IN)	SAT. SUCTION TEMP. (°F)	OUTDOOR AIR TEMP. (°F)	AIR TEMP ENT. °F DB	AIR TEMP ENT. °F WB	AIR TEMP LVG. °F DB	AIR TEMP LVG. °F WB	FILTER TYPE MEDIA	FILTER TYPE FV FPM	MOTOR DATA V	MOTOR DATA PH	MOTOR DATA Hz	MOTOR DATA HP	MOTOR DATA WATTS	MCA	MOCP	WEIGHT (LBS)	REMARKS
FCU A1-1	ADMIN 1ST FLOOR CONFERENCE ROOM	CEILING SUSPENDED	580	115	24,300	15,000	N/A	40	95	78.0	66.8	54.6	53.2	MERV 4	-	208	1	60	0.13	95	1	25	71	1,2,3,4,6,11
FCU A2-1	ADMIN 2ND FLOOR CONFERENCE ROOM	CEILING SUSPENDED	465	100	21,700	13,300	N/A	40	95	79.3	67.7	53.4	52.5	MERV 4	-	208	1	60	0.13	95	1	25	71	1,2,3,4,6,11
FCU Y1-1	YOUNG 1ST FLOOR BREAKROOM-2	CASSETTE	381	41	10,100	9,100	N/A	40	95	75.0	61.0	55.0	51.7	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,10
FCU Y1-2	YOUNG 1ST FLOOR DAY CARE OFFICE	CASSETTE	1002	55	23,800	22,600	N/A	40	95	75.0	60.2	55.0	51.8	MERV 13	-	208	1	60		120	0.92	15	55	1,2,3,6,7,8,10
FCU Y1-3	YOUNG 1ST FLOOR LIBRARY	CASSETTE	603	201	25,900	23,400	N/A	40	95	75.0	61.7	55.0	46.0	MERV 13	-	208	1	60		120	0.92	15	55	1,2,3,6,7,8,10
FCU Y1-4	YOUNG 1ST FLOOR ADULT DAY CARE	CASSETTE	657	219	28,200	25,500	N/A	40	95	75.0	61.7	55.0	46.0	MERV 13	-	208	1	60		120	0.92	15	55	1,2,3,6,7,8,10
FCU Y1-5	YOUNG 1ST FLOOR LOUNGE	CASSETTE	558	186	22,000	19,700	N/A	40	95	75.0	61.7	55.0	47.4	MERV 13	-	208	1	60		120	0.57	15	55	1,2,3,6,7,8,10
FCU Y1-6	YOUNG 1ST FLOOR KITCHEN	CASSETTE	594	198	22,200	20,200	N/A	40	95	75.0	61.1	55.0	47.6	MERV 13	-	208	1	60		120	0.57	15	55	1,2,3,6,7,8,10
FCU Y1-7	YOUNG 1ST FLOOR OCCUPATIONAL THERAPY	CASSETTE	585	195	15,300	13,300	N/A	40	95	75.0	61.2	55.0	52.1	MERV 13	-	208	1	60		50	0.43	15	46	1,2,3,6,7,8,11
FCU Y1-8	YOUNG 1ST FLOOR OCCUPATIONAL THERAPY	CASSETTE	585	195	15,300	13,300	N/A	40	95	75.0	61.2	55.0	52.1	MERV 13	-	208	1	60		50	0.43	15	46	1,2,3,6,7,8,11
FCU Y1-9	YOUNG 1ST FLOOR RECREATIONAL THERAPY	CASSETTE	594	198	16,250	14,150	N/A	40	95	75.0	61.2	55.0	51.7	MERV 13	-	208	1	60		50	0.43	15	46	1,2,3,6,7,8,11
FCU Y1-10	YOUNG 1ST FLOOR RECREATIONAL THERAPY	CASSETTE	594	198	16,250	14,150	N/A	40	95	75.0	61.2	55.0	51.7	MERV 13	-	208	1	60		50	0.43	15	46	1,2,3,6,7,8,11
FCU Y1-11	YOUNG 1ST FLOOR OFFICE-1	CASSETTE	224	33	5,800	4,900	N/A	40	95	75.0	61.7	55.0	52.8	MERV 13	-	208	1	60		50	0.24	15	46	1,2,3,6,7,8,11
FCU Y1-12	YOUNG 1ST FLOOR OFFICE-2	CASSETTE	240	37	6,100	5,200	N/A	40	95	75.0	61.6	55.0	52.8	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,11
FCU Y1-13	YOUNG 1ST FLOOR OFFICE-3	CASSETTE	335	54	8,600	7,300	N/A	40	95	75.0	60.9	55.0	52.8	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,11
FCU Y1-14	YOUNG 1ST FLOOR OFFICE-5	CASSETTE	403	38	10,100	9,000	N/A	40	95	75.0	61.2	55.0	52.4	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,11
FCU Y1-15	YOUNG 1ST FLOOR OFFICE-6	CASSETTE	317	11	7,600	7,300	N/A	40	95	75.0	61.2	55.0	52.2	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,11
FCU Y1-16	YOUNG 1ST FLOOR EMPLOYEE LUNCH ROOM	CASSETTE	479	88	13,200	10,800	N/A	40	95	75.0	62.3	55.0	52.9	MERV 13	-	208	1	60		50	0.43	15	46	1,2,3,6,7,8,11
FCU Y1-17	YOUNG 1ST FLOOR BREAKROOM-1	CASSETTE	368	21	8,900	8,400	N/A	40	95	75.0	60.3	55.0	51.6	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,11
FCU Y2-1	YOUNG 2ND FLOOR CONFERENCE ROOM	CEILING SUSPENDED	1095	215	35,800	24,300	N/A	40	95	75.0	63.9	55.0	52.7	MERV 4	-	208	1	60		110	1.22	15	84	1,2,3,4,7,8,9
FCU Y2-2	YOUNG 2ND FLOOR DINING ROOM	CASSETTE	315	315	12,800	10,900	N/A	40	95	75.0	63.5	55.0	48.6	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,9
FCU Y2-3	YOUNG 2ND FLOOR NURSING STATION	DUCTED	170	45	4,500	3,600	0.5	40	95	75.0	62.0	55.0	52.8	MERV 13	-	208	1	60		60	1.05	15	49	1,2,3,6,7,8,9
FCU Y2-4	YOUNG 2ND FLOOR SOLARIUM	CASSETTE	565	180	20,000	14,350	N/A	40	95	77.8	65.2	55.0	53.5	MERV 13	-	208	1	60		120	0.54	15	55	1,2,3,6,7,8,9
FCU Y2-5	YOUNG 2ND FLOOR SOLARIUM	CASSETTE	565	180	20,000	14,350	N/A	40	95	77.8	65.2	55.0	53.5	MERV 13	-	208	1	60		120	0.54	15	55	1,2,3,6,7,8,9
FCU Y3-1	YOUNG 3RD FLOOR DINING ROOM	CASSETTE	320	320	11,700	9,600	N/A	40	95	75.0	63.4	55.0	50.8	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,9
FCU Y3-2	YOUNG 3RD FLOOR NURSING STATION	DUCTED	545	65	13,500	12,000	0.5	40	95	75.0	60.9	55.0	52.2	MERV 13	-	208	1	60		110	1.56	15	58	1,2,3,6,7,8,9
FCU Y3-3	YOUNG 3RD FLOOR SOLARIUM	CASSETTE	565	180	20,000	14,350	N/A	40	95	77.8	65.2	55.0	53.5	MERV 13	-	208	1	60		120	0.54	15	55	1,2,3,6,7,8,9
FCU Y3-4	YOUNG 3RD FLOOR SOLARIUM	CASSETTE	565	180	20,000	14,350	N/A	40	95	77.8	65.2	55.0	53.5	MERV 13	-	208	1	60		120	0.54	15	55	1,2,3,6,7,8,9
FCU Y4-1	YOUNG 4TH FLOOR DINING ROOM	CASSETTE	320	320	11,700	9,600	N/A	40	95	75.0	63.4	55.0	50.8	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,9
FCU Y4-2	YOUNG 4TH FLOOR NURSING STATION	DUCTED	545	65	13,500	12,000	0.5	40	95	75.0	60.9	55.0	52.2	MERV 13	-	208	1	60		110	1.56	15	58	1,2,3,6,7,8,9
FCU Y4-3	YOUNG 4TH FLOOR SOLARIUM	CASSETTE	565	180	20,000	14,350	N/A	40	95	77.8	65.2	55.0	53.5	MERV 13	-	208	1	60		120	0.54	15	55	1,2,3,6,7,8,9
FCU Y4-4	YOUNG 4TH FLOOR SOLARIUM	CASSETTE	565	180	20,000	14,350	N/A	40	95	77.8	65.2	55.0	53.5	MERV 13	-	208	1	60		120	0.54	15	55	1,2,3,6,7,8,9
FCU Y5-1	YOUNG 5TH FLOOR DINING ROOM	CASSETTE	320	320	10,900	8,800	N/A	40	95	75.0	63.4	55.0	51.8	MERV 13	-	208	1	60		50	0.39	15	46	1,2,3,6,7,8,9
FCU Y5-2	YOUNG 5TH FLOOR NURSING ROOM	DUCTED	600	65	14,800	13,300	0.5	40	95	75.0	60.8	55.0	52.1	MERV 13	-	208	1	60		110	1.56	15	58	1,2,3,6,7,8,9
FCU Y5-3	YOUNG 5TH FLOOR SOLARIUM	CASSETTE	590	180	20,600	14,950	N/A	40	95	77.7	65.0	55.0	53.5	MERV 13	-	208	1	60		120	0.54	15	55	1,2,3,6,7,8,9
FCU Y5-4	YOUNG 5TH FLOOR SOLARIUM	CASSETTE	590	180	20,600	14,950	N/A	40	95	77.7	65.0	55.0	53.5	MERV 13	-	208	1	60		120	0.54	15	55	1,2,3,6,7,8,9

NOTES:
1. REFER TO MANUFACTURER'S WIRING DIAGRAM FOR POWERING GUIDELINES.
2. PIPING LENGTH MODIFICATIONS MADE IN FIELD SHALL BE COORDINATED WITH MANUFACTURER FOR PIPING RECOMONDATIONS AND REVISED LINE SIZES.
3. HANG FROM STRUCTURE USING MANUFACTURER PROVIDED RUBBER IN SHEAR ISOLATORS AND HANGER RODS.
4. PROVIDE MERV-4 FILTER
5. PROVIDE MERV-8 FILTER
6. PROVIDE MERV-13 FILTER
7. PROVIDE INDIVIDUAL CONTROLLER
8. PROVIDE BUILT-IN CONDENSATE PUMP
9. BASE BID
10. ADDITIVE ALTERNATE 1
11. ADDITIVE ALTERNATE 2

REVISIONS | BY

This work was prepared by me or under my supervision and construction of this project will be under my observation.

JOEL P. YUEN LICENSED PROFESSIONAL ENGINEER No. 5805-M HAWAII, U.S.A.

INSYNERGY ENGINEERING INC
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

MECHANICAL SCHEDULE

Designed CL, GO, KT
Drawn ISE
Checked JY
Date 2/28/2020
Job No. 20008
Sheet M-601
Of 16 Sheets 31

DEDICATED OUTDOOR AIR SCHEDULE (DX)

UNIT NO.	SERVES	OUTDOOR AIR CFM	TOTAL CAPACITY (BTUH)	SENSIBLE CAPACITY (BTUH)	E.S.P (IN)	REFRIG. TEMP. (°F)	AIR TEMP ENT. °F DB	AIR TEMP ENT. °F WB	AIR TEMP LVG. °F DB	AIR TEMP LVG. °F WB	FILTER TYPE MEDIA	FILTER TYPE FV FPM	MOTOR DATA V	MOTOR DATA PH	MOTOR DATA Hz	MOTOR DATA HP	MOTOR DATA WATTS	MCA	MCOP	WEIGHT (LBS)	REMARKS
DOAS Y1-1	YOUNG 1ST FLOOR ADULT DAY HEALTH	900	61,100	27,800	1	-	82.7	74.5	55.0	54.9	MERV 13	-	208	1	60	-	375	4.8	15	177	1,2,3,4,5,7
DOAS Y1-2	YOUNG 1ST FLOOR OT/RT	1137	77,200	35,100	1	-	82.7	74.5	55.0	54.9	MERV 13	-	208	1	60	-	375	4.8	15	177	1,2,3,4,5,8
DOAS Y2-1	YOUNG 2ND FLOOR DINING ROOM, NURSING STATION	360	24,200	11,000	1	-	82.7	74.5	55	54.9	MERV 13	-	208	1	60	-	244	3.3	15	109	1,2,3,4,5,6
DOAS Y3-1	YOUNG 3RD FLOOR DINING ROOM, NURSING STATION	385	26,000	11,800	1	-	82.7	74.5	55	54.9	MERV 13	-	208	1	60	-	244	3.3	15	109	1,2,3,4,5,6
DOAS Y4-1	YOUNG 4TH FLOOR DINING ROOM, NURSING STATION	385	26,000	11,800	1	-	82.7	74.5	55	54.9	MERV 13	-	208	1	60	-	244	3.3	15	109	1,2,3,4,5,6
DOAS Y5-1	YOUNG 5TH FLOOR DINING ROOM, NURSING STATION	385	26,000	11,800	1	-	82.7	74.5	55	54.9	MERV 13	-	208	1	60	-	244	3.3	15	109	1,2,3,4,5,6

NOTES:
1. REFER TO MANUFACTURER'S WIRING DIAGRAM FOR POWERING GUIDELINES.
2. PIPING LENGTH MODIFICATIONS MADE IN FIELD SHALL BE COORDINATED WITH MANUFACTURER FOR PIPING RECOMONDATIONS AND REVISED LINE SIZES.
3. HANG FROM STRUCTURE USING MANUFACTURER PROVIDED RUBBER IN SHEAR ISOLATORS AND HANGER RODS.
4. MERV-13 FILTER
5. PROVIDE BUILT-IN CONDENSATE PUMP
6. BASE BID
7. ADDITIVE ALTERNATE 1
8. ADDITIVE ALTERNATE 2

AIR COOLED CONDENSING UNIT SCHEDULE

UNIT NO.	SERVICE	TOTAL CAPACITY (BTUH)	SAT. COND. TEMP. (°F)	SAT. SUCTION. TEMP. (°F)	AMB. TEMP. (°F)	REFRIG.	CONDENSER FAN DATA CFM	CONDENSER FAN DATA NO.	CONDENSER FAN DATA TYPE	CONDENSER FAN DATA WATTS (EACH)	COMPRESSOR DATA NO.	COMPRESSOR DATA kW (EACH)	COMPRESSOR DATA LRA	COMPRESSOR DATA RLA	UNIT ELECTRICAL DATA V	UNIT ELECTRICAL DATA PH	UNIT ELECTRICAL DATA Hz	UNIT ELECTRICAL DATA MCA	UNIT ELECTRICAL DATA MOCP	EER	WEIGHT (LBS)	REMARKS
ACCU A1-1	FCU A1-1	24,300	120	40	95	R410A	1940	1	PROP	86	1	-	11	7	208	1	60	19	26	12.2	151	1,2,5
ACCU A2-1	FCU A2-1	21,700	120	40	95	R410A	1940	1	PROP	86	1	-	11	7	208	1	60	19	26	12.2	151	1,2,5
ACCU Y1-1	FCU Y1-1, FCU Y1-2, FCU Y1-3, FCU Y1-4, FCU Y1-5, FCU Y1-6	132,200	120	40	95	R410A	10600	2	PROP	920	1	11.4	-	-	208	3	60	59	90	11.7	713	1,2,4
ACCU Y1-2	DOAS Y1-1	61,100	120	40	95	R410A	6000	1	PROP	920	1	3.8	-	-	208	3	60	24	40	13.1	479	1,2,4
ACCU Y1-3	FCU Y1-7, FCU Y1-8, FCU Y1-9, FCU Y1-10, FCU Y1-11, FCU Y1-12, FCU Y1-13, FCU Y1-14, FCU Y1-15, FCU Y1-16, FCU Y1-17	123,400	120	40	95	R410A	9200	2	PROP	460	1	9.6	-	-	208	3	60	49	80	12.6	640	1,2,5
ACCU Y1-4	DOAS Y1-2	77,200	120	40	95	R410A	6700	2	PROP	460	1	5.5	-	-	208	3	60	33	50	13.4	569	1,2,5
ACCU Y2-1	FCU Y2-1	35,800	120	40	95	R410A	3885	2	PROP	74	1	2.8	-	-	208	1	60	29	44	15.0	267	1,2,3
ACCU Y2-2	FCU Y2-2, FCU Y2-3, FCU Y2-4, DOAS Y2-1	81,400	120	40	95	R410A	6700	2	PROP	460	1	5.4	-	-	208	3	60	31	45	14.1	622	1,2,3,6
ACCU Y3-1	FCU Y3-1, FCU Y3-2, FCU Y3-3, DOAS Y3-1	91,000	120	40	95	R410A	6700	2	PROP	460	1	5.4	-	-	208	3	60	31	45	14.1	622	1,2,3,6
ACCU Y4-1	FCU Y4-1, FCU Y4-2, FCU Y4-3, DOAS Y4-1	91,000	120	40	95	R410A	6700	2	PROP	460	1	5.4	-	-	208	3	60	31	45	14.1	622	1,2,3,6
ACCU Y5-1	FCU Y5-1, FCU Y5-2, FCU Y5-3, DOAS Y5-1	92,800	120	40	95	R410A	6700	2	PROP	460	1	5.4	-	-	208	3	60	31	45	14.1	622	1,2,3,6

NOTES:
1. REFRIGERANT PIPE QUANTITIES AND SIZE TO BE PER MANUFACTURER'S PIPING SCHEMATIC.
2. COAT UNIT CASING AND COILS WITH COATING RATED FOR COASTAL ENVIRONMENT
3. BASE BID
4. ADDITIVE ALTERNATE 1
5. ADDITIVE ALTERNATE 2
6. PROVIDE AIR OUTLET GUIDE

BOOSTER FAN SCHEDULE

UNIT	FCU SERVED	AIRFLOW (CFM)	EXTERNAL STATIC (IN. WG.)	SPEED (RPM)	ELECTRICAL DRIVE	ELECTRICAL VOLTS	ELECTRICAL PHASE	ELECTRICAL HZ	ELECTRICAL AMPS	OPER. WEIGHT (LBS)	REMARKS
BF Y2-1	FCU Y2-4	180	0.4	2618	DIRECT	120	1	60	0.99	8.2	DESIGN BASED ON FANTECH FG 8. FURNISH WITH 1" THICK RUBBER TYPE INSULATION LAGGING. INTERLOCK BOOSTER FAN WITH FAN COIL UNIT.
BF Y2-2	FCU Y2-5	180	0.4	2618	DIRECT	120	1	60	0.99	8.2	DESIGN BASED ON FANTECH FG 8. FURNISH WITH 1" THICK RUBBER TYPE INSULATION LAGGING. INTERLOCK BOOSTER FAN WITH FAN COIL UNIT.
BF Y3-1	FCU Y3-3	180	0.4	2618	DIRECT	120	1	60	0.99	8.2	DESIGN BASED ON FANTECH FG 8. FURNISH WITH 1" THICK RUBBER TYPE INSULATION LAGGING. INTERLOCK BOOSTER FAN WITH FAN COIL UNIT.
BF Y3-2	FCU Y3-4	180	0.4	2618	DIRECT	120	1	60	0.99	8.2	DESIGN BASED ON FANTECH FG 8. FURNISH WITH 1" THICK RUBBER TYPE INSULATION LAGGING. INTERLOCK BOOSTER FAN WITH FAN COIL UNIT.
BF Y4-1	FCU Y4-3	180	0.4	2618	DIRECT	120	1	60	0.99	8.2	DESIGN BASED ON FANTECH FG 8. FURNISH WITH 1" THICK RUBBER TYPE INSULATION LAGGING. INTERLOCK BOOSTER FAN WITH FAN COIL UNIT.
BF Y4-2	FCU Y4-4	180	0.4	2618	DIRECT	120	1	60	0.99	8.2	DESIGN BASED ON FANTECH FG 8. FURNISH WITH 1" THICK RUBBER TYPE INSULATION LAGGING. INTERLOCK BOOSTER FAN WITH FAN COIL UNIT.
BF Y5-1	FCU Y5-3	180	0.4	2618	DIRECT	120	1	60	0.99	8.2	DESIGN BASED ON FANTECH FG 8. FURNISH WITH 1" THICK RUBBER TYPE INSULATION LAGGING. INTERLOCK BOOSTER FAN WITH FAN COIL UNIT.
BF Y5-2	FCU Y5-4	180	0.4	2618	DIRECT	120	1	60	0.99	8.2	DESIGN BASED ON FANTECH FG 8. FURNISH WITH 1" THICK RUBBER TYPE INSULATION LAGGING. INTERLOCK BOOSTER FAN WITH FAN COIL UNIT.

REVISIONS	BY

This work was prepared by me or under my supervision and construction of this project will be under my observation.
Joel P. Yuen

JOEL P. YUEN LICENSED PROFESSIONAL ENGINEER No. 5805-M HAWAII, U.S.A.

INSYNERGY ENGINEERING INC.
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

MECHANICAL SCHEDULE

Designed CL, GO, KT
Drawn ISE
Checked JY
Date 2/28/2020
Job No. 20008
Sheet M-602
Of 17 Sheets 31

ELECTRICAL GENERAL NOTES

1. 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 ELECTRIC CODE (NEC). WORK INCLUDES INSTALLATION OF ALL ELECTRICAL SYSTEMS COMPLETE AND OPERATIONAL AS LIMITED BY THE INTENT OF THE CONTRACT DOCUMENTS.
2. ALL WORK SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC), NATIONAL ELECTRIC 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.
3. OBTAIN AND PAY FOR BUILDING / ELECTRICAL PERMIT, ARRANGE FOR PERIODIC INSPECTION BY LOCAL AUTHORITIES, AND DELIVER CERTIFICATE OF FINAL INSPECTION THE THE OWNER.
4. SEC. 18-5.2 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. (SEC. 18-5.2 R.0 1978 (1983 ED.); AM. ORD. 93-59).
5. STRUCTURES UNDERGOING CONSTRUCTION, ALTERATION, OR DEMOLITION OPERATIONS, INCLUDING THOSE IN UNDERGROUND LOCATIONS, SHALL COMPLY WITH NFPA 241, STANDARD FOR SAFEGUARDING CONSTRUCTION, ALTERATION, AND DEMOLITION OPERATIONS, AND NFPA 1 2012, AS AMENDED.
6. FIRE SAFETY DURING ALTERATION:
   - 6.1. 16.4.4.1 WHERE THE BUILDING IS PROTECTED BY FIRE PROTECTION SYSTEMS, SUCH SYSTEMS SHALL BE MAINTAINED OPERATIONAL AT ALL TIMES DURING ALTERATION.
   - 6.2. 16.4.4.2 WHERE ALTERATION REQUIRES MODIFICATION OF A PORTION OF THE FIRE PROTECTION SYSTEM, THE REMAINDER OF THE SYSTEM SHALL BE KEPT IN SERVICE AND THE FIRE DEPARTMENT SHALL BE NOTIFIED.
   - 6.3. 16.4.4.3 WHEN IT IS NECESSARY TO SHUT DOWN THE SYSTEM, THE AHJ SHALL HAVE THE AUTHORITY TO REQUIRE ALTERNATE MEASURES OF PROTECTION UNTIL THE SYSTEM IS RETURNED TO SERVICE.
   - 6.4. 10.8.1.1 AS NECESSARY DURING EMERGENCIES, MAINTENANCE, DRILLS, PRESCRIBED TESTING, ALTERATIONS, OR RENOVATIONS, PORTABLE OR FIXED FIRE-EXTINGUISHING SYSTEMS OR DEVICES OR ANY FIRE-WARNING SYSTEM SHALL BE PERMITTED TO BE MADE INOPERATIVE OR INACCESSIBLE. A FIRE WATCH SHALL BE REQUIRED AS SPECIFIED IN SECTIONS 13.3.3.6.5.2(4)(b), 13.7.1.4.4, 16.5.4, 34.6.3.3, 41.2.2.6, 41.2.2.7, 41.2.4, 41.3.5, 41.4.1, 34.5.4.3, AND 25.1.8 AT NO COST TO THE AHJ. NFPA 1 2012, AS AMENDED.
7. THE DRAWINGS DO NOT REFLECT ALL THE EXISTING CONDITIONS THAT MAY BE ENCOUNTERED DURING CONSTRUCTION. VISIT THE PROJECT SITE AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS, THE EXTENT OF ANY DEMOLITION, RELOCATION, RECONNECTION, AND THE NEW WORK PRIOR TO THE START OF ON-SITE CONSTRUCTION ACTIVITIES. REPORT ANY DISCREPANCIES AND/OR DIFFERENCES BETWEEN THE EXISTING CONDITIONS AND THE CONSTRUCTION DOCUMENTS TO THE OWNER. RESOLVE ALL 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 DISCREPANCIES AND QUESTIONS AND NO EXTRA PAYMENT WILL BE AUTHORIZED FOR WORK REQUIRED BY THE CONTRACTOR'S FAILURE TO DO SO.
8. COORDINATE ALL ELECTRICAL WORK WITH THE WORK OF THE OTHER TRADES AND SCHEDULE WORK TO MINIMIZE THE NUMBER AND DURATION OF ELECTRICAL OUTAGES AND IMPACT TO THE OPERATIONS IN OR ADJACENT TO THE PROJECT AREA. COORDINATE ACCESS TO THE PROJECT AREA AND SCHEDULE ALL REQUIRED SYSTEM OUTAGES WITH THE OWNER.
9. VERIFY AND COORDINATE ALL PENETRATIONS PRIOR TO THE START OF CONSTRUCTION. OBTAIN APPROVAL BEFORE MAKING ANY PENETRATIONS THROUGH STRUCTURAL MEMBERS OR FIRE RATED WALLS AND CEILINGS.
10. SCAN (E.G. X-RAY, ELECTROMAGNETIC, ETC.) ALL CONCRETE WALLS OR FLOOR STRUCTURES PRIOR TO COMMENCING WITH CORING/DRILLING WORK FOR PENETRATIONS TO AVOID DAMAGING THE EXISTING REINFORCING STEEL.
11. COORDINATE AND PROVIDE ACCESS PANELS FOR ALL CONCEALED ELECTRICAL EQUIPMENT, DEVICES, BOXES AND CONDUIT BODIES SO THAT THEY ARE ACCESSIBLE.
12. 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.
13. RE-REOUTE ALL EXISTING CONDUIT, WIRING AND CABLING TO REMAIN WITHIN THE PROJECT AREA AS NECESSARY TO FACILITATE THE REMOVAL OF EXISTING EQUIPMENT AS WELL AS THE INSTALLATION OF ALL NEW EQUIPMENT. REMOVE AND RE-INSTALL ELECTRICAL EQUIPMENT, INCLUDING LIGHTS, TO REMAIN AS REQUIRED.
14. 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 CO0NTRACTOR AT NO ADDITIONAL COST TO THE PROJECT. AN EXAMPLE OF SUCH INCIDENTAL WORK ARE JUNCTION BOXES AND PULL BOXES REQUIRED FOR THE INSTALLATION OF ELECTRICAL DEVICES AND EQUIPMENT. ALL INCIDENTAL WORK SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
15. 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.
16. THE LOCATION OF THE ELECTRICAL APPARATUS AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND BEFORE INSTALLING, STUDY THE ARCHITECTURAL, STRUCTURAL, AND MECHANICAL DETAILS AND 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 OWNER WITHOUT ADDITIONAL CHARGE TO THE PROJECT.
17. 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 OWNER 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.
18. DISCONNECT AND REMOVE ALL ELECTRICAL APPARATUS, WIRING DEVICES, JUNCTION BOXES, AND ASSOCIATED FEEDER AND BRANCH CIRCUIT WIRING SPECIFIED IN THE PROJECT AREA, UNLESS OTHERWISE NOTED. THE DEMOLITION DRAWINGS ARE INTENDED TO SHOW THE GENERAL LIMITS OF THE SCOPE OF WORK AND MAY NOT SHOW ALL THE EXISTING DEVICES, CONDUIT RUNS, ETC. FEEDER AND BRANCH CIRCUIT WIRING TO BE REMOVED SHALL BE DISCONNECTED FROM ITS SOURCE. REMOVE ALL CONDUCTORS AND CONDUIT AND CONDUIT SUPPORT STRUCTURES WHERE ACCESSIBLE. PATCH/REPAIR WALL, FLOOR AND CEILING DAMAGES AS A RESULT OF THE REMOVAL WORK.
19. 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.
20. THE ELECTRICAL DRAWINGS ARE BASED ON PROPOSED EQUIPMENT. VERIFY ALL SYSTEM REQUIREMENTS (ELECTRICAL, MECHANICAL) WITH THE SELECTED SYSTEM'S MANUFACTURER OR AUTHORIZED REPRESENTATIVE PRIOR TO COMMENCING WITH ANY WORK. COORDINATE RATINGS OF OVERCURRENT PROTECTION DEVICES, DISCONNECT SWITCHES, CONDUIT & 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.
21. 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 OWNER OF ANY INADEQUATE CLEARANCES OR CONDITIONS THAT WILL PREVENT THE PROPER INSTALLATION, MAINTENANCE, AND OPERATION OF THE EQUIPMENT.
22. CONCEAL ALL CONDUIT ; EXPOSED CONDUITS ARE PERMITTED ONLY WHERE SPECIFICALLY SHOWN ON THE DRAWINGS. 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.
23. PROVIDE TYPEWRITTEN CIRCUIT DIRECTORIES FOR ALL PANELS, NEW OR MODIFIED, REFLECTING THE CIRCUIT ARRANGEMENTS AS THEY WERE ACTUALLY INSTALLED.
24. AN ADHESIVE VINYL NAMEPLATE SHALL BE PROVIDED FOR ALL RECEPTACLES, DISCONNECT SWITCHES MOTOR STARTERS 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.
25. A GREEN, EQUIPMENT GROUND CONDUCTOR SIZED IN ACCORDANCE WITH THE NEC ARTICLE 250 SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS WHETER INDICATED ON CONTRACT DRAWINGS OR NOT. INSTALL THIS CONDUCTOR IN ALL RACEWAYS INCLUDING THOSE INSTALLED FOR SWITCH LEGS AND ATTACH TO THE DEVICES, LUMINAIRE, OR EQUIPMENT USING A SUITABLE GROUNDING LUG.
26. 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 NEC 2014 ARTICLE 200.6 (WHITE, GRAY, THREE CONTINUOUS WHITE OR GRAY STRIPES, ETC.).
27. PROVIDE NYLON PULLSTRINGS IN ALL EMPTY CONDUITS UNLESS OTHERWISE INDICATED.
28. PROVIDE KNOCK-UP PLUGS FOR ALL UNUSED CONDUIT PENETRATIONS IN BOXES AND ENCLOSURES DUE TO CONDUIT REMOVAL.
29. 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.
30. PATCH, REFINISH, AND PAINT ALL PENETRATIONS THROUGH WALLS AND SLABS TO MATCH FINISH OF ADJACENT SURFACES.
31. 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.
32. PAINTING OF ELECTRICAL EQUIPMENT:
   - 32.1. INTERIOR LOCATIONS - PRIME AND PAINT ALL EXPOSED CONDUITS, BOXES, FITTINGS, SUPPORT CHANNELS, MOUNTING HARDWARE AND ACCESSORIES WITH TWO FINISH COATS TO MATCH THE SURFACE ON WHICH THEY ARE MOUNTED OR TO MATCH THE FINISH OF THE ADJACENT SURFACES. EQUIPMENT SURFACES/COMPONENTS WITH A FACTORY-APPLIED PAINT FINISH NEED NOT BE PAINTED.
   - 32.2. EXTERIOR LOCATIONS - PRIME ALL EXPOSED CONDUITS, BOXES, FITTINGS, SUPPORT CHANNELS, MOUNTING HARDWARE AND ACCESSORIES WITH A 2-PART EPOXY PRIMER AND FINISH WITH 2 COATS OF AN ALIPHATIC ACRYLIC URETHANE PAINT. PAINT FINISH TO MATCH THE SURFACE ON WHICH THEY ARE MOUNTED OR TO MATCH THE FINISH OF THE ADJACENT SURFACES. STAINLESS STEEL MATERIALS NEED NOT BE PAINTED.

CITY AND COUNTY OF HONOLULU
REVISED ORDINANCE CHAPTER 32
HONOLULU COUNTY CODE 1990, AS AMENDED

TO THE BEST OF MY KNOWLEDGE, THIS PROJECT'S DESIGN SUBSTANTIALLY CONFORMS TO THE STATE OF HAWAII ADMINISTRATIVE RULES CHAPTER 3-181.1, "STATE ENERGY CONSERVATION CODE" (IECC 2015, AS AMENDED), FOR:

ELECTRICAL POWER AND LIGHTING SYSTEMS
(SECTIONS C405 AND C408)

SCOTT TOMOKIYO LICENSED PROFESSIONAL ENGINEER No. 15968-E HAWAII, U.S.A.

SIGNATURE: Scott Tomokiyo DATE: 2/28/2020
NAME: SCOTT TOMOKIYO
TITLE: ELECTRICAL ENGINEER
LICENSE No.: 15968-E

REVISIONS	BY

This work was prepared by me or under my supervision and construction of this project will be under my observation.
Scott Tomokiyo
SCOTT TOMOKIYO LICENSED PROFESSIONAL ENGINEER No. 15968-E HAWAII, U.S.A.

INSYNERGY ENGINEERING INC.
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

ELECTRICAL GENERAL NOTES

Designed: TS
Drawn: TS
Checked: ST
Date: 02/28/2020
Job No.: 20008
Sheet: E-001
Of Sheets 31

ELECTRICAL SYMBOL LIST / MOUNTING HEIGHT SCHEDULE

MOUNTING HEIGHT FROM FLOOR TO		SYMBOL		DESCRIPTION
TOP	℄	EXISTING	NEW	(SPECIAL MOUNTING HEIGHTS INDICATED ON PLAN)
	18"	WP	WP	RECEPTACLE, DUPLEX, WEATHERPROOF, GFCI TYPE, 125V, NEMA TYPE 5-20R
			J	JUNCTION BOX, WALL MOUNTED
				NON-FUSED DISCONNECT SWITCH, 3P30A UNLESS OTHERWISE NOTED, VOLTAGE TO MATCH CIRCUITING
				MAGNETIC MOTOR STARTER, FURNISHED BY MECHANICAL CONTRACTOR & INSTALLED BY ELECTRICAL CONTRACTOR
			M	MOTOR CONNECTION
		E	E	ELECTRICAL CONNECTION
84"				PANELBOARD
				CONCEALED CONDUIT IN CEILING OR WALLS
				EXPOSED RACEWAY, PROVIDE STRAP 8'-0" ON CENTER MAXIMUM
		A-1,3	A-1,3	HOMERUN ARROW TO PANELBOARD. LETTER INDICATES PANELBOARD, NUMBERS INDICATES CIRCUITS.
		1	1	NOTE INDICATOR
				HATCH THROUGH ITEMS DENOTES REMOVE EXISTING ITEM

PANEL: 4AC				VOLTAGE:	208Y/120V			3 PHASE			POLES:		30		
MAIN BUS: 225A				MAIN BKR:	MLO			4 WIRE			MIN. A.I.C.:		10,000		
MOUNTING: SURFACE				BKR TYPE:	BOLT-ON			NEMA 4X			CABINET WIDTH:		20"		
GND	WIRE	CKT NO.	DESCRIPTION	CKT BKR	KVA A		KVA B		KVA C		CKT BKR	DESCRIPTION	CKT NO.	WIRE	GND
#10	#6	1			3.8	3.8							2	#6	#10
#10	#6	3	ACCU Y2-2	3P45A			3.8	3.8			3P45A	ACCU Y4-1	4	#6	#10
#10	#6	5							3.8	3.8			6	#6	#10
#10	#6	7			3.8	3.0							8	#6	#10
#10	#6	9	ACCU Y3-1	3P45A			3.8	3.0			3P45A	ACCU Y5-1	10	#6	#10
#10	#6	11							3.8	3.8			12	#6	#10
#12	#12	13	MAINTENANCE RECEPTACLE	1P20A	0.2	0.6					2P15A	4TH FLOOR FCU AND DOAS UNITS	14	#10	#10
		15	SPARE	1P20A				0.6					16	#10	#10
		17	SPARE	1P20A							1P20A	SPARE	18		
		19	SPARE	1P20A							1P20A	SPARE	20		
		21	PFB								1P20A	SPARE	22		
		23	PFB									PFB	24		
		25	PFB									PFB	26		
		27	PFB									PFB	28		
		29	PFB									PFB	30		
		31	---30 CIRCUIT PANEL---									---30 CIRCUIT PANEL---	32		
		33											34		
		35											36		
		37											38		
		39											40		
		41											42		

TOTAL PHASE A, B, C	15.2	15.0	15.2	NOTES:
CONNECTED KVA:	45.4	KVA		
DEMAND FACTOR:	100	%		
DEMAND KVA:	45.4	KVA		
DEMAND AMPS:	126	AMPS		
DEMAND KVA	A	B	C	
	15.2	15.0	15.2	

2 BASIC BID
NO SCALE

PANEL: 1DP				VOLTAGE:	208Y/120V			3 PHASE			POLES:		30		
MAIN BUS: 400A				MAIN BKR:	3P350A			4 WIRE			MIN. A.I.C.:		22,000		
MOUNTING: SURFACE				BKR TYPE:	BOLT-ON			NEMA 4X			CABINET WIDTH:		20"		
GND	WIRE	CKT NO.	DESCRIPTION	CKT BKR	KVA A		KVA B		KVA C		CKT BKR	DESCRIPTION	CKT NO.	WIRE	GND
#6	#2	1			4.7	8.6							2	#1/0	#6
#6	#2	3	ACCU Y1-3**	3P80A			4.7	8.4			3P100A	PANEL 1AC*	4	#1/0	#6
#6	#2	5							4.7	8.0			6	#1/0	#6
#6	#2	7			3.1	15.0							8	#2/0	#6
#6	#2	9	ACCU Y1-4**	3P50A			3.1	15.0			3P175A	PANEL 4AC	10	#2/0	#6
#6	#2	11							3.1	15.2			12	#2/0	#6
#8	#4	13	1ST FLOOR FCU AND DOAS UNITS**	1P15A		0.1					1P20A	MASTER CONTROL & DAMPER**	14	#12	#12
#8	#4	15					0.6				1P20A	SPARE	16		
		17	SPARE	1P20A					0.6		1P20A	SPARE	18		
		19	SPARE	1P20A	0.8							PFB	20		
		21	SPARE	1P20A			0.8					PFB	22		
		23	PFB									PFB	24		
		25	PFB									PFB	26		
		27	PFB									PFB	28		
		29	PFB									PFB	30		
		31	---30 CIRCUIT PANEL---									---30 CIRCUIT PANEL---	32		
		33											34		
		35											36		
		37											38		
		39											40		
		41											42		

TOTAL PHASE A, B, C	32.3	32.6	31.6	NOTES:
CONNECTED KVA:	96.5	KVA		
DEMAND FACTOR:	100	%		
DEMAND KVA:	96.5	KVA		* - ADDITIVE ALTERNATE 1
DEMAND AMPS:	268	AMPS		** - ADDITIVE ALTERNATE 2
DEMAND KVA	A	B	C	
	32.3	32.6	31.6	

3 BASIC BID
NO SCALE

PANEL: 1AC				VOLTAGE:	208Y/120V			3 PHASE			POLES:		18		
MAIN BUS: 100A				MAIN BKR:	MLO			4 WIRE			MIN. A.I.C.:		10,000		
MOUNTING: SURFACE				BKR TYPE:	BOLT-ON			NEMA 4X			CABINET WIDTH:		20"		
GND	WIRE	CKT NO.	DESCRIPTION	CKT BKR	KVA A		KVA B		KVA C		CKT BKR	DESCRIPTION	CKT NO.	WIRE	GND
#6	#2	1			5.7	2.3							2	#8	#10
#6	#2	3	ACCU Y1-1	3P90A			5.7	2.3			3P45A	ACCU Y1-2	4	#8	#10
#6	#2	5							5.7	2.3			6	#8	#10
#12	#12	7	MAINTENANCE RECEPTACLE	1P20A	0.2	0.4					2P15A	1ST FLOOR FCU AND DOAS UNITS	8	#10	#10
#10	#10	9	MASTER CONTROLLER & DAMPER	1P20A			0.1	0.4					10	#10	#10
		11	SPARE	1P20A							1P20A	SPARE	12		
		13	SPARE	1P20A							1P20A	SPARE	14		
		15	PFB									PFB	16		
		17	PFB									PFB	18		
		19	--- 18 CIRCUIT PANEL ---									--- 18 CIRCUIT PANEL ---	20		
		21											22		
		23											24		
		25											26		
		27											28		
		29											30		
		31											32		
		33											34		
		35											36		
		37											38		
		39											40		
		41											42		

TOTAL PHASE A, B, C	8.6	8.5	8.0	NOTES:
CONNECTED KVA:	25.1	KVA		
DEMAND FACTOR:	100	%		
DEMAND KVA:	25.0	KVA		
DEMAND AMPS:	70	AMPS		
DEMAND KVA	A	B	C	
	8.6	8.5	8.0	

1 ADDITIVE ALTERNATE 1
NO SCALE

REVISIONS	BY

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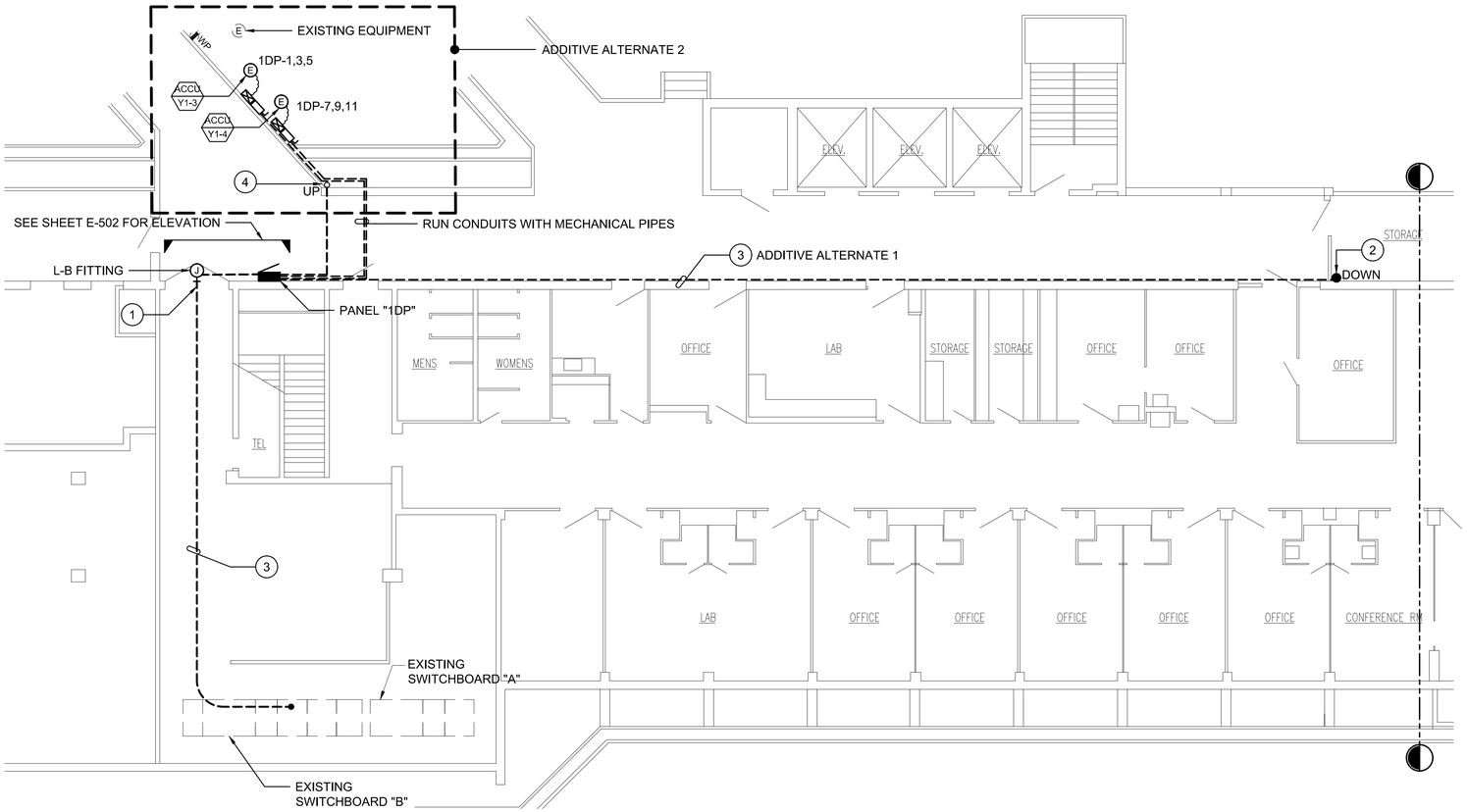
Scott Tomokiyo
SCOTT TOMOKIYO LICENSED PROFESSIONAL ENGINEER No. 15968-E HAWAII, U.S.A.

INSYNERGY ENGINEERING INC.
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

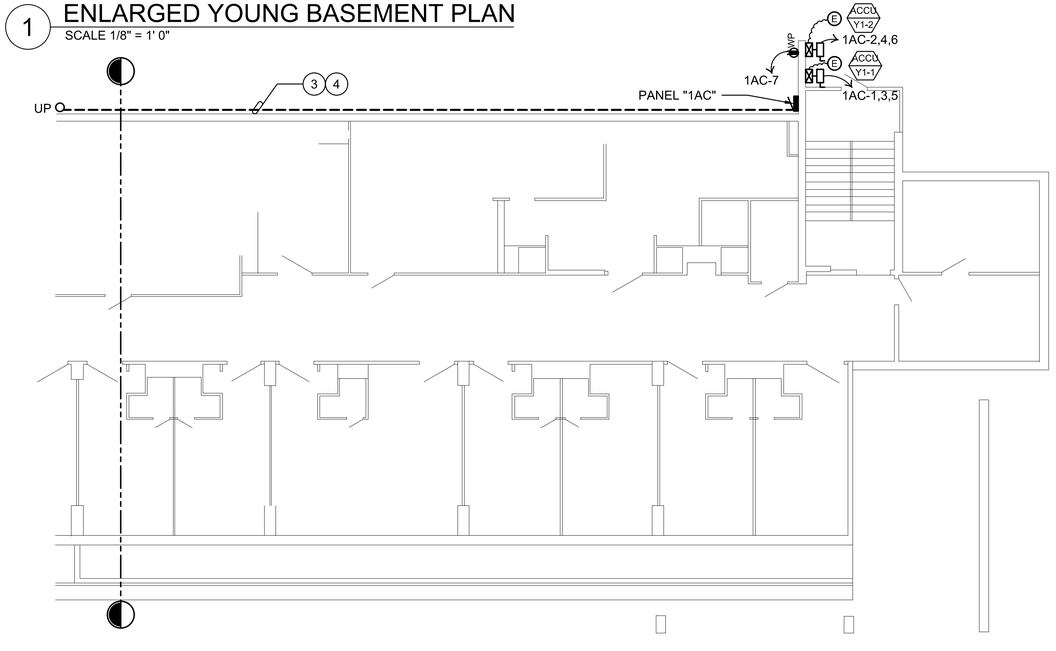
LEAHI HOSPITAL AC REPLACEMENT

ELECTRICAL SYMBOLS AND PANEL SCHEDULES

Designed TS
Drawn TS
Checked ST
Date 02/28/2020
Job No. 20008
Sheet E-002
Of Sheets 31



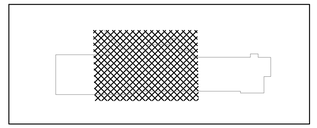
BASIC BID
1 ENLARGED YOUNG BASEMENT PLAN
SCALE 1/8" = 1' 0"



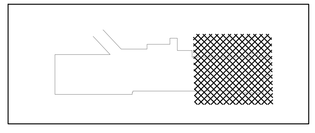
ADDITIVE ALTERNATE 1
2 ENLARGED YOUNG GROUND FLOOR ELECTRICAL PLAN
SCALE 1/8" = 1' 0"

SHEET NOTES:

1. USE EXISTING HOLE FOR NEW CONDUIT THROUGH CONCRETE WALL. SEAL PENETRATION USING LISTED FIRE STOPPING MATERIAL TO MAINTAIN FIRE RATING OF WALLS.
2. CORE DOWN TO LEVEL BELOW IN STORAGE ROOM.
3. ROUTE CONDUIT AS HIGH AS PRACTICABLE.
4. SEE SHEET E-501 FOR EXTERIOR ELEVATION OF CONDUIT ROUTING.



KEYPLAN
SCALE: N.T.S.



KEYPLAN
SCALE: N.T.S.

0 2' 4' 8' 12' 16' 20' 24'
SCALE: 1/8" = 1'-0"

PLAN NORTH
TRUE NORTH

REVISIONS	BY

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Scott Tomokiyo
SCOTT TOMOKIYO * LICENSED PROFESSIONAL ENGINEER No. 15968-E * HAWAII, U.S.A.

INSYNERGY ENGINEERING
MECHANICAL ▪ ELECTRICAL ▪ FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

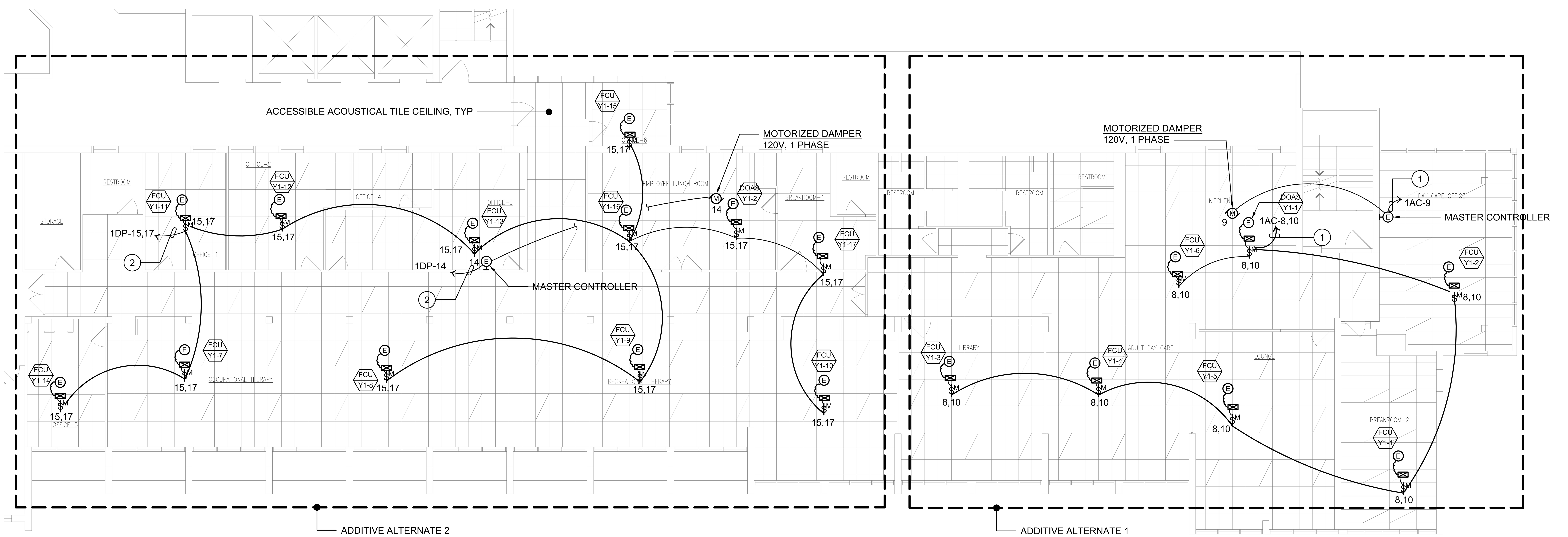
LEAHI HOSPITAL AC REPLACEMENT

ENLARGED BASEMENT ELECTRICAL PLAN

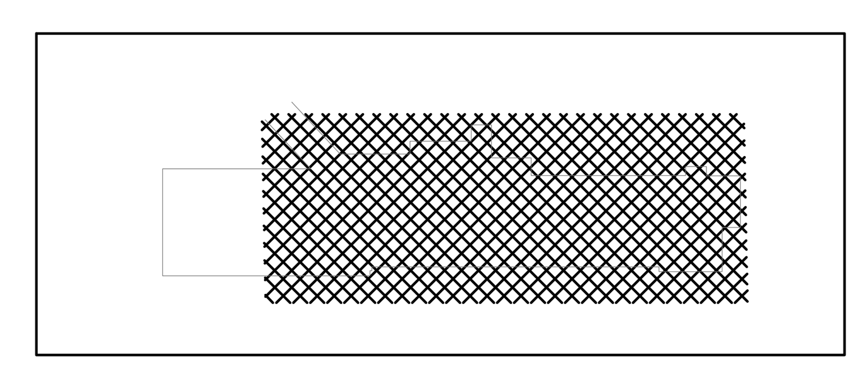
Designed	TS
Drawn	TS
Checked	ST
Date	02/28/2020
Job No.	20008
Sheet	E-201
Of	Sheets 31

SHEET NOTES:

1. RUN CONDUIT WITH MECHANICAL PIPING TO PANEL "1AC" OUTSIDE.
2. RUN CONDUIT WITH MECHANICAL PIPING TO PANEL "1DP" OUTSIDE.



1 ENLARGED YOUNG 1ST FLOOR ELECTRICAL PLAN
SCALE 1/8" = 1' 0"



KEYPLAN
SCALE: N.T.S.

0 2' 4' 8' 12' 16' 20' 24'
SCALE: 1/8" = 1'-0"

PLAN NORTH
TRUE NORTH

REVISIONS	BY

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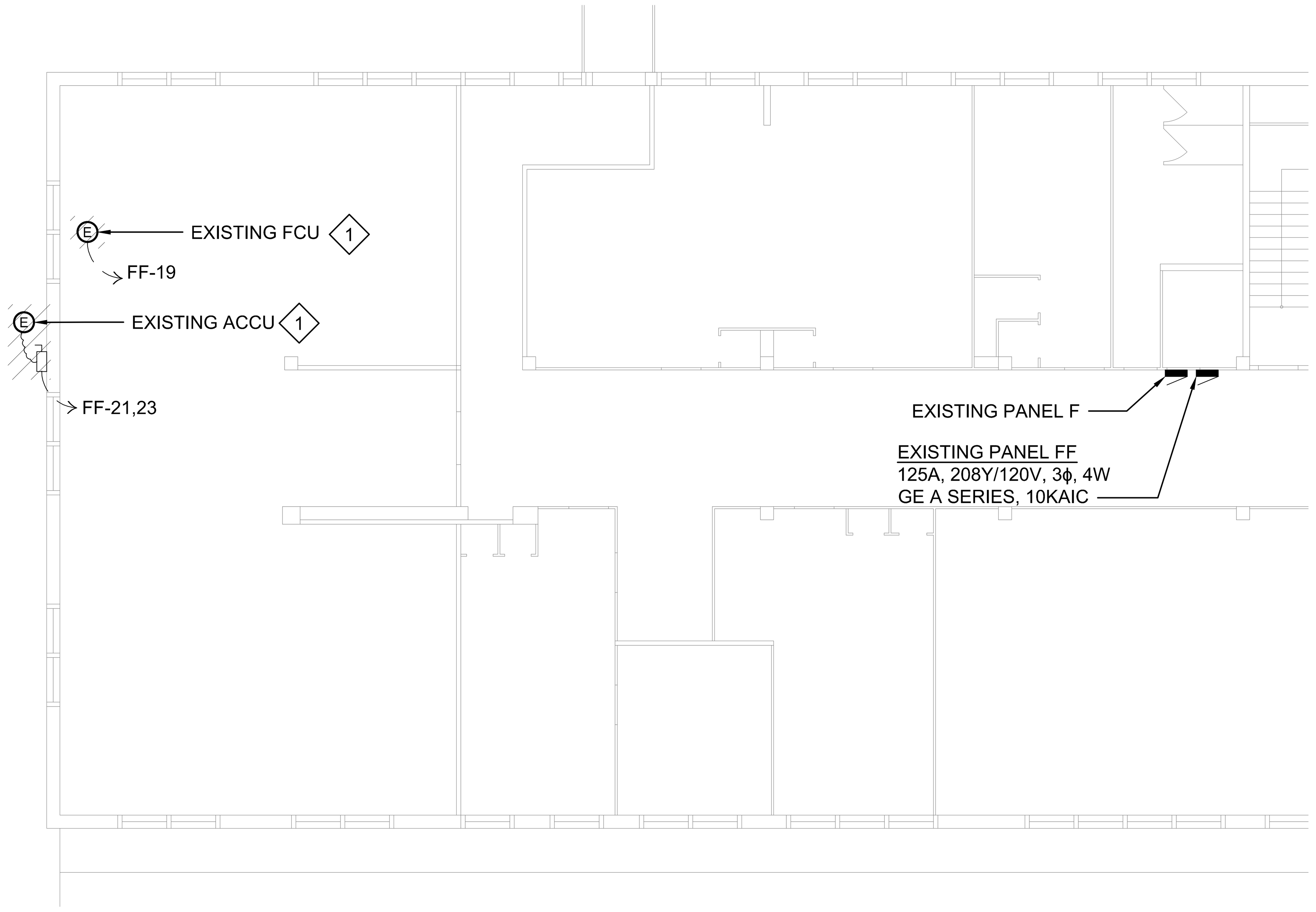
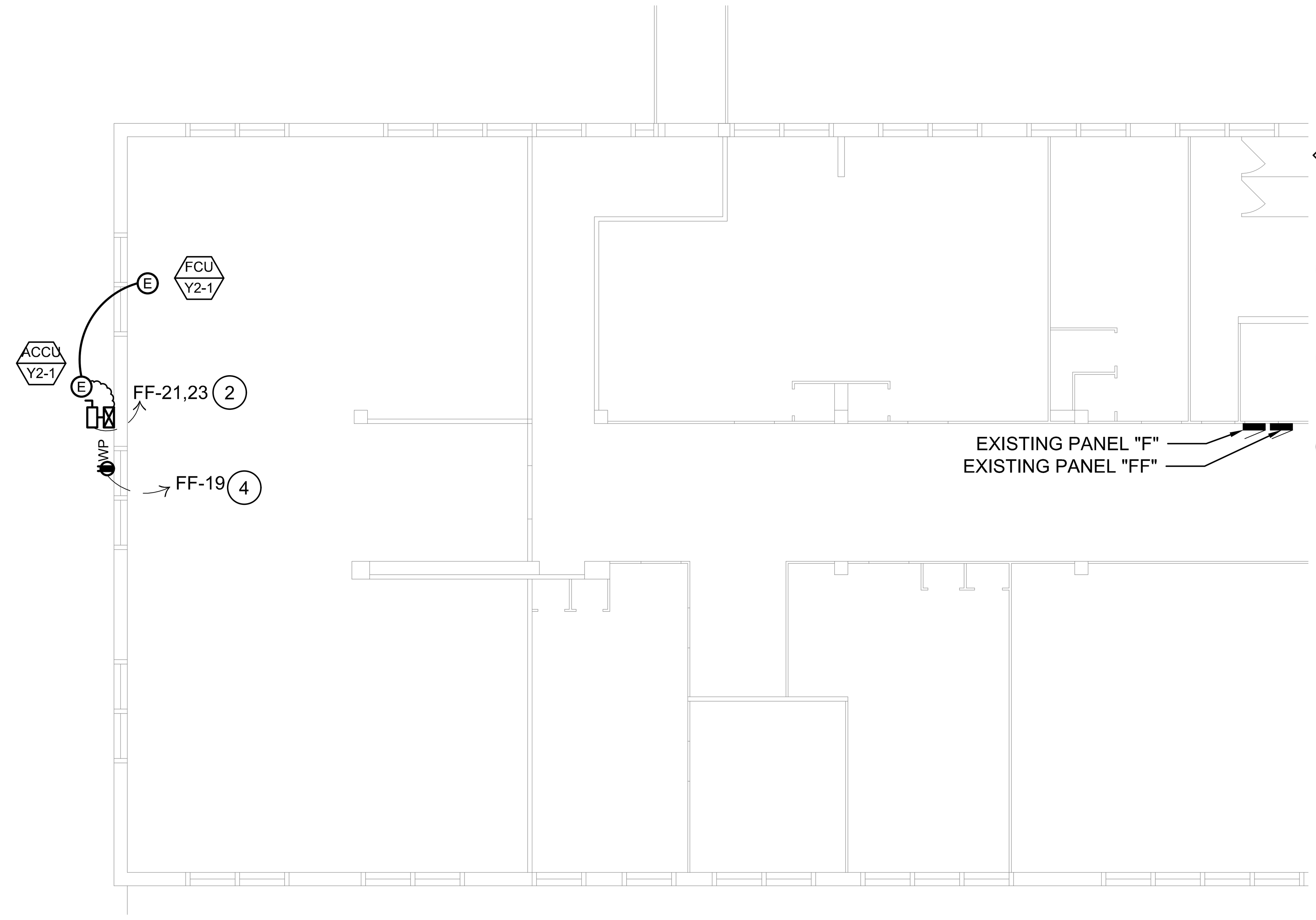
InSynergy Engineering Inc
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT
ENLARGED YOUNG 1ST FLOOR ELECTRICAL PLAN

Designed	TS
Drawn	TS
Checked	ST
Date	02/28/2020
Job No.	20008
Sheet	E-202
Of	Sheets 31



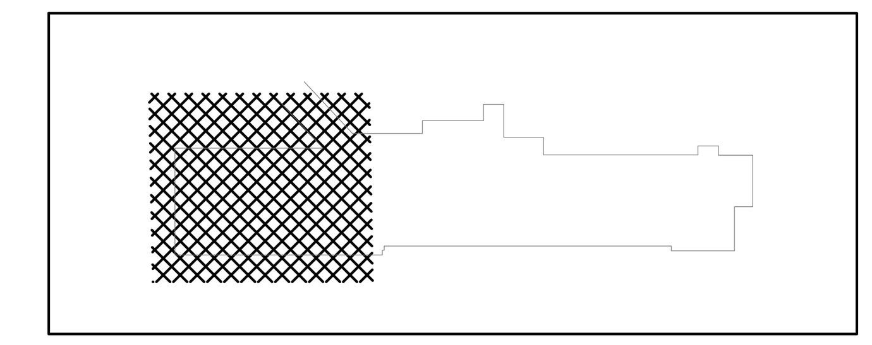
1 BASIC BID
ENLARGED YOUNG 2ND FLOOR LIBRARY DEMO PLAN
SCALE 1/8" = 1' 0"



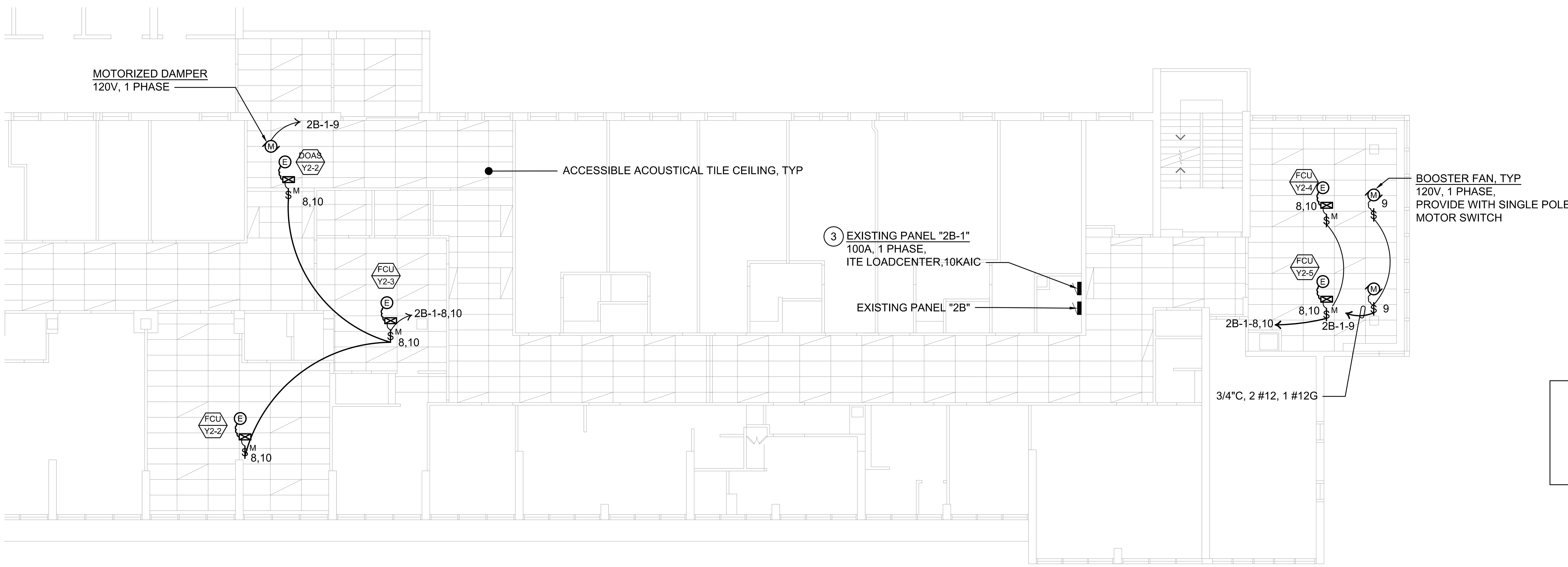
2 BASIC BID
ENLARGED YOUNG 2ND FLOOR LIBRARY NEW PLAN
SCALE 1/8" = 1' 0"

SHEET NOTES:

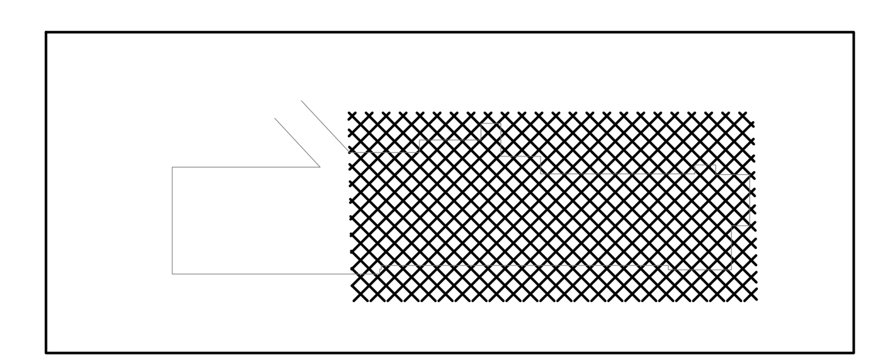
1. DISCONNECT AND REMOVE ELECTRICAL CONNECTION FROM EXISTING ACCU AND FCU. CONDUIT AND WIRING PACK TO PANEL TO REMAIN.
2. PROVIDE NEW 2P35A BREAKER AND 3 #8, 1 #10G CONDUCTORS IN EXISTING RACEWAY TO ACCU Y2-1.
3. PROVIDE A 2P15A CIRCUIT BREAKER IN EXISTING PANEL "2B-1" IN SPACE 8,10 AND A 1P20A CIRCUIT BREAKER SPACE 9 FOR BOOSTER FAN CIRCUIT.
4. CONNECT NEW MAINTENANCE RECEPTACLE TO EXISTING CIRCUIT F-19 THAT WAS PREVIOUSLY USED TO POWER THE EXISTING FCU.



KEYPLAN
SCALE: N.T.S.



3 BASIC BID
ENLARGED YOUNG 2ND FLOOR PLAN
SCALE 1/8" = 1' 0"



KEYPLAN
SCALE: N.T.S.

0 2' 4' 8' 12' 16' 20' 24'
SCALE: 1/8" = 1'-0"

PLAN NORTH
TRUE NORTH

REVISIONS	BY

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SCOTT TOMOKIYO
LICENSED PROFESSIONAL ENGINEER
No. 15968-E
HAWAII, U.S.A.

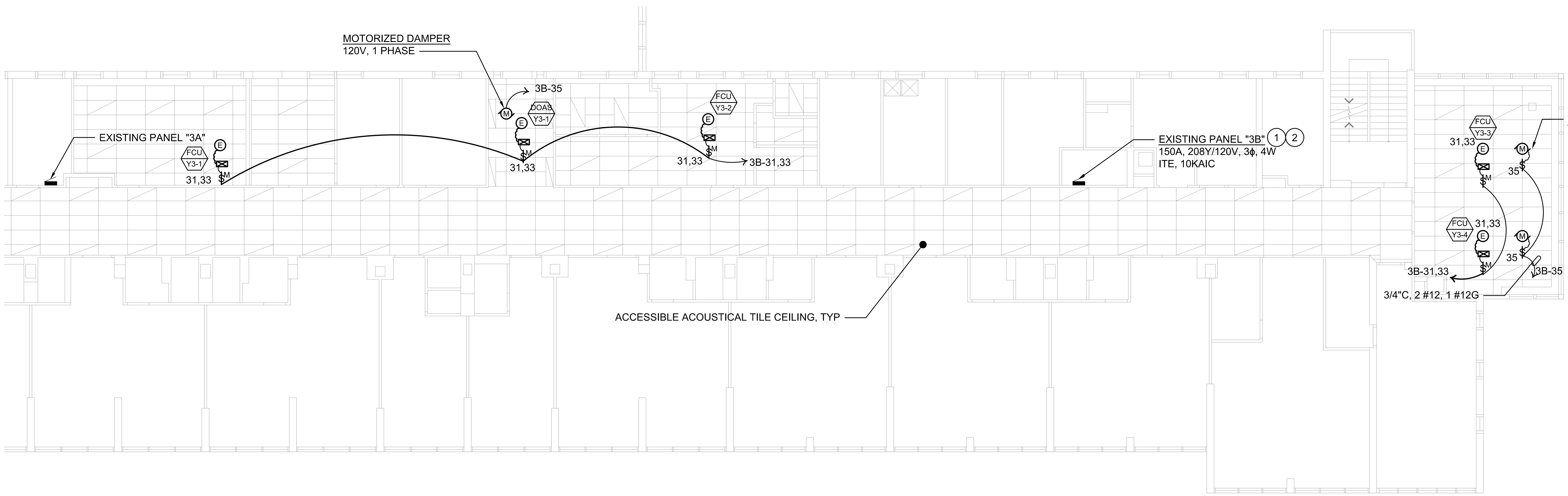
InSynergy Engineering, Inc.
MECHANICAL • ELECTRICAL • FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT
ENLARGED YOUNG 2ND FLOOR ELECTRICAL PLAN

Designed	TS
Drawn	TS
Checked	ST
Date	02/28/2020
Job No.	20008
Sheet	E-203
Of	Sheets 31

SHEET NOTES:

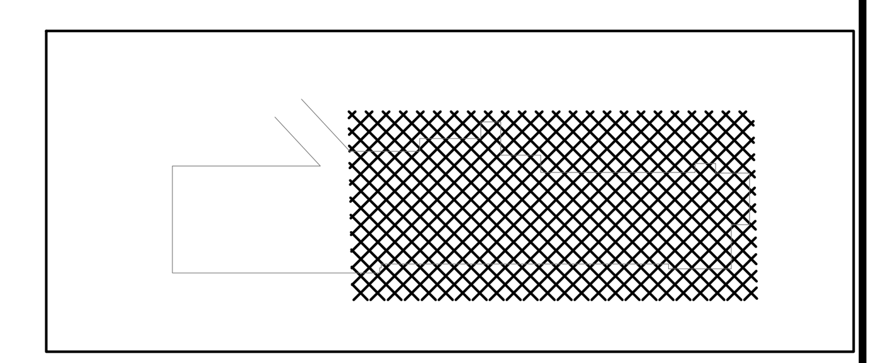
1. PROVIDE A 2P15A CIRCUIT BREAKER IN EXISTING PANEL "3B" IN PFB SPACE 31,33.
2. PROVIDE A 1P20A CIRCUIT BREAKER IN EXISTING PANEL "3B" IN PFB SPACE 35.



BASIC BID

1 ENLARGED YOUNG 3RD FLOOR PLAN

SCALE 1/8" = 1' 0"



KEYPLAN

SCALE: N.T.S.

0 2' 4' 8' 12' 16' 20' 24'

SCALE: 1/8" = 1'-0"

PLAN NORTH

TRUE NORTH

REVISIONS	BY

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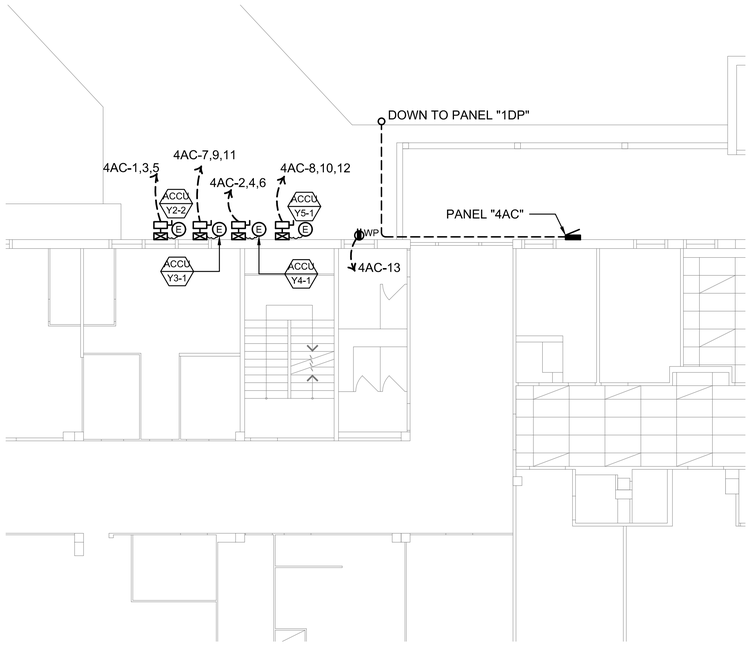
LEAHI HOSPITAL AC REPLACEMENT

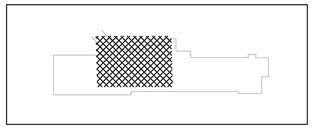
ENLARGED YOUNG 3RD FLOOR ELECTRICAL PLAN

Designed	TS
Drawn	TS
Checked	ST
Date	02/28/2020
Job No.	20008
Sheet	E-204
Of	Sheets 31



1 BASIC BID ENLARGED YOUNG 4TH FLOOR PLAN

SCALE 1/8" = 1' 0"

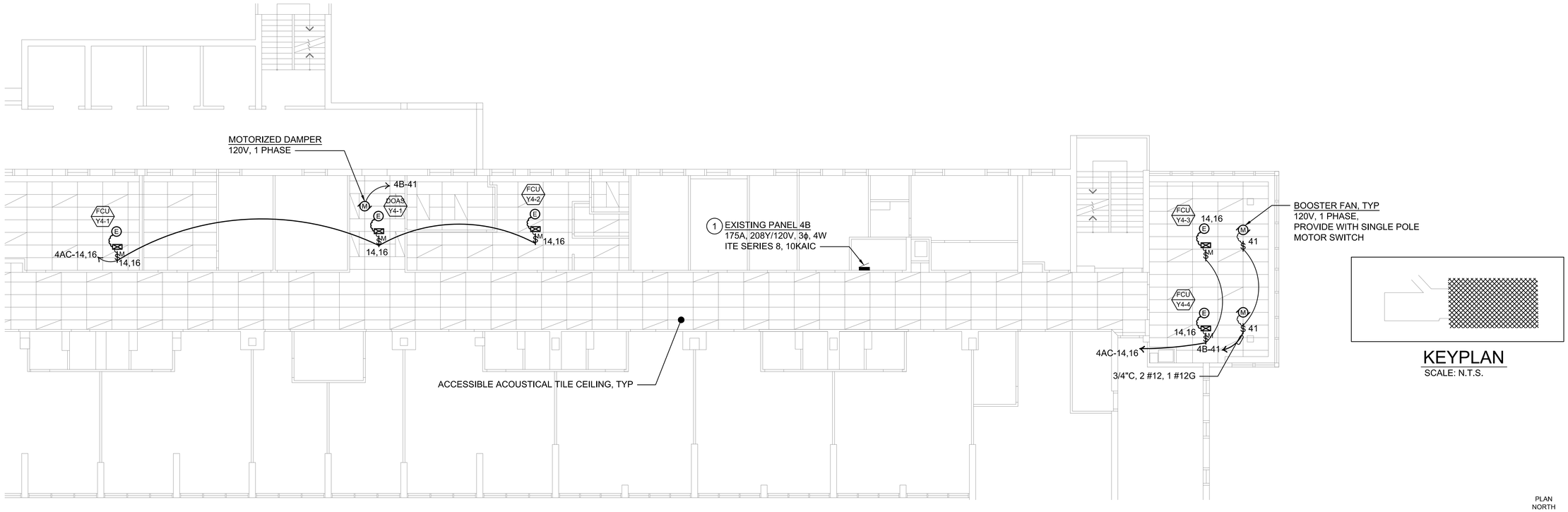


KEYPLAN

SCALE: N.T.S.

SHEET NOTES:

1. PROVIDE A 1P20A CIRCUIT BREAKER IN EXISTING PANEL "4B" IN PFB SPACE 41 FOR BOOSTER FAN CIRCUIT.



2 BASIC BID ENLARGED YOUNG 4TH FLOOR PLAN

SCALE 1/8" = 1' 0"

KEYPLAN

SCALE: N.T.S.

0 2' 4' 8' 12' 16' 20' 24'

SCALE: 1/8" = 1'-0"

PLAN NORTH

TRUE NORTH

REVISIONS	BY

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INSYNERGY ENGINEERING LLC
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828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
Phone: (808) 521-3773 Fax: (808) 521-3993

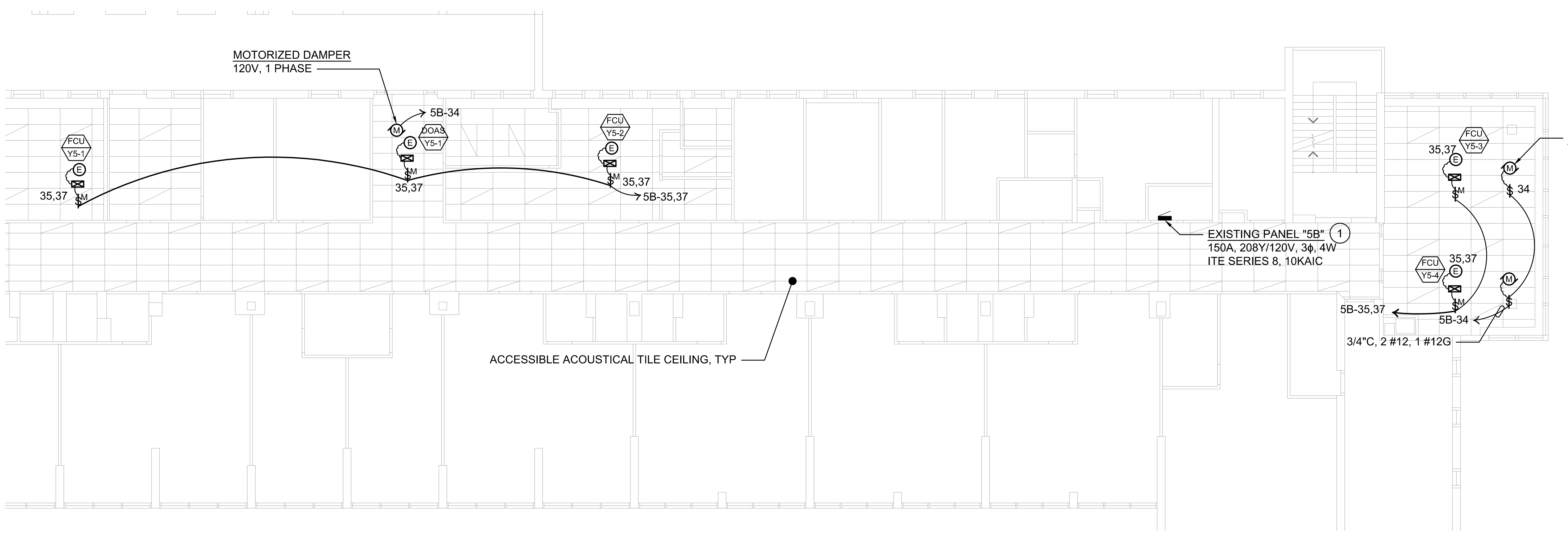
LEAHI HOSPITAL AC REPLACEMENT

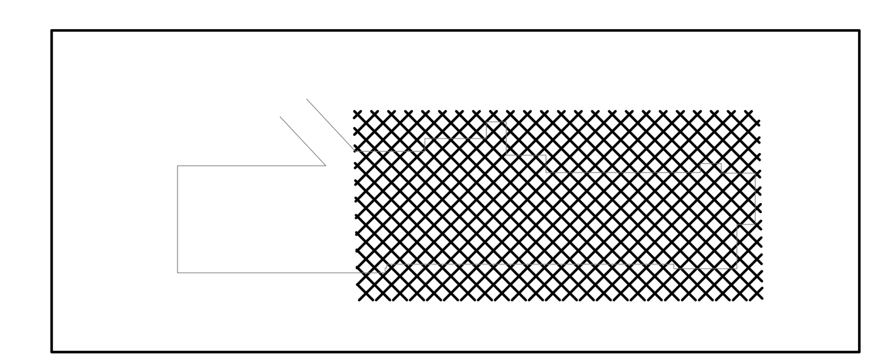
ENLARGED YOUNG 4TH FLOOR ELECTRICAL PLAN

Designed	TS
Drawn	TS
Checked	ST
Date	02/28/2020
Job No.	20008
Sheet	E-205
Of	Sheets 31

SHEET NOTES:

1. PROVIDE A 2P15A CIRCUIT BREAKER IN EXISTING PANEL "5B" IN PFB SPACE 35,37 FOR AC UNITS AND A 1P20A CIRCUIT BREAKER IN PFB SPACE 34 FOR BOOSTER FAN CIRCUIT.





KEYPLAN
SCALE: N.T.S.

BASIC BID
1 ENLARGED YOUNG 5TH FLOOR PLAN
SCALE 1/8" = 1' 0"

0 2' 4' 8' 12' 16' 20' 24'
SCALE: 1/8" = 1'-0"

PLAN NORTH
TRUE NORTH

REVISIONS	BY

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Phone: (808) 521-3773 Fax: (808) 521-3993

LEAHI HOSPITAL AC REPLACEMENT

ENLARGED YOUNG 5TH FLOOR ELECTRICAL PLAN

Designed	TS
Drawn	TS
Checked	ST
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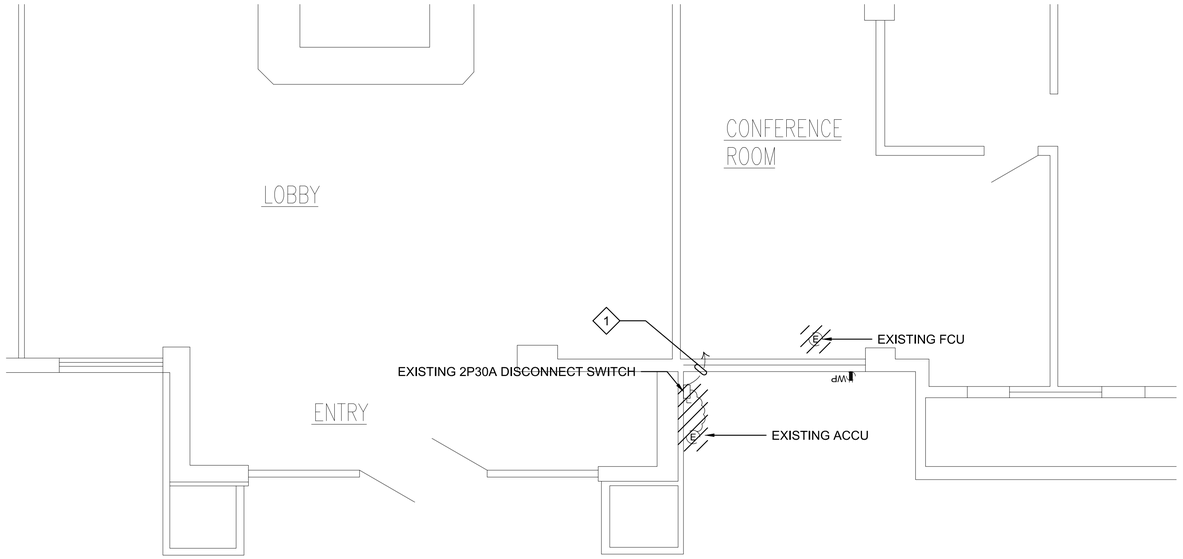
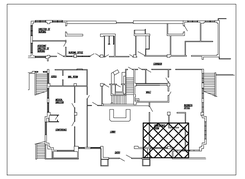


ADDITIVE ALTERNATE 2
ENLARGED ADMIN 1ST FLOOR DEMO PLAN

1 SCALE 1/4" = 1' 0"

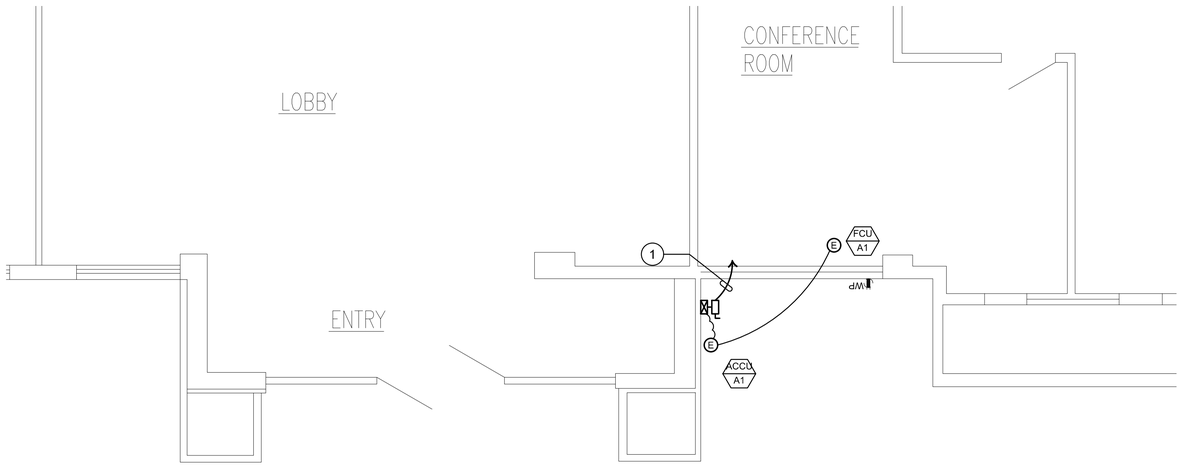
DEMOLITION NOTES:

1. CONTRACTOR TO TRACE SOURCE OF ACCU/FCU UNIT POWER SOURCE FOR SAFE DISCONNECTION DURING CONSTRUCTION, DISCONNECT AND REMOVE ELECTRICAL CONNECTION TO EXISTING ACCU SYSTEM, CONDUIT BACK TO PANEL TO REMAIN.



KEYPLAN

SCALE: N.T.S.

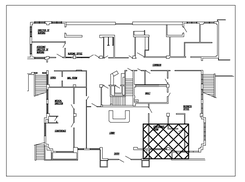


ADDITIVE ALTERNATE 2
ENLARGED ADMIN 1ST FLOOR NEW PLAN

2 SCALE 1/4" = 1' 0"

NEW WORK NOTES:

1. PROVIDE NEW 2P25A CIRCUIT BREAKER AND 3 #10, 1 #10G IN EXISTING RACEWAY TO ACCU-A1.



KEYPLAN

SCALE: N.T.S.

0 2' 4' 6' 8' 10' 12'

SCALE: 1/4" = 1'-0"

PLAN NORTH

TRUE NORTH

REVISIONS	BY

This work was prepared by me or under my supervision and I will be under my observation.

SCOTT TOMKIYO LICENSED PROFESSIONAL ENGINEER No. 15968-E HAWAII, U.S.A.

Scott Tomkiyo

INSYNERGY ENGINEERING LLC
MECHANICAL ■ ELECTRICAL ■ FIRE PROTECTION
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LEAHI HOSPITAL AC REPLACEMENT

ENLARGED ADMIN 1ST FLOOR ELECTRICAL PLAN

Designed	TS
Drawn	TS
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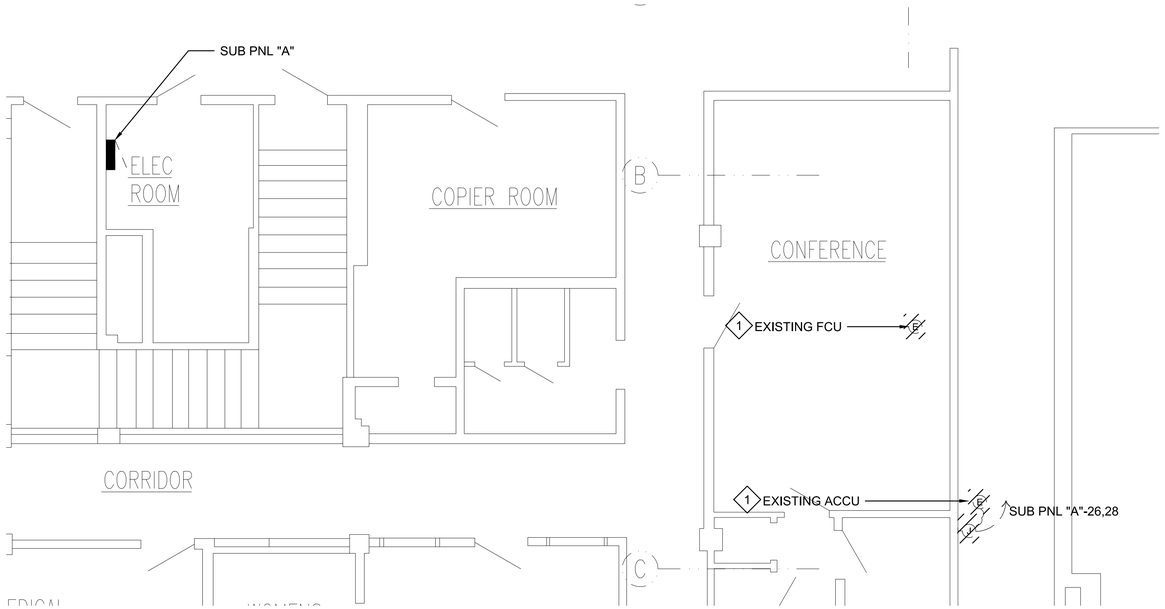
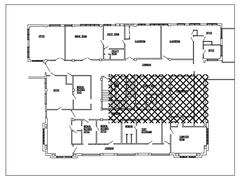


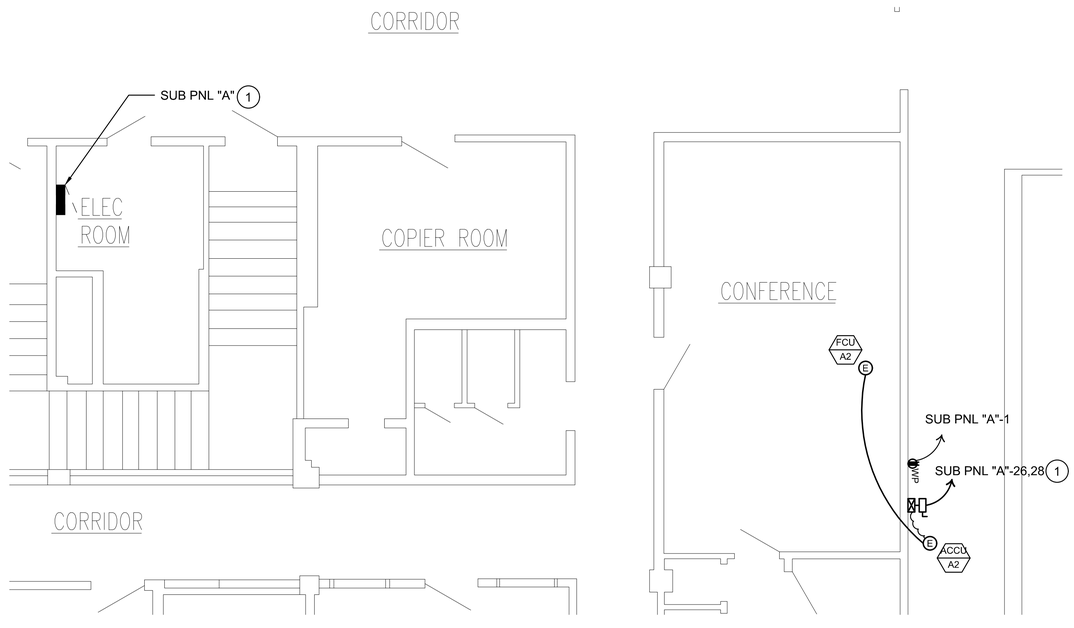
DEMOLITION NOTES:

1. DISCONNECT AND REMOVE ELECTRICAL CONNECTION TO EXISTING ACCU. EXISTING CONDUIT BACK TO PANEL TO REMAIN.



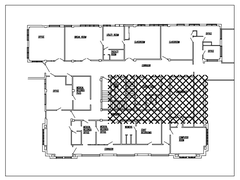
KEYPLAN
SCALE: N.T.S.

ADDITIVE ALTERNATE 2
1 ENLARGED ADMIN 2ND FLOOR DEMO PLAN
SCALE 1/4" = 1' 0"



NEW WORK NOTES:

1. PROVIDE NEW 2P25A BREAKER AND 3 #10, 1 #10G CONDUCTORS IN EXISTING RACEWAY FOR ACCU-A2
2. PROVIDE MAINTENANCE RECEPTACLE FOR NEW ACCU AND 3/4"C, 2 #12, 1 #12G TO SUB PNL "A". CONFIRM SPARE IN SUB PNL "A" SPACE 1.



KEYPLAN
SCALE: N.T.S.

ADDITIVE ALTERNATE 2
2 ENLARGED ADMIN 2ND FLOOR NEW PLAN
SCALE 1/4" = 1' 0"

0 2' 4' 6' 8' 10' 12'
SCALE: 1/4" = 1'-0"

PLAN NORTH
TRUE NORTH

REVISIONS	BY

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TOMOKIYO Scott LICENSED PROFESSIONAL ENGINEER No. 15968-E HAWAII, U.S.A.

INSYNERGY ENGINEERING LLC
MECHANICAL ▪ ELECTRICAL ▪ FIRE PROTECTION
828 Fort Street Mall Suite 500, Honolulu, Hawaii 96813
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LEAHI HOSPITAL AC REPLACEMENT

ENLARGED ADMIN 2ND FLOOR ELECTRICAL PLAN

Designed	TS
Drawn	TS
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Date	02/28/2020
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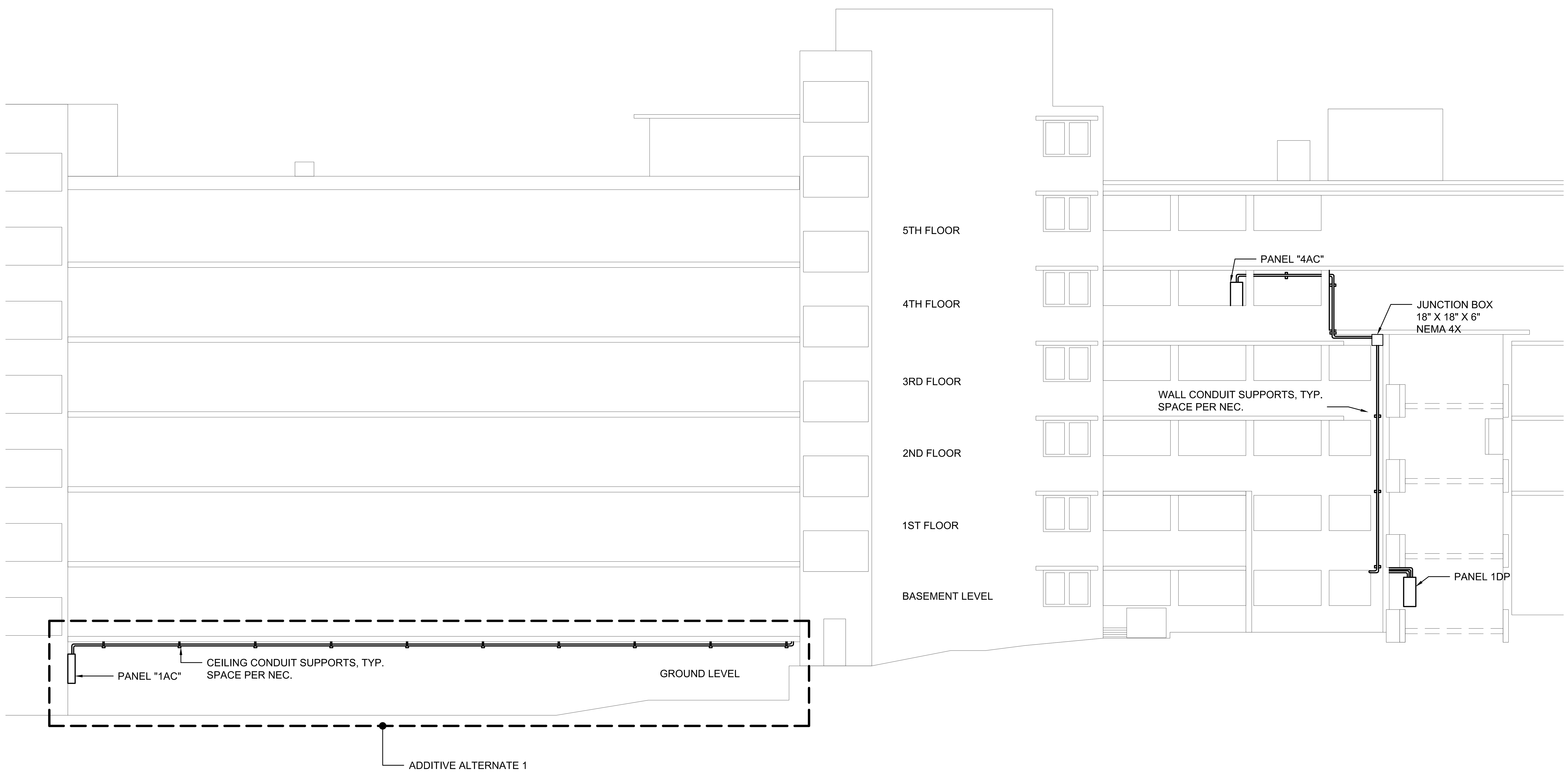
SHEET NOTES:

1. PROVIDE JUNCTION BOXES AS REQUIRED.



BASIC BID

1 YOUNG BUILDING ELEVATION PLAN

SCALE 1/8" = 1' 0"

0 2' 4' 8' 12' 16' 20' 24'

SCALE: 1/8" = 1'-0"

PLAN NORTH

TRUE NORTH

REVISIONS	BY

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SCOTT TOMOKIYO LICENSED PROFESSIONAL ENGINEER No. 15968-E HAWAII, U.S.A.

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LEAHI HOSPITAL AC REPLACEMENT

DETAILS AND ELEVATION

Designed	TS
Drawn	TS
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Job No.	20008
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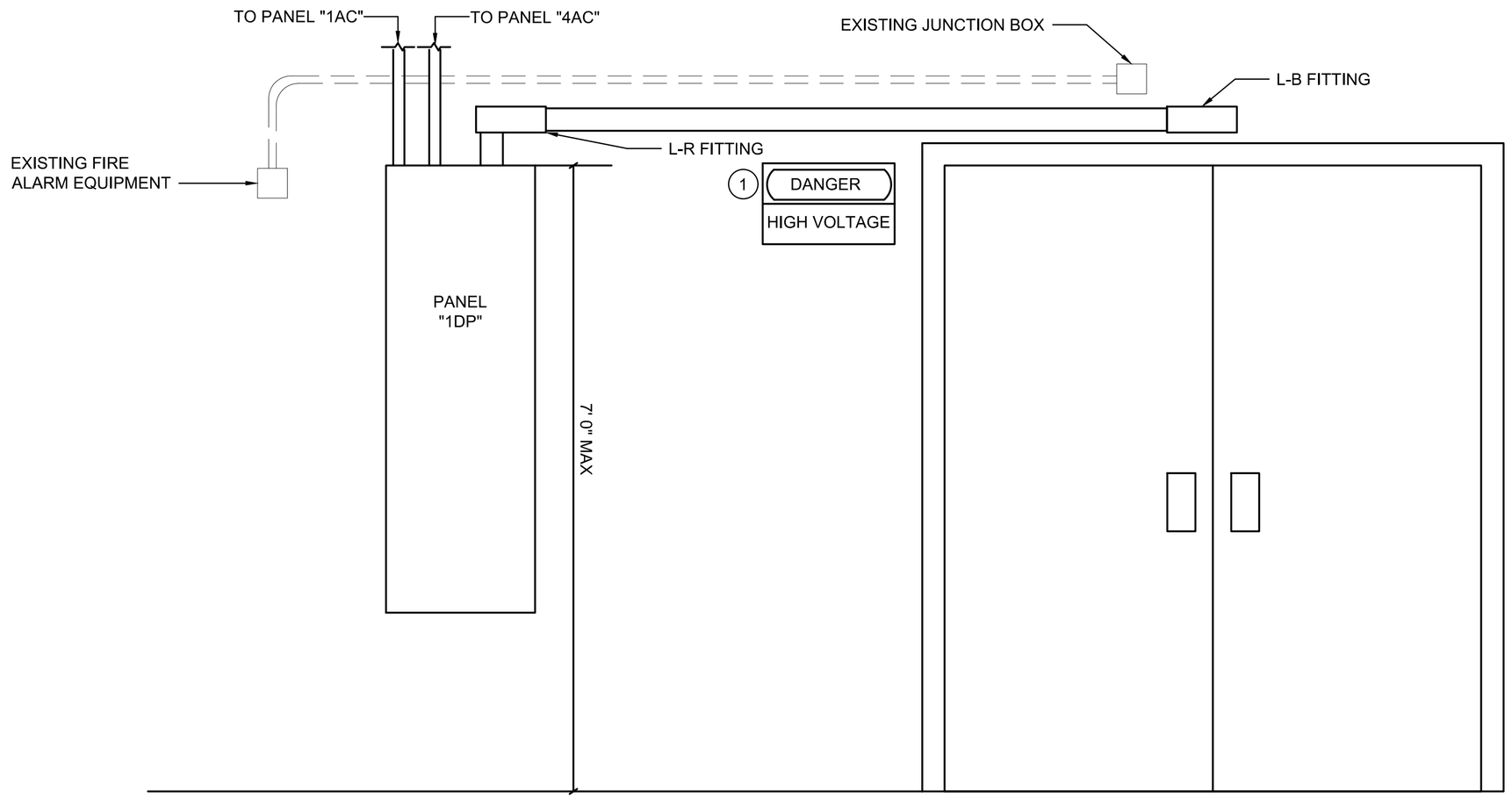

1 ELECTRICAL ROOM DOOR ELEVATION
NOT TO SCALE

DETAIL NOTES:

1 MOVE EXISTING DANGER SIGN TO SIDE OF DOOR TO ACCOMMODATE NEW CIRCUIT FEEDER.

REVISIONS	BY

This work was prepared by me or under my supervision and was conducted for this project and will be under my observation.

Scott Tomkiyo

SCOTT TOMKIYO * LICENSED PROFESSIONAL ENGINEER * No. 15968-E * HAWAII, U.S.A.

INSYNERGY ENGINEERING INC
MECHANICAL ▪ ELECTRICAL ▪ FIRE PROTECTION
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LEAHI HOSPITAL AC REPLACEMENT

DETAILS

Designed	TS
Drawn	TS
Checked	ST
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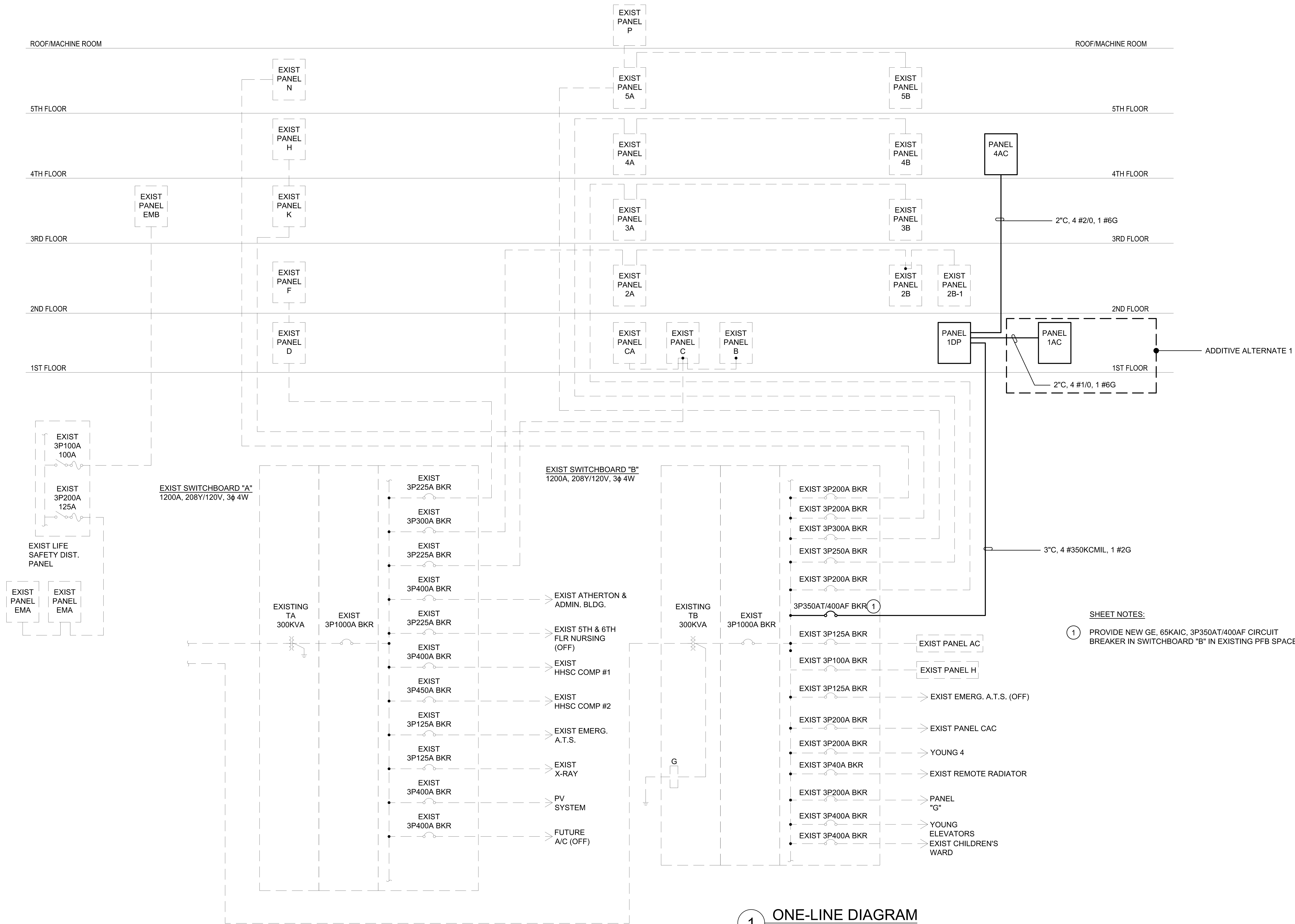

SHEET NOTES:

1. PROVIDE NEW GE, 65KAIC, 3P350AT/400AF CIRCUIT BREAKER IN SWITCHBOARD "B" IN EXISTING PFB SPACE.

1 ONE-LINE DIAGRAM
NOT TO SCALE

REVISIONS	BY

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LEAHI HOSPITAL AC REPLACEMENT

YOUNG BUILDING ONE LINE DIAGRAM

Designed	TS
Drawn	TS
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FAN COIL UNIT (FCU)

UNIT NO.	ELECTRICAL DATA					COMMENTS	REMARKS
	V	PH	RLA	MCA	MOCP		
FCU-A1	208	1	0.8	1		POWERED FROM ACCU-A1	3
FCU-A2	208	1	0.8	1		POWERED FROM ACCU-A2	3
FCU Y1-1	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	2
FCU Y1-2	208	1	0.736	0.92	15	PROVIDE WITH 2 POLE MOTOR SWITCH	2
FCU Y1-3	208	1	0.736	0.92	15	PROVIDE WITH 2 POLE MOTOR SWITCH	2
FCU Y1-4	208	1	0.736	0.92	15	PROVIDE WITH 2 POLE MOTOR SWITCH	2
FCU Y1-5	208	1	0.456	0.57	15	PROVIDE WITH 2 POLE MOTOR SWITCH	2
FCU Y1-6	208	1	0.456	0.57	15	PROVIDE WITH 2 POLE MOTOR SWITCH	2
FCU Y1-7	208	1	0.344	0.43	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-8	208	1	0.344	0.43	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-9	208	1	0.344	0.43	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-10	208	1	0.344	0.43	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-11	208	1	0.192	0.24	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-12	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-13	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-14	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-15	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-16	208	1	0.344	0.43	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y1-17	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
FCU Y2-1	208	1	0.976	1.22	15	POWERED FROM ACCU-Y2-1	1
FCU Y2-2	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y2-3	208	1	0.84	1.05	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y2-4	208	1	0.432	0.54	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y2-5	208	1	0.432	0.54	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y3-1	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y3-2	208	1	1.248	1.56	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y3-3	208	1	0.432	0.54	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y3-4	208	1	0.432	0.54	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y4-1	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y4-2	208	1	1.248	1.56	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y4-3	208	1	0.432	0.54	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y4-4	208	1	0.432	0.54	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y5-1	208	1	0.312	0.39	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y5-2	208	1	1.248	1.56	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y5-3	208	1	0.432	0.54	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
FCU Y5-4	208	1	0.432	0.54	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1

NOTES:
1. BASE BID
2. ADDITIVE ALTERNATE 1
3. ADDITIVE ALTERNATE 2

DEDICATED OUTDOOR AIR (DOAS)

UNIT NO.	ELECTRICAL DATA					COMMENTS	REMARKS
	V	PH	RLA	MCA	MOCP		
DOAS Y1-1	208	1	3.84	4.8	15	PROVIDE WITH 2 POLE MOTOR SWITCH	2
DOAS Y1-2	208	1	3.84	4.8	15	PROVIDE WITH 2 POLE MOTOR SWITCH	3
DOAS Y2-1	208	1	2.64	3.3	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
DOAS Y3-1	208	1	2.64	3.3	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
DOAS Y4-1	208	1	2.64	3.3	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1
DOAS Y5-1	208	1	2.64	3.3	15	PROVIDE WITH 2 POLE MOTOR SWITCH	1

NOTES:
1. BASE BID
2. ADDITIVE ALTERNATE 1
3. ADDITIVE ALTERNATE 2

AIR COOLED CONDENSING UNIT (ACCU)

UNIT NO.	MOTOR DATA					COMMENTS	REMARKS
	V	PH	RLA	MCA	MOCP		
ACCU-A1	208	1	15.2	19	26	PROVIDE WITH 2P30A DISCONNECT SWITCH	3
ACCU-A2	208	1	15.2	19	26	PROVIDE WITH 2P30A DISCONNECT SWITCH	3
ACCU Y1-1	208	3	47.2	59	90	PROVIDE WITH 3P100A DISCONNECT SWITCH	2
ACCU Y1-2	208	3	23.2	29	44	PROVIDE WITH 3P60A DISCONNECT SWITCH	2
ACCU Y1-3	208	3	39.2	49	80	PROVIDE WITH 3P100A DISCONNECT SWITCH	3
ACCU Y1-4	208	3	26.4	33	50	PROVIDE WITH 3P60A DISCONNECT SWITCH	3
ACCU Y2-1	208	1	23.2	29	44	PROVIDE WITH 2P60A DISCONNECT SWITCH	1
ACCU Y2-2	208	3	24.8	31	45	PROVIDE WITH 3P60A DISCONNECT SWITCH	1
ACCU Y3-1	208	3	24.8	31	45	PROVIDE WITH 3P60A DISCONNECT SWITCH	1
ACCU Y4-1	208	3	24.8	31	45	PROVIDE WITH 3P60A DISCONNECT SWITCH	1
ACCU Y5-1	208	3	24.8	31	45	PROVIDE WITH 3P60A DISCONNECT SWITCH	1

NOTES:
1. BASE BID
2. ADDITIVE ALTERNATE 1
3. ADDITIVE ALTERNATE 2

REVISIONS	BY

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LEAHI HOSPITAL AC REPLACEMENT

ELECTRICAL MECHANICAL EQUIPMENT SCHEDULES

Designed	TS
Drawn	TS
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Date	02/28/2020
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